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VOLUME 1

FINAL
ENVIRONMENTAL IMPACT STATEMENT
ENVIRONMENTAL IMPACT REPORT

FOR THE
CALIFORNIA-OREGON TRANSMISSION PROJECT

AND THE
LOS BANOS-GATES TRANSMISSION PROJECT

DOE/EIS-0128
SCH#85040914

JANUARY 1988

№ 0152

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CALIFORNIA-OREGON TRANSMISSION PROJECT
AND
LOS BANOS-GATES TRANSMISSION PROJECT

Environmental Impact Statement/Environmental Impact Report

Draft ( ) Supplemental Draft ( ) Final (X) DOE/EIS - 0128
SCH # 85040914

Lead Agencies

Transmission Agency of Northern California
U. S. Department of Energy, Western Area Power Administration

Cooperating Federal Agencies

U. S. Department of Agriculture, Forest Service
U. S. Department of Energy, Bonneville Power Administration
U. S. Department of the Interior, Bureau of Land Management
U. S. Department of the Army, Corps of Engineers

Responsible State Agency

California Public Utilities Commission

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This Final EIS/EIR should be used in conjunction with the Draft EIS/EIR and the Supplement to the Draft EIS/EIR. The Draft EIS/EIR for the California-Oregon Transmission Project (COTP) and the Los Banos-Gates Transmission Project was issued in November 1986. The Supplement to the Draft EIS/EIR was issued in June 1987. This Final EIS/EIR contains changes to and responses to the public and agency comments on the Draft EIS/EIR and the Supplement to the Draft EIS/EIR.

ABSTRACT

The ABSTRACT from the Draft EIS/EIR is reproduced here in its entirety. Deletions are noted by slashes while additions are noted by underscoring.

Electrical transmission projects (Figure 1) are proposed by public and privately owned utilities to expand and reinforce the Pacific Northwest-Pacific Southwest Intertie. The projects have multiple purposes and would essentially: 1) provide a third 500 kV AC transmission path between southern Oregon and central California (California-Oregon Transmission Project); 2) complete a third 500 kV AC transmission path in the San Joaquin Valley of California (Los Banos-Gates Transmission Project); and 3) reinforce existing 500 kV AC transmission system facilities in Oregon and southern Washington (Pacific Northwest Reinforcement Project).

This Final EIS/EIR incorporates public comments received on the Draft EIS/EIR and the Supplement to the Draft EIS/EIR. The Supplement to the Draft EIS/EIR presented new routing options for the California-Oregon Transmission Project that were the result of public comments received on the Draft EIS/EIR. Some of the new routing options have been incorporated into the COTP preferred alternative. The Final EIS/EIR should be reviewed in conjunction with both the Draft EIS/EIR and the Supplement to the Draft EIS/EIR.

California-Oregon Transmission Project (COTP)

The Transmission Agency of Northern California (TANC), Western Area Power Administration (Western), privately owned utilities (Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas and Electric), the California Department of Water Resources, six southern California cities, and six additional public entities (50 MW Allottees) propose to build an approximately 340-mile long 500 kilovolt (kV) AC transmission line from southern Oregon to the Tesla Substation in central California. The COTP would include: a new substation near ~~either~~ Malin, ~~Pinehurst, or Keno,~~ Oregon; approximately 14~~0~~6 miles of new 500 kV transmission line from southern Oregon to a new substation (Olinda) near Redding, California (Figure 2); approximately 170 miles of reconstructed 230 kV to 500 kV transmission line owned by the Western Area Power Administration from the ~~new Redding area~~ proposed Olinda Substation ~~(Olinda)~~ near Redding to the Sacramento River; approximately 20 miles of new 500 kV transmission line from the Sacramento River to the existing Tracy Substation (Figure 3); a new series compensation station (Maxwell) near Maxwell, California; expansion of the Tracy Substation; and approximately six miles of new 500 kV transmission line between the Tracy Substation and an area near the existing Tesla Substation. Alternative locations for the transmission line and supporting facilities ~~are~~ were analyzed. Impacts ~~are~~ were identified and mitigation measures ~~are~~ were considered. A preferred alternative is identified in this Final EIS/EIR. If approved, construction would begin in 1988 and would be completed in 1991.

Los Banos-Gates Transmission Project

The Pacific Gas and Electric Company (PGandE) proposes to build an approximately 84-mile long 500 kV transmission line in the foothills of western San Joaquin Valley between the existing Los Banos and Gates Substations. The Los Banos-Gates Transmission Project (Figure 4) includes: approximately 84 miles of new 500 kV transmission line; realignment of the existing Los Banos-Midway No. 2 500 kV transmission line into Gates Substation; modification of the Los Banos and Gates Substations to accommodate new equipment and line connections; installation of shunt capacitors at various existing substations; possible installation of series capacitors at Gates and/ or Midway Substations; and reconductoring portions of the Gates-Arco-Midway 230 kV transmission line. Alternative routes for the transmission line ~~are~~ were analyzed. Impacts ~~are~~ were identified and mitigation measures ~~are~~ were considered. A preferred alternative is identified in this Final EIS/EIR. If approved, construction ~~would~~ may begin in 1988 and ~~would~~ could be completed in 1991.

The determination of the need for or timing of the future need for the Los Banos-Gates Project is uncertain. If the Los Banos-Gates Transmission Project is not constructed or is deferred, it may be necessary to make minor modifications to the transmission system south of Tesla Substation to accommodate the increased power transfer demands that will be placed on this system by the COTP.

Pacific Northwest (PNW) Reinforcement Project

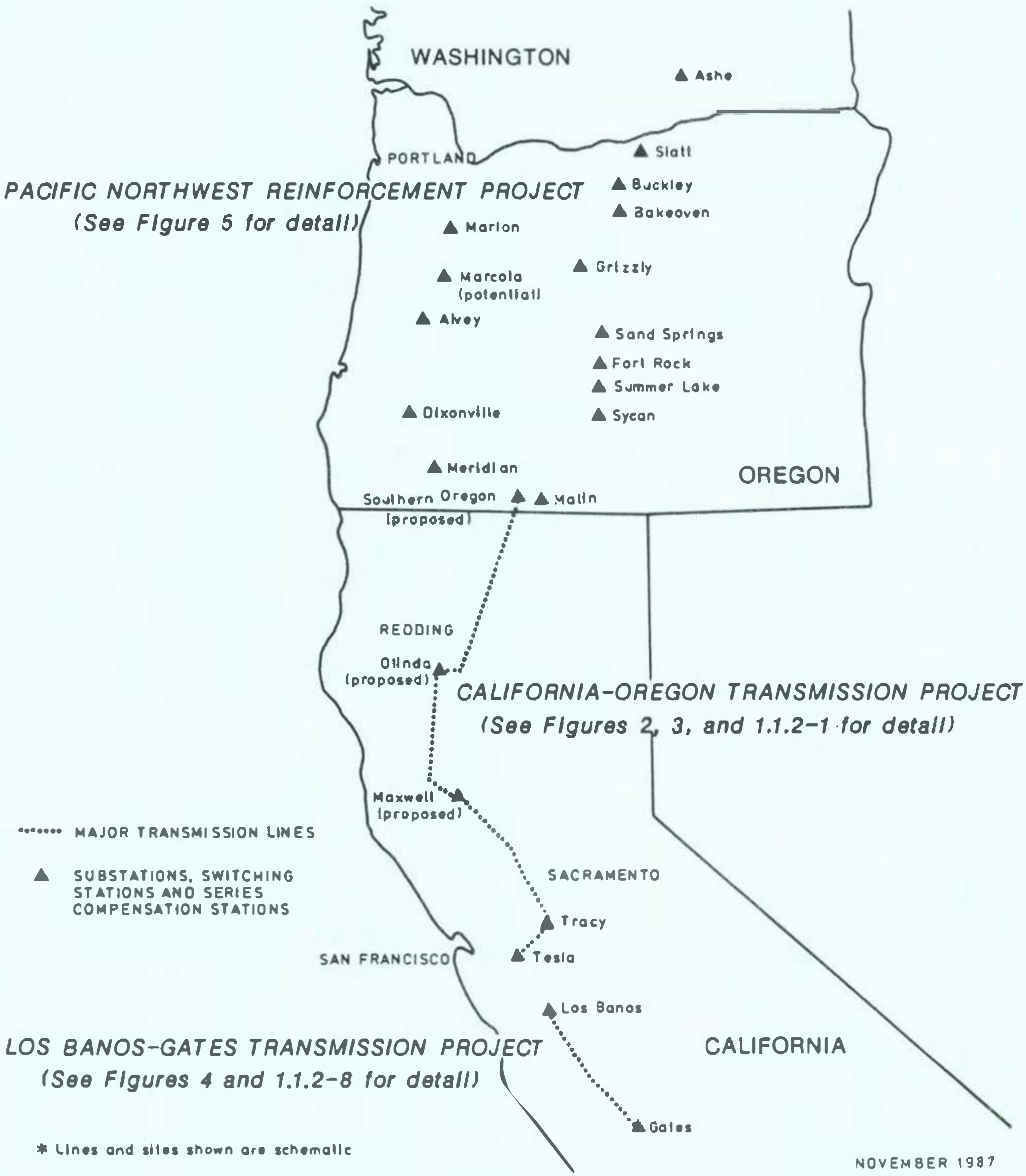
The Bonneville Power Administration, Pacific Power & Light Company (PP&L), and Portland General Electric Company propose to build new and modify existing transmission lines and supporting facilities in southern Washington and Oregon (Figure 5). Approximately eight miles of new 500 kV transmission line are proposed. Modifications may be made to 13 or more existing substations. One new substation (Marcola) may be constructed between the existing Marion Substation and Alvey Substation. Impacts ~~are~~ were assessed and mitigation measures ~~are~~ were considered. If approved, construction would begin in ~~1988~~ 1989 and would be completed in 1991.

In addition, BPA has an option to acquire a 50 percent interest in the incremental capacity of PP&L's Eugene-Medford 500 kV transmission line. The Eugene-Medford project has already been sited, permitted, scheduled for construction, and is justified to serve PP&L loads in southern Oregon and northern California. If

BPA exercises its option, the Eugene-Medford project would also be used to support the Intertie system as part of the Pacific Northwest Reinforcement Project. The environmental effects of the Eugene-Medford line are presented in the BLM Final EIS entitled "Proposed Eugene-Medford 500 kV Transmission Line, May 1983 (FES) 83-23)". Construction may begin in 1989 and could be completed in 1991.

FIGURE 1

Proposed Actions*
In the California-Oregon Transmission Project
and the Los Banos-Gates Transmission Project
Draft EIS/EIR



* Lines and sites shown are schematic

NOVEMBER 1987

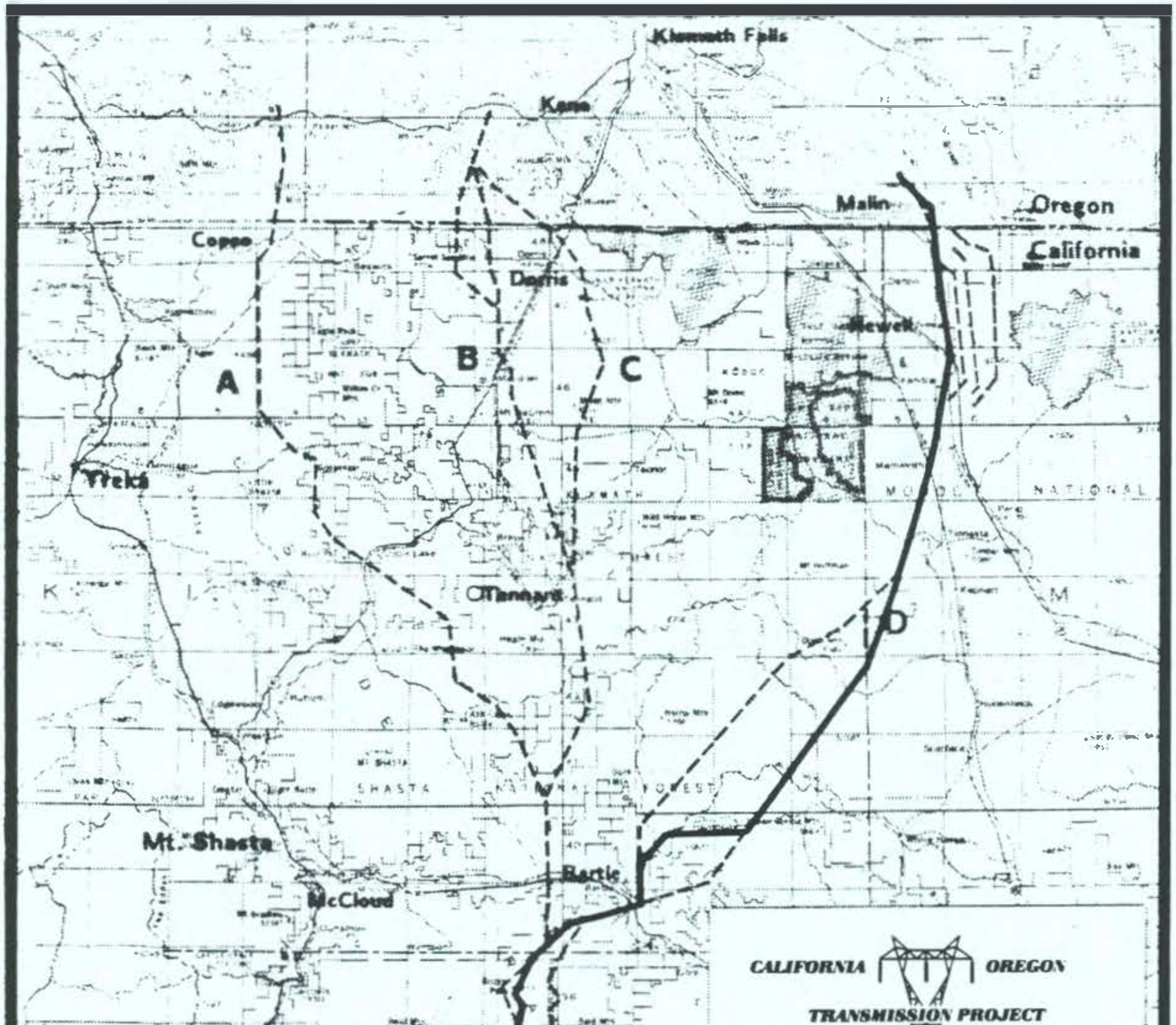


FIGURE 2

NORTHERN SECTION ALTERNATIVES AND OPTIONS

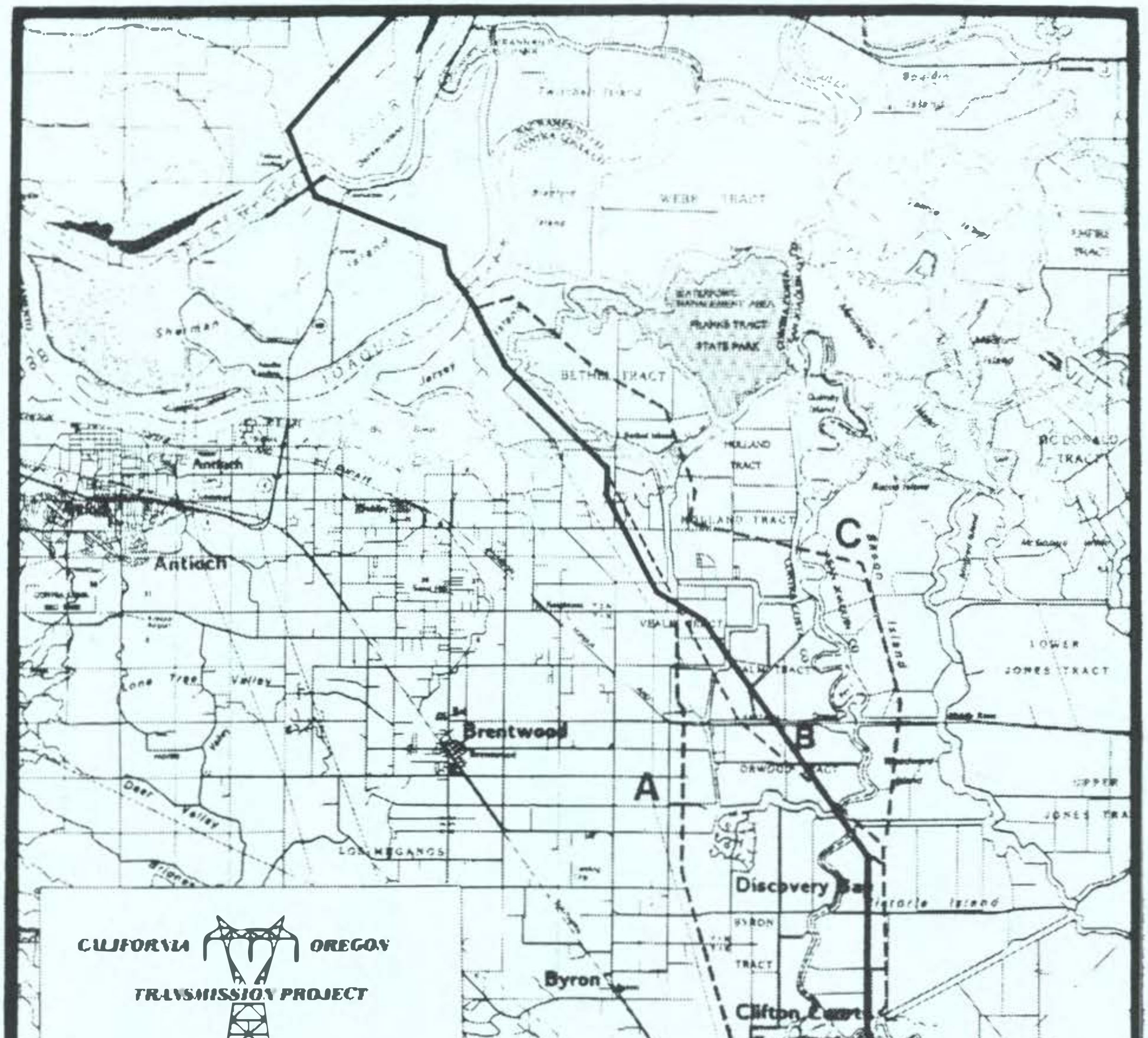


FIGURE 3

SOUTHERN SECTION ALTERNATIVES AND OPTIONS

FIGURE 4

LOS BANOS-GATES TRANSMISSION PROJECT
Alternative Routes

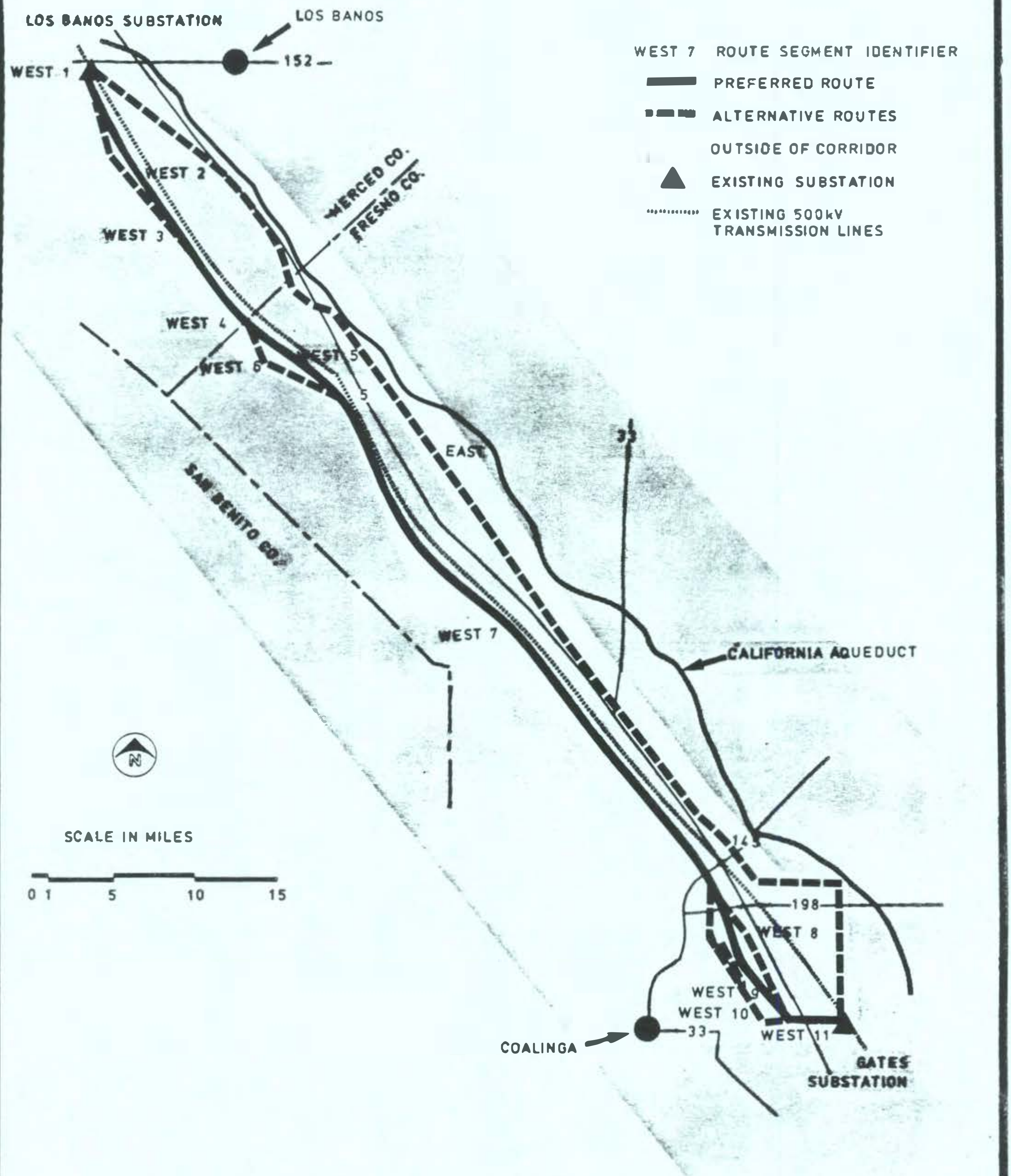
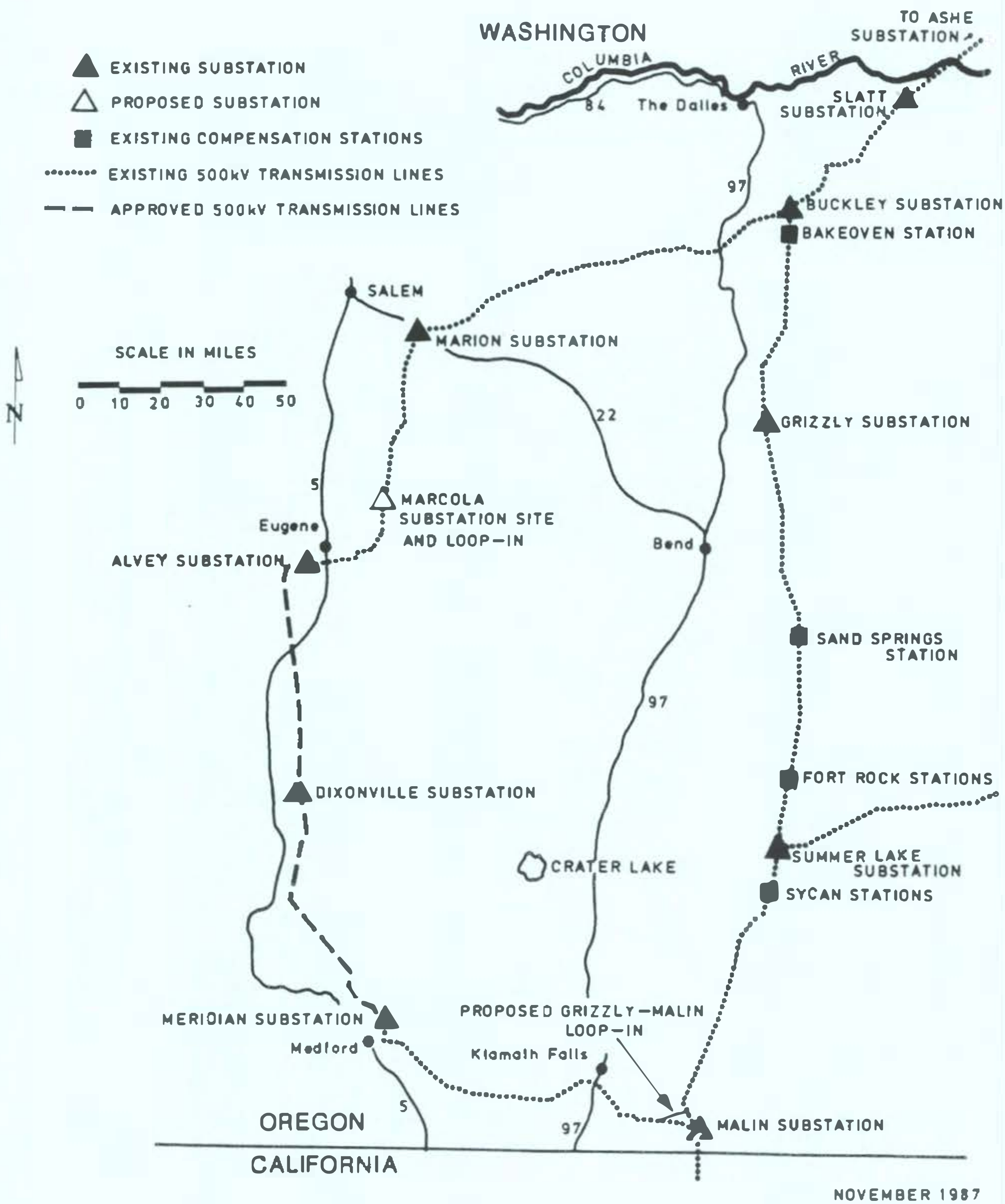


FIGURE 5

Pacific Northwest Reinforcement Project



FOREWORD

READER'S GUIDE

This Final EIS/EIR is composed of:

Volume 1

- A summary of the proposed actions and their effects on the natural and human environments as documented in the Draft EIS/EIR, the Supplement to the Draft EIS/EIR, and this Final EIS/EIR. (See pages 1 through 51.)
- Updates and clarifications to analyses and conclusions presented in the Draft EIS/EIR and Supplement to the Draft EIS/EIR including a revised preferred route for the COTP. (See Section 1.1.2.)
- Specific changes and corrections to data in the Draft EIS/EIR and the Supplement to the Draft EIS/EIR.

Volumes 2A and 2B

- Letter comments on the Draft EIS/EIR and the Supplement to the Draft EIS/EIR, and responses to those comments.

Volume 3

- Testimony comments on the Draft EIS/EIR and the Supplement to the Draft EIS/EIR, and responses to those comments.

The Draft EIS/EIR, the Supplement to the Draft EIS/EIR, and this document should be jointly reviewed as they together comprise the complete Final EIS/EIR. The Foreword and Summary are updates of the same sections in the Draft EIS/EIR. The Summary in this Final EIS/EIR also includes an overview of the responses to major issues/concerns raised on the Draft EIS/EIR and the Supplement to the Draft EIS/EIR. Section 10.0 of Volume 1 of the Draft EIS/EIR and Section 1.1.10 of this document present a glossary and abbreviations to aid the reader in reviewing the text.

Changes to the Draft EIS/EIR and the Supplement to the Draft EIS/EIR

Volume 1 of this document contains changes to the Draft EIS/EIR and the Supplement to the Draft EIS/EIR in the order of appearance in the original documents. (See Table of Contents following blue pages.)

Changes are presented as errata, addenda, or complete revisions where there are substantial changes. The format used to describe changes for each section of the Draft EIS/EIR and the Supplement to the Draft EIS/EIR is described below.

Revised Sections - The following are revised and presented in this Final EIS/EIR in their entirety:

- The summary of both the Draft EIS/EIR and the Supplement to the Draft EIS/EIR. (See Summary on page 1 of this document.)

- Section 2.0, Alternatives Including the Proposed Actions-COTP, of Volume 1 of the Draft EIS/EIR. (See Section 1.1.2 of this document.)

- Section 4.0, Environmental Consequences, of Volume 1 of the Draft EIS/EIR. (See Section 1.1.4 of this document.)

- Section 5.0, Mitigation Measures, of Volume 1 of the Draft EIS/EIR. (See Section 1.1.5 of this document.)

- Section 7.0, Summary of Public and Agency Consultation, of Volume 1 of the Draft EIS/EIR. (See Section 1.1.7 of this document.)

- Impact comparison tables for COTP routing options presented in the Supplement to the Draft EIS/EIR. (See Section 2.0 of this document.)

Errata - Words, numbers, or sentences are included for clarification or as corrections.

Addenda - New information has been added to certain sections of the Draft EIS/EIR and Supplement to the Draft EIS/EIR. These include:

- Section 2.0, Alternatives Including the Proposed Actions of Volume 1 of the Draft EIS/EIR. (See Section 1.1.2 of this document.)

- Section 4.0, Environmental Consequences, of Volume 1 of the Draft EIS/EIR. (See Section 1.1.4 of this document.)

- Section 12.0, Index, of Volume 1 of the Draft EIS/EIR. (See Section 1.1.12 of this document.)

- Phase II Routing Investigations Report of Volume 2A of the Draft EIS/EIR. (See Section 1.2.2 of this document.)

- Report entitled, "South of Tesla Reinforcements for Deferral of the Los Banos-Gates Transmission Project." (See Section 1.3 of this document.)

- Appendix A, COTP Design, Construction, Operation and Maintenance Characteristics; Appendix C, Substation and Related Facilities Siting Report; Appendix D, Summary of Intertie Development and Use EIS; and Appendix E, Wetlands and Floodplains Crossed by the Preferred Alternative of Volume 3A of the Draft EIS/EIR. (See Section 1.5 of this document.)

RESPONSES TO PUBLIC AND AGENCY COMMENTS

The large number of comments received on the documents required that the correspondence and testimony be presented in separate volumes. Volumes 2A and 2B present correspondence and responses to correspondence. Volume 3 presents testimony and responses to testimony.

Section 3.0 of Volume 1 of this document is a guide and index to the comments and responses. The index of commentors is presented in alphabetical order. An index of comments by topic is also presented in Section 3.0 to aid the reader in locating comments that address similar subjects.

Volumes 2A and 2B contain the correspondence and responses on the Draft EIS/EIR and the Supplement to the Draft EIS/EIR. Section 1.0 of Volume 2A provides an index for Volumes 2A and 2B, also organized alphabetically by the commentor's last name.

Volume 3 contains testimony and responses to testimony on both the Draft EIS/EIR and the Supplement to the Draft EIS/EIR. This volume also contains an index to commentors. Written comments submitted at the hearings are included with the testimony in Volume 3.

DISTRIBUTION OF THIS FINAL EIS/EIR

Copies of the Final EIS/EIR have been sent to agencies, organizations, and individuals who have received copies of the Draft EIS/EIR or the Supplement to the Draft EIS/EIR and to those who have since requested copies of these documents.

PROJECT RELATIONSHIPS AND DECISIONS

Relationship Between the Proposed Actions

There are three proposed actions addressed in the Draft EIS/EIR, the Supplement to the Draft EIS/EIR, and this Final EIS/EIR: the California-Oregon Transmission Project, the Los Banos-Gates Transmission Project, and the Pacific Northwest (PNW) Reinforcement Project. The three proposed actions are addressed together in these documents due to the interrelationships between the proposals. Western, lead federal agency under NEPA, and TANC, lead agency under ~~the~~ CEQA, will consider and make their determinations on the projects in accordance with applicable laws and regulations.

The COTP is a proposal by nearly all of California's public and privately owned electric utilities to construct new and modify existing transmission lines and supporting facilities ~~from~~ between the existing 500 kV Malin-Meridian transmission line in southern Oregon ~~to~~ and the existing 500 kV lines near the Tesla Substation in central California (Figure 6). An existing double circuit 230 kV AC line would be upgraded to 500 kV AC for approximately ~~two-thirds~~ one-half of the length of the COTP.

A unique feature of the COTP is the participation of most electric utilities in California, collectively representing over 98 percent of the State's electric customers. COTP Participants (referred to individually as "Participant" and collectively as "Participants") include:

- TANC, composed of the Cities of Alameda, Biggs, Gridley, Healdsburg, Lodi, Lompoc, Palo Alto, Redding, Roseville, Santa Clara, and Ukiah, the Plumas-Sierra Rural Electric Cooperative, the Sacramento Municipal Utility District, the Modesto Irrigation District, and the Turlock Irrigation District;
- the Cities of Anaheim, Azusa, Banning, Colton, Riverside, and Vernon (collectively referred to as "Southern California Cities");
- the Carmichael Water District, El Dorado Hills Community Service District, San Juan Suburban Water District, Shasta Dam Area Public Utilities District, Southern San Joaquin Valley Power Authority, and Trinity County Utility District (collectively referred to as "50 Megawatt (MW) Allottees");
- Pacific Gas and Electric Company (PGandE), San Diego Gas and Electric Company (SDG&E), and Southern California Edison Company (SCE) (collectively referred to as "Investor-Owned Utilities");
- the California Department of Water Resources (CDWR); and
- Western

The Los Banos-Gates Transmission Project is a proposal by the Pacific Gas and Electric Company to construct new and modify existing transmission lines and supporting facilities from the existing Los Banos Substation to the existing Gates Substation in central California. The environmental process for the Los Banos-Gates Transmission Project and the California-Oregon Transmission Project began independently and the projects are being proposed by different entities. In January 1986, the lead, cooperating, and responsible agencies and the project proponents determined that, because of the interrelationships between the projects, the projects should be considered under one joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) to fulfill both federal and state requirements.

The PNW Reinforcement Project is a proposal by the Bonneville Power Administration (BPA), Pacific Power & Light Company (PP&L), and Portland General Electric Company (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.

The COTP was initially proposed in response to Title III of Public Law 98-360 which authorizes the Secretary of Energy, through Western, to "construct or participate in the construction of such additional facilities as he deems necessary to allow mutually beneficial power sales between the Pacific Northwest and California". The proposal was developed by a group of California public and private utilities and Western through a Memorandum of Understanding (MOU) that provides the framework for development of the COTP.

One provision of the COTP MOU is that PGandE provide power transfers between the existing Tesla Substation and southern California for certain Participants. Earlier PGandE studies of both the existing and future transmission needs between the Tesla Substation and southern California indicated that a new 500 kV line and supporting facilities would be the most appropriate and economical means for PGandE to meet the contractual obligations of the COTP MOU. These facilities became known as the Los Banos-Gates Transmission Project. PGandE has since studied the Los Banos-Gates power flow requirements and believes it can meet its commitments under the MOU to provide firm bidirectional transmission without constructing Los Banos-Gates at this time. Arrangements between the Participants in the COTP to implement this are under discussion. Reinforcements South of Tesla are discussed in this Final EIS/EIR as potentially needed if the Los Banos-Gates line is deferred or not built.

Although the three projects have different sets of sponsors, all are necessary to exchange approximately 1,600 megawatts (MW) of additional power between the two regions and meet the intent of the COTP MOU. Because of this interrelationship, the three projects are considered together under this EIS/EIR to promote an assessment of the cumulative impacts and a coordinated decision-making process.

Federal Agency Decisions on Projects

Upgrading the AC Intertie between the Pacific Northwest (PNW) and California will require decisions by several federal agencies. ~~Several federal agencies are involved in the proposed projects.~~ Western, as part of the United States Department of Energy (DOE), is both a COTP Participant and the lead federal agency for the three projects under NEPA. ~~Western is making decisions on participation in the COTP.~~ Participants in the COTP, including the Western Area Power Administration, will decide whether or not to construct the COTP. The COTP includes the ~~upgrading, operation, and maintenance~~ reconstruction of ~~190~~ approximately 170 miles of one of Western's 230 kV transmission lines to 500 kV between the proposed ~~Redding area substation (~~Olinda~~)~~ Substation and the existing Tracy Substation. The Western Administrator will be considering the cumulative impacts of the COTP, Los Banos-Gates, PNW Reinforcements, Intertie Development and Use (IDU) EIS and the Eugene-Medford 500 kV Transmission Line EIS in arriving at Western's decision.

The BPA Administrator must decide whether ~~or not~~ to allow interconnection of the COTP to the existing Intertie system and to upgrade the existing system in the PNW to accommodate the additional capacity. The Administrator will be considering BPA's ~~Intertie Development and Use~~ IDU EIS, the COTP EIS, and the Eugene-Medford 500 kV Transmission Line EIS in arriving at such a decision. ~~Participants in the COTP, including the Western Area Power Administration, will decide whether or not to construct the COTP.~~ BPA has contractual rights and responsibilities with PP&L to construct and own the interconnection between the COTP and PNW system. However, the responsibilities for interconnection have not been finalized and will be negotiated between the COTP Participants and the PNW entities. For these reasons, BPA is a cooperating agency under NEPA and will consider the impacts addressed in the EIS/EIR in arriving at decisions concerning reinforcement and interconnection of the PNW ~~transmission~~ AC Intertie system. BPA has provided to Western the necessary environmental documentation concerning the PNW Reinforcement Project.

The USDA Forest Service (USFS) will be requested to provide a right-of-way for the COTP on National Forest lands. The USFS has responsibilities for considering the impacts of the proposed facilities on National Forest lands and policies, and is also a cooperating agency under NEPA.

The USDI Bureau of Land Management (BLM) may be requested to provide a right-of-way for facilities of the projects depending on siting decisions. The BLM has responsibilities for considering the impact of the proposed facilities on BLM lands and policies, and is also a cooperating agency under NEPA. BLM has jurisdiction over relatively small areas of land potentially affected by the projects.

The USDI Bureau of Reclamation (BOR) may be requested to issue a right-of-way permit for BOR land potentially affected by the COTP and Los Banos-Gates Project. Although the BOR is not a cooperating agency, the BOR will consider the impacts of the proposed facilities on BOR lands and policies and use this EIS/EIR to satisfy their requirements under NEPA.

The United States Department of the Army, Corps of Engineers (COE), may require a 404 permit for the COTP. The Corps of Engineers has responsibility for considering the impacts of the proposed facilities on navigable waters, and is a cooperating agency under NEPA.

Additional federal agency permits may be required for the projects. Sections 6.1, 6.2, and 6.3 of the Draft EIS/EIR address these potential additional requirements.

State and Local Agency Decisions on Projects

Several state and local agencies are involved in the proposed projects. TANC is both a COTP Participant and the lead agency under CEQA for the COTP and Los Banos-Gates Transmission Project. TANC is making decisions on participation in the COTP. TANC will be considering the cumulative effects of the PNW Reinforcement Project in making its decisions.

The Southern California Cities, composed of six southern California cities, and the 50 MW allottees, composed of six publicly owned utilities throughout northern and central California, are COTP Participants. These local agencies are making decisions on agreements for participation in the COTP. These agencies also have responsibilities under CEQA for considering the impacts of the COTP and Los Banos-Gates Transmission Project.

The CDWR is a COTP Participant and is making decisions on agreements for participation in the COTP. The CDWR has responsibilities under CEQA for considering the impacts of the COTP and Los Banos-Gates Project.

The California Public Utilities Commission (CPUC) has responsibilities as a responsible agency under CEQA to consider the impacts of the COTP and Los Banos-Gates Transmission Project before deciding whether to grant a Certificate of Public Convenience and Necessity for the Investor-Owned Utilities' participation in the projects. The CPUC has provided ~~to TANC and Western~~ environmental documentation concerning PGandE's Los Banos-Gates Project for inclusion in the EIS/EIR.

Additional state and local agency permits may be required for the projects. Sections 6.1, 6.2, and 6.3 of the Draft EIS/EIR address these potential additional requirements. In addition, the lead agencies continue to coordinate with the Oregon Department of Energy; this is discussed in Section 1.1.7 of this Volume.

Relationship of This EIS/EIR to the Intertie Development and Use EIS

The Pacific Northwest-Pacific Southwest Intertie (Intertie) was authorized by Congress in 1964 after many years of discussion. The Intertie began operation in 1968. Congressional intent in authorizing the original Intertie was to: 1) increase BPA revenues for repaying its debt to the U. S. Treasury; 2) enable the efficient use of power resources between the Pacific Northwest and California; and, 3) provide an equitable distribution of benefits to both regions from power transactions. These concepts are more fully addressed in the Pacific Northwest Preference Act of 1964 (16 U.S.C. Section 837), and the Ninth Circuit Court of Appeals Decision in Department of Water and Power of the City of Los Angeles v. Bonneville Power Administration, 759 F.2d 684, (1985).

The Intertie consists of two alternating current (AC) transmission lines and one direct current (DC) line that together have the capability to transmit 5,200 MW of power between the two regions. With the construction of BPA's ~~proposed~~ DC Terminal Expansion Project, Intertie capacity would be increased to approximately 6,300 MW. The proposed projects would increase the transfer capacity of the Intertie by approximately 1,600 MW.

During abundant water years, more electricity can be produced in the PNW than can be sent to California because the Intertie is loaded to capacity. The amount of surplus firm power that can be sent is therefore constrained during the hours when the power is most valuable, thus reducing the potential for economical exchanges of power between the regions.

BPA markets wholesale electrical power to several customer groups within the PNW. Under provisions of the PNW Electric Power Planning and Conservation Act and the PNW Preference Act, BPA may sell surplus power outside the region if it is not needed in the region.

BPA is preparing an ~~Intertie Development and Use EIS (~~IDU EIS~~)~~ that examines the potential environmental impacts associated with proposed increases in Intertie capacity and use. Effects from changes in energy resource operations are analyzed in the context of alternative Intertie access policy options, and are evaluated in terms of impacts on air and water quality, fish, wildlife, vegetation, cultural resources, irrigation, recreational and non-renewable (fossil fuel) resources, and electric power costs. The analysis includes the PNW, California, the Inland Southwest, and British Columbia, and covers several scenarios including the COTP.

This EIS/EIR and the IDU EIS are related since both consider environmental consequences of the three projects. This EIS/EIR addresses the potential impacts from construction, operation, and maintenance of the proposed projects. The IDU EIS addresses the potential impacts from the possible changes in operations of energy resource facilities that may result from the proposed projects or other Intertie expansion proposals.

~~BPA and~~ COTP Participant decisions on construction, operation, and interconnection of the COTP, Los Banos-Gates Project, and PNW Reinforcement Project will be based on: 1) the environmental impacts discussed in this EIS/EIR, 2) the environmental effects of changes in resource operation in British Columbia, PNW, California, and Inland Southwest as described in the Draft IDU EIS (BPA, 1986) and BPA's Hydro Operations Information Paper (BPA, November, 1987) and herein incorporated by reference; and 3) the economic benefits available through transactions between the PNW and the Pacific Southwest. Appendix D of Volume 3A of the Draft EIS/EIR contain~~s~~ed a summary of the Draft IDU EIS prepared by the Bonneville Power Administration. The Final COTP EIS contains an updated summary of the results of analyses conducted for the Final IDU EIS in Section 1.5.4.

The Final IDU EIS ~~is~~ was scheduled to be completed prior to this EIS/EIR so that the information concerning the environmental impacts and related economic considerations of BPA's policies on Intertie access ~~are~~ would be available for decisions on the COTP, Los Banos-Gates Project, and PNW Reinforcement Project. The Draft IDU EIS was made available for public comment in late October 1986. ~~The Final IDU EIS is scheduled to be issued in May 1987. The Final EIS/EIR for the COTP, Los Banos-Gates Project, and PNW Reinforcement Project is scheduled to be issued in July 1987.~~ Because of extensive revisions and refinements to the models for the IDU EIS undertaken by BPA as a result of public comments on the Draft IDU EIS, the Final IDU EIS will not be available until April 1988. However, Western and TANC have coordinated closely with BPA to review and remain informed of the results of the analyses conducted in preparation for the Final IDU EIS. BPA's Hydro Operations Information Paper addressed the changes in analyses and presented the latest data regarding environmental impacts related to changes in the operation of the PNW hydro system. This updated summary in Section 1.5.4 incorporates information from the Hydro Operations paper, as well as results of additional analyses subsequently completed for the Final IDU EIS. In addition, Western will not issue a Record of Decision on the COTP EIS until the Final IDU EIS is issued.

SUMMARY

The Summary of the Draft EIS/EIR is reproduced below, with revisions, beginning with Purpose and Need. Deletions are cross hatched and additions are underlined. Table 1A is also reproduced from the Draft EIS/EIR. There is a new table (Table 1B) which compares the COTP preferred alternative shown in the Draft EIS/EIR and the COTP preferred alternative identified in the Final EIS/EIR. Table 1C compares alternatives for the Los Banos-Gates Project. Tables 2A and 2B replace Table 2 of the Draft EIS/EIR. Because of their length, all tables referenced in this Summary are located at the end of this section.

The Draft EIS/EIR for the COTP and the Los Banos-Gates Transmission Project (Los Banos-Gates) was issued in November 1986. The Supplement to the Draft EIS/EIR for route options for the COTP was issued in June 1987. The Draft EIS/EIR, the Supplement to the Draft EIS/EIR, and this Final EIS/EIR are to be reviewed together as all three documents comprise the Final EIS/EIR.

Comments received on these two documents from special interest groups, public agencies, and the general public resulted in the identification of an environmentally superior alternative and a project preferred alternative for the COTP that differ from those presented in the Draft EIS/EIR. Several routing options presented in the Supplement to the Draft EIS/EIR have been incorporated into the COTP preferred alternative. The new routing options that have been incorporated into the COTP preferred route are coincident with the environmentally superior route with the exception of one area in the Tulelake basin and one area near Bear Mountain. In the Tulelake basin, the lead agencies found the recommended environmentally superior route (N-10 Alt.4) to have prohibitively high costs compared to slight environmental benefits and is therefore not feasible from an economic perspective. In the Bear Mountain area, the lead agencies found that more extensive access road and construction efforts on North 2C made the comparison with North 2B so close that one is not clearly environmentally superior to the other. In these and other areas, environmental impacts along the preferred route can be reduced to acceptable levels through implementation of mitigation measures. Section 1.1.2 identifies the Project preferred route as revised since the Draft EIS/EIR.

PURPOSE AND NEED

The purpose of the proposed actions is to expand the bidirectional capability of the Pacific Northwest-Pacific Southwest Intertie transmission system and to help serve California's need for economical power, the Pacific Northwest's desire to sell surplus power, and the need for maintaining and increasing the reliability of the existing transmission system. The COTP will add approximately 1,600 megawatts (MW) of additional transfer capability between the Pacific Northwest and California pursuant to federal legislation and a Memorandum of Understanding among the Participants. The COTP, the Los Banos-Gates Transmission Project, and PNW Reinforcement Project would also add to and strengthen the existing high voltage transmission links between California and the Pacific Northwest. These projects would provide for greater access to Northwest power surpluses, facilitate more efficient use of regional power resources, provide greater resource diversity, and enhance transmission system reliability. Volume 1, Section 1.0 of the Draft EIS/EIR more fully describes the purpose and need for the projects. Section 1.1.1 of this document expands on certain topics addressed in the Draft EIS/EIR.

A comprehensive analysis was conducted on the economics of the COTP and Los Banos-Gates Project to determine the benefits and costs to California if the COTP is built. The analysis, which is summarized in Volume 1, Section 1.5 of the Draft EIS/EIR addresses a range of conditions for strong and weak Organization of Petroleum Exporting Countries (OPEC) price scenarios and seven Northwest capacity availability scenarios. Considering the expected values, the COTP is expected to be cost effective under strong OPEC prices, and cost effective under weak OPEC prices except when capacity benefits are very low.

The economic analysis discussed in the Draft EIS/EIR includes 7/16 of the cost of the 500 kV line between the Pacific Gas and Electric Company's (PGandE) Los Banos and Gates Substations as part of the facilities associated with development of the COTP. Since completion of the Draft EIS/EIR, PGandE has indicated that the need for or timing of the future need for the Los Banos-Gates Project is uncertain. In the event the Los Banos-Gates line is not required to achieve the benefits of the COTP, a portion of the cost of the Projects would be reduced, thereby further improving the anticipated net economic benefits of the COTP. If the Los Banos-Gates Project is not constructed or is deferred, it may be necessary to make minor modifications to the transmission system south of Tesla.

ALTERNATIVES ~~TO~~ INCLUDING THE PROPOSED ACTIONS

The bidirectional power transactions to be provided by the COTP, the Los Banos-Gates Project, and the PNW Reinforcement Project represent one of several approaches for meeting a portion of

California's and the Pacific Northwest's present and future power needs. Several alternatives (including no-action and non-transmission and transmission projects) were examined before the proposed actions were fully defined.

Non-transmission alternatives considered include increased power purchases from the Southwest, increased power purchases from out-of-state coal-fired power plants, increased dependence on other in-state generating technologies, and increased reliance on conservation and load management. Transmission alternatives evaluated include upgrading and modifying existing AC transmission lines, constructing new AC lines, and constructing new direct current (DC) lines. The no-action alternative is discussed in Volume 1, Section 2.4 and the other non-transmission and transmission alternatives are discussed in Volume 1, Section 2.5 of the Draft EIS/EIR.

The no-action alternative would result in maintaining the current level of Intertie capacity between the Pacific Northwest and California, and may lead to a number of individual actions by the many different proponents to obtain other resources. None of the alternatives that the individual utilities are anticipated to rely upon would have the economic and environmental advantages of regional exchanges with the Pacific Northwest. None of the power supply alternatives to the proposed actions addressed in Volume 1, Section 2.5 of the Draft EIS/EIR are believed to be both economically ~~or~~ and environmentally superior. No-action is expected to increase reliance on fossil fuels, subjecting California ratepayers to ~~significant~~ uncertainties regarding future supplies and prices of these fuels.

Transmission line routing evaluations were part of a continuous process involving the public, agencies, and proponent representatives. These evaluations are discussed in the Draft EIS/EIR under Volume 2A, Phase II for the COTP and Volume 3B, Appendix A for the Los Banos-Gates Project. Additional evaluations for the COTP since the Draft EIS/EIR are described in the Supplement to the Draft EIS/EIR and in Section 1.2 of Volume 1 of this Final EIS/EIR. A review of the options for the Pacific Northwest Reinforcement Project is presented in Volume 2C of the Draft EIS/EIR.

The routing evaluations for COTP are summarized in Tables 1A~~.~~ and 1B (presented at the end of this Summary). Table 1B compares the Project preferred alternative shown in the Draft EIS/EIR with the new Project preferred alternative which incorporates route options discussed in the Supplement to the Draft EIS/EIR. Figures 2.1-8 and 2.1-9 in the Draft EIS/EIR and Figures 1.1.2-7 and 1.1.2-8 in Volume 1 of this document show the locations of these alternative routes.

In the Northern Section, there are four alternative routes - A, B, C, and D, and one common route from Grizzly Peak to the ~~Redding area substation (~~Olinda~~)~~ Substation. Alternative D is shown as the Project preferred and environmentally superior route in the Draft EIS/EIR. A modified Alternative D remains the environmentally superior alternative in this Final EIS/EIR. Certain route options within Alternative D were analyzed in the Supplement to the Draft EIS/EIR and replace portions of the original Alternative D as the preferred route. These route options are coincident with the environmentally superior route with the exception of one area in the Tulelake basin and one area near Bear Mountain. In the Tulelake basin, the lead agencies found the recommended environmentally superior route (N-10 Alt.4) to have prohibitively high costs compared to slight environmental benefits and is therefore not feasible from an economic perspective. In the Bear Mountain area, the lead agencies found that more extensive access road and construction efforts on North 2C made the comparison with North 2B so close that one is not clearly environmentally superior to the other. In these and other areas, environmental impacts along the preferred route can be reduced to acceptable levels through implementation of mitigation measures. An explanation of these considerations is presented in Section 1.2.2 of Volume 1 of this document.

Alternative D~~,~~ in the northern section was chosen as the environmentally preferred alternative primarily because it minimize~~d~~s impacts to timberlands, ~~maximized the route segments on public lands,~~ and minimize~~d~~s impacts to earth, water, and vegetation resources and critical wildlife species and their habitats. Alternative D was selected as the Project preferred route, because this alternative satisfies transmission system reliability considerations, ~~by providing adequate separation from the existing Intertie and because it minimizes the potential for environmental impacts~~ provided that a fuels management plan and fire response plan is developed in conjunction with the USDA Forest Service and implemented by the COTP for the area between the existing Intertie and the preferred route as revised. The USDA Forest Service indicated in November 1987 that the area east of the North 3J corridor (east of Little Meadows) has a feasible route location that will minimize resource impacts while meeting geologic concerns. Should a superior location be found near North 3J during final design, the lead agencies will work with the Forest Service to identify, review, and approve that location. There are no alternative routes for the upgrade between the ~~Redding area substation~~ proposed ~~(~~Olinda~~)~~ Substation and the Sacramento River since the upgrade was judged to be environmentally superior to any new routing alternative.

In the southern section, between the Sacramento River and Tracy Substation, there are three routing alternatives. A modified alternative Route B ~~is~~ remains both the environmentally superior and the Project preferred ~~alternative~~ route. A route option within Alternative B was analyzed in the Supplement to the Draft EIS/EIR and replaces a portion of the original Alternative B as both the environmentally superior and Project preferred option. Alternative B in the Southern Section was identified as the environmentally preferred alternative because it minimize~~d~~s impacts to developed and planned land uses to the extent practical. Alternative B is the Project preferred route because environmental impacts are minimized while providing adequate separation from the existing Intertie. A route option to the Tracy-Tesla proposed route was also analyzed in the Supplement to the Draft EIS/EIR and has replaced the original route as both the environmentally superior and Project preferred route.

Table 1~~B~~C (presented at the end of this Summary) compares the route alternatives for the Los Banos-Gates Project. There are two main corridors, East and West, shown in Figure ~~2.2-1~~ 1.1.2-10. The West corridor has several route segment options. The western route segments 1, 2, ~~3~~ 4, 5, 7, 9, and 11 comprise both the environmentally superior and Project preferred ~~alternatives~~ route. If the Los Banos-Gates Project is not constructed or is deferred, minor modifications may be required south of Tesla to support the increased power transfer needs of COTP. These modifications are summarized in Table 1.3-1 in Section 1.3 of Volume 1 of this document. Potential reinforcements are analyzed and compared in the report and Alternative 1 is preferred.

PROPOSED ACTIONS

The COTP, Los Banos-Gates Project, and Pacific Northwest Reinforcement Project would involve constructing new and modifying existing 500 kV and 230 kV AC transmission system facilities in northern and central California, in Oregon, and in southern Washington. Figure 1 following the Abstract ~~provides~~ shows the approximate locations of the proposed projects.

An easement to build, operate, and maintain the transmission lines would be acquired. A typical easement width for the new line would be for a 200-foot right-of-way. The upgrade portion would retain its existing 125-foot wide right-of-way. Landowners would be compensated for the easement at fair market value and would retain the right to use the land for activities compatible with the transmission line. For substations and switching stations, the land would be purchased in fee. Just compensation based on fair market value would be paid for all land and land rights acquired for the projects. Permits would be obtained for transmission system communication facilities on public land. Communications sites on private land would be purchased, or in the case of existing facilities, a use agreement would be negotiated with the owner.

Mitigation measures have been ~~incorporated~~ adopted that would reduce the environmental impacts of construction and operation. Construction activities, including surveying, clearing, access road construction, foundation installation, structure erection, conductor stringing, and conductor sagging, would follow mitigation ~~guidelines~~ measures provided in the construction contract ~~and design~~ specifications.

The mitigation section has been reorganized. Mitigation measures are now grouped by resource categories to assist the reader in determining which mitigation measures should be applied to reduce significant resource impacts. In response to public comment, mitigation measures have been revised and in many cases reflect more specificity.

The COTP is a proposal to construct or upgrade and operate approximately 340 miles of transmission lines, three substations, a switching station, a series compensation station, and communication and other supporting facilities. Figure 6 shows the Participants involved in the COTP. The proposed actions for the COTP ~~is as follows~~ are:

- Constructing a new 500 kV AC transmission line (approximately 14~~0~~6 miles long) from the California-Oregon border area to the proposed Olinda Substation near ~~the~~ Redding, California. ~~area.~~

- Upgrading an existing double circuit 230 kV AC line (approximately 170 miles long) owned by the Western Area Power Administration to a single circuit 500 kV AC line from the ~~Redding area~~ proposed Olinda Substation to the ~~Tracy Substation~~ Sacramento River.

- Constructing approximately 20 miles of ~~the southernmost portion of the upgrade will be relocated onto a new and separate right-of-way~~ new 500 kV transmission line from the Sacramento River to the existing Tracy Substation.

- Constructing a new 500 kV AC ~~single or~~ double-circuit link (approximately six miles long) between the Tracy Substation and the area of Tesla Substation. ~~If a~~ This double circuit 500 kV AC line ~~is constructed, modification of the~~ would be connected to the existing Tesla-Los Banos No. 2 500 kV line ~~may be also required near the Tesla Substation~~ creating the Tracy-Tesla and Tracy-Los Banos 500 kV transmission lines.

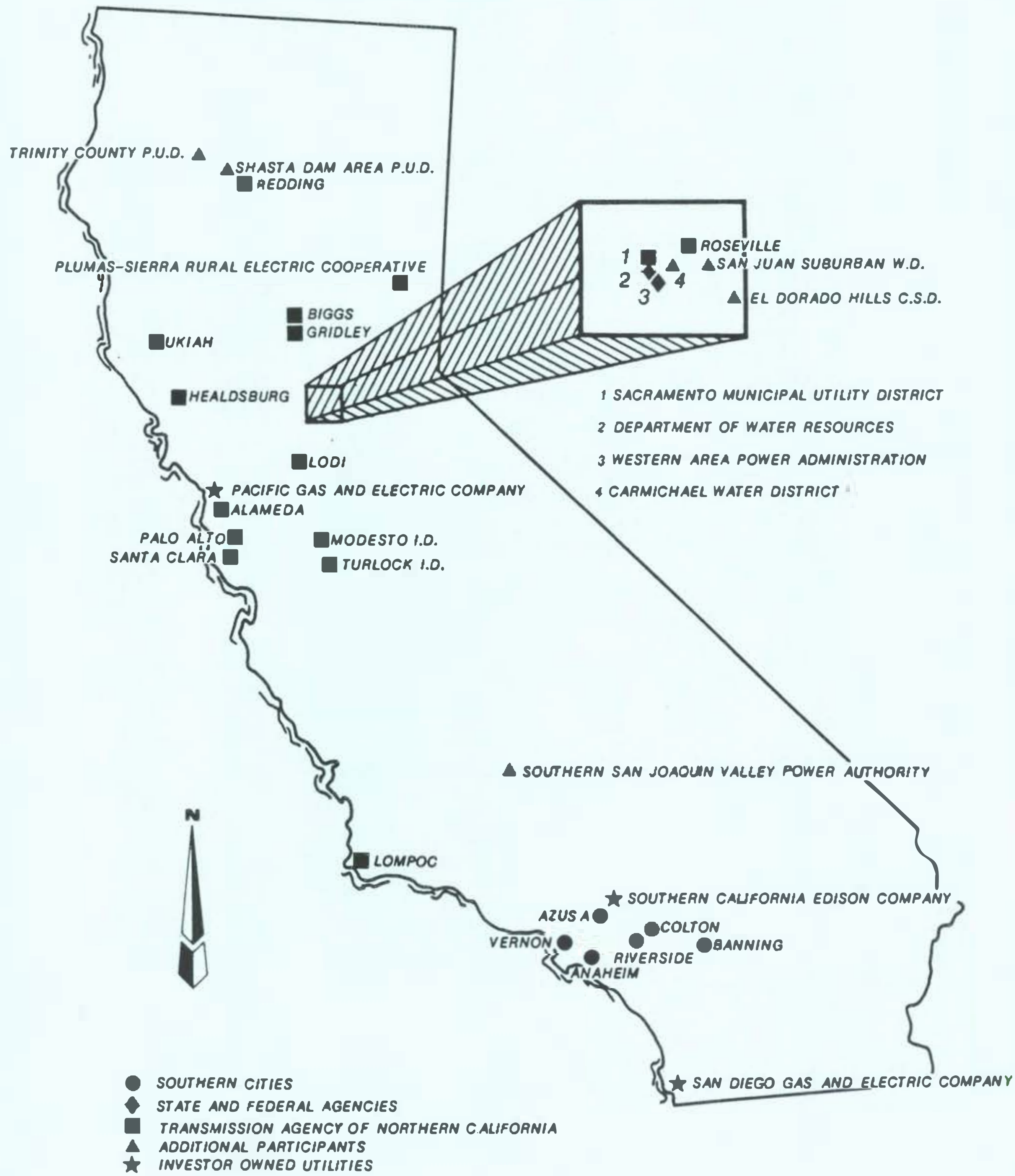
COTP substation and other supporting facilities included in the proposed action are:

- Constructing a new switching station in the Oregon border area near ~~either Pinehurst, Keno, or~~ Malin along the existing Malin-Meridian 500 kV AC transmission line to serve as the northern terminus for the COTP and interconnection point to the Pacific Northwest transmission system.

- Constructing a new substation (Olinda) south of Redding near the intersection of Gas Point Road and Happy Valley Road.

FIGURE 6

CALIFORNIA-OREGON TRANSMISSION PROJECT
Project Participants



- Constructing a new series compensation station (Maxwell) near the town of Maxwell, California.

- Expanding the Tracy Substation and replacing six 230 kV circuit breakers.

- Modifying the Tesla Substation to ~~accommodate the~~ replace two 230 kV circuit breakers, relaying and other equipment necessary to accommodate the new COTP line termination.

- Modifying existing and constructing new microwave communication system facilities in central and northern California and southern Oregon.

- Modifying the existing Cottonwood Substation to replace three 230 kV circuit breakers.

System reliability was a primary factor influencing the location of the COTP transmission line routing alternatives. Reports by COTP technical committees provide recommendations for project design to ensure compliance with both the Western Systems Coordinating Council (WSCC) and the North American Electric Reliability Council (NERC) guidelines. To minimize the potential for a simultaneous power outage of the COTP and the two existing AC Intertie lines, a minimum separation, where possible, ~~of 5~~ measured in miles between the existing AC Intertie lines and a new 500 kV line north of Redding and a minimum separation of 2,000 feet between the existing AC Intertie lines and a new 500 kV line south of the Sacramento River has been utilized by the COTP Participants. Separation distances are based on detailed system studies and the application of the WSCC and NERC criteria to reduce the potential for widespread blackouts within the western United States, affecting utility customers as far away as El Paso, Texas.

The proposed COTP transmission line would be supported on steel structures that meet state and national standards. Several types of structures are proposed, including single circuit lattice, double circuit lattice, single circuit tubular, single pole and H-frame, double circuit tubular, and upgrade towers. On the upgrade single circuit lattice towers, steel support members would be added to the ~~base~~ main body of the existing 230 kV double circuit lattice towers, and the top would be rebuilt, to support the new 500 kV AC conductors and provide adequate electrical clearances. Tower structures would typically be 125-~~140~~ 180 feet tall.

The proposed action for the Los Banos-Gates Transmission Project includes the following facilities and activities:

- Constructing approximately 84 miles of series compensated 500 kV transmission line between Los Banos and Gates Substations.

- Realigning the existing Los Banos-Midway No. 2 500 kV transmission line into Gates Substation.

- Modifying the Los Banos and Gates Substations to accommodate new electrical equipment and the new line.

- Installing shunt capacitors at various existing substations.

- Possibly installing series capacitors at Gates and/or Midway Substations to compensate the 500 kV transmission lines connecting to Diablo Canyon.

- Reconductoring portions of the Gates-Arco-Midway 230 kV transmission line.

- If any or all of the above features are not constructed or are deferred, it may be necessary to make minor modifications to the transmission system south of Tesla.

The installation of significant system additions, such as the Los Banos-Gates Project, requires careful consideration of electric system reliability. For the bulk high-voltage transmission additions, the project must be so defined that a credible three-line outage cannot occur. To minimize the possibility of a simultaneous three-line outage, a minimum separation of approximately 2,000 feet between the two existing 500 kV lines and the proposed 500 kV line has been utilized by PGandE.

The Los Banos-Gates transmission line would be supported on steel structures that meet state and national standards. Single circuit lattice structures are proposed. Tower structures would typically be 100-160 feet tall.

The Pacific Northwest Reinforcement Project is a proposal to construct new, modify existing, and operate approximately eight miles of transmission lines, ten substations, and four series compensation stations in Oregon and southern Washington. The proposed actions include:

- Improvements and reinforcements to facilities in Oregon at the Alvey, Ashe, Buckley, Bakeoven, Dixonville, Fort Rock, Grizzly, Malin, Marion, Meridian, Sand Spring, Slatt, Summer Lake, and Sycan substations located in the Oregon counties of Deschutes, Douglas, Jackson, Josephine, Gilliam, Jefferson, Klamath, Lake, Lane, Marion, Sherman, and Wasco, and one county within Washington (Benton).

- Adding, removing, and/or replacing transmission towers or equipment such as power circuit breakers.

- Constructing short sections of transmission lines to loop existing lines into substations.

- Possibly constructing a new substation (Marcola).
- Expanding substations to adjacent properties or relocating equipment within substation yards.
- Upgrading short sections of existing transmission lines.

In addition, BPA has an option to acquire a 50 percent interest in the incremental capacity of PP&L's Eugene-Medford 500 kV transmission line. The Eugene-Medford project has already been sited, permitted, scheduled for construction, and is justified to serve PP&L loads in southern Oregon and northern California. If BPA exercises its option, the Eugene-Medford project would also be used to support the Intertie system as part of the Pacific Northwest Reinforcement Project. The environmental effects of the Eugene-Medford line are presented in a BLM Final EIS entitled "Proposed Eugene-Medford 500 kV Transmission Line, May 1983 (FES) 83-23)".

ENVIRONMENTAL CONSEQUENCES

A summary of significant and residual impacts is presented in Tables 2A and 2B (presented at the end of this Summary). Table 2A has been revised from the Draft EIS/EIR to reflect changes in the mitigation measures. Table 2B has been added to present impacts for the Los Banos-Gates Project.

Significant impacts have been analyzed in detail in Volume 1, Section 4.0 of the Draft EIS/EIR for the alternatives, and in Volume 2A, Section 3.0 of the Draft EIS/EIR for route segments and in the Supplement to the Draft EIS/EIR.

Wherever possible, resource specialists concentrated on quantifying the level of impacts that would result from the Project. Quantifying impacts made the comparison of alternatives a more objective process. Quantifications were based on federal or state standards for some resources, and on professional experience and judgment for others. For example, significant air quality impacts were dependent on federal or state standards.

Where specific federal or state standards were not available, the resource specialists developed draft threshold values (or levels) above which significant impacts were defined to occur. For example, for the COTP, forestry impacts were considered significant if 40 acres or more of prime timberland was crossed. Designations of significance can be based on a single factor or on a combination of several factors. For the COTP, agricultural impacts were considered significant if one-half mile of prime farmland or farmland of statewide importance were crossed by a new route segment, and/or if the route results in a new permanent crossing of at least one-half mile of a non-irrigated farming area that is designated in an adopted environmental plan or local land use policy, such as an agricultural preserve program. A summary of the quantitative and qualitative criteria used by each resource specialist to determine the significance of impacts is described in Section 1.1.4.

A full discussion of mitigation measures for the COTP is presented in Volume 1, Section 1.1.5 of this document. Mitigation measures for the Los Banos-Gates Project are discussed in Section 5.2 of the Draft EIS/EIR.

For the COTP, ~~a~~ the Project preferred alternative ~~has been identified that~~ is coincident with the recommended environmentally superior alternative with the exception of route options in two areas, as previously discussed.

~~Most~~ Many impacts can either be avoided during the alignment phase of the project or through implementation of adopted mitigation. Impacts for each resource discipline include:

Air Quality: Vehicle exhaust and fugitive dust would be the primary emission sources. These are short term, localized effects which should not significantly affect existing climate or ambient air quality. Ozone production from operation of the transmission line would not measurably increase ambient concentrations.

Earth Resources: Potential effects include excessive wind and water erosion, future interference with mining of specified mineral resources and effects on the project facilities resulting from low soil bearing capacities, landslides, lavatube collapse, and earthquakes. With the exception of water erosion, there would be no significant effects with application of the mitigation measures.

Water Resources/Fisheries: Potential effects would include sedimentation of streams due to increased soil erosion, reduction of water quality and supply, barriers to fish migration and degradation of Redband Trout habitat in one area. With application of all mitigation measures, there would be no residual significant effect.

Vegetation: Potential effects on vegetation include loss of riparian woodland along the Sacramento River, disturbance to or loss of vernal pool habitats; disturbance to or loss of MacNab cypress forests along Montgomery Creek, Valley Sink (iodine bush) scrub habitat, and wetlands along certain water courses crossed by the COTP. None of the effects would be significant following implementation of mitigation. For example, some wetlands may be disturbed by unavoidable siting of a few transmission structures. If and where this occurs, appropriate compensation measures will be implemented in consultation with state and federal resource and land management agencies.

Wildlife: There is the potential for collision of special-status and sensitive bird species or water fowl with conductors and shield wires, disturbance to nests and densities of special-status and sensitive wildlife species during clearing and constructions activities, ahd removal of snags from forested areas with subsequent decline in cavity-dependent wildlife populations. Impacts could also occur to big game species and their habitats from direct habitat loss and effects of human disturbance. With the exception of the potential for collisions, all effects could be mitigated to a less than significant level.

Land Use: Land use impacts include crossing prime timberland, Timberland Production Zones (TPZ), Prime Farmland or Farmland of Statewide Importance (or irrigated, cultivated farmland), and agricultural preserves. All of these impacts would remain significant following application of the proposed mitigation measures. The maximum allowable timber sale quantity on National Forests is limited to the long-term sustained yield, which is that amount of timber production that can be sustained in perpetuity. The long-term sustained yield will vary depending upon the management objectives for each forest. When timberland is removed from production, the long-term sustained yield will be reduced by an amount equal to the net annual growth on those areas. This reduction amounts to less than one-half of one percent for each national forest crossed by the COTP, which is estimated to be 700 thousand board feet (MBF) for the Shasta-Trinity National Forest and 180 MBF for the Modoc National Forest.

Visual: Although mitigation measures would reduce effects, the effects would remain significant following application of the measures. These effects include visual contrast and visibility in open landscape; visibility from Lava Beds National Monument; crossing of sensitive land uses, USFS lands managed for scenic quality retention or partial retention, and local scenic roads and highways.

Socioeconomics: Potential effects include inadequate temporary housing facilities for construction workers, loss in agricultural production, the construction of new access roads, and the location of transmission lines within areas close to residential communities. Effects from construction of new access roads and the location of transmission lines near communities may be significant and ~~unmitigatible~~ unmitigable.

Cultural Resources: Potential effects on cultural resources can be mitigated to a level of less than significant. This includes effects from siting transmission structures or access roads on archaeological or historic sites, near Native American Heritage sites, near properties of architectural significance and potential disturbance of an Achumawi sacred area.

~~A summary of significant and residual impacts is presented in Table 2. Significant impacts have been analyzed in detail in~~

~~Volume 1, Section 4 for the alternatives, and in Volume 2A, Section 3 for route segments. A full discussion of mitigation measures is presented in Volume 1, Section 5.~~

~~For the Los Banos-Gates Project, PGandE has identified a Project preferred alternative that is coincident with the environmentally superior alternative. The preferred route has the potential for both short- and long-term impacts on the environment. Most impacts to biological resources and cultural and paleontological resources that may occur during the construction of the transmission line can be avoided during the alignment phase of the project.~~

The ~~project~~ Los Banos-Gates Project will result in only minimal impacts to earth resources, air and water quality, and public health and safety. No adverse socioeconomic impacts are expected. The primary short-term impacts include disturbance of about 260 acres of land due to construction activities. Only a small amount of agricultural land would be permanently removed from production along the right-of-way. Operational impacts (long-term) include a maximum loss of about 150 acres of land to access roads and tower foundations and the change in aesthetic quality due to the presence of the towers in certain viewsheds. Potential impacts of the preferred route and other alternatives have been analyzed in Section 4 of Volume 2B of the Draft EIS/EIR (Environmental Consequences and Mitigation).

For the Los Banos-Gates Project, PGandE has identified a Project preferred route that is coincident with the environmentally superior alternative. The preferred route has the potential for both short- and long-term impacts on the environment. Most impacts to biological resources and cultural and paleontological resources that may occur during the construction of the transmission line can be avoided during the alignment phase of the project.

A decision to defer the Los Banos-Gates transmission line may require modification of the transmission system south of Tesla Substation. Most of these modifications are of limited scope or will occur inside existing substations and will not result in impacts to the environment. The major exception is the potential need for construction of a 70 kV wood pole line approximately 12 miles long. The environmental impact of the construction of the 70 kV pole line can be satisfactorily mitigated. No significant residual impact will remain. A discussion of the potential impacts and mitigation of the 70 kV pole line is contained in Section 1.3 of this Final EIS/EIR.

For the PNW Reinforcement Project, facilities where improvements would occur are remote and most facility expansions would occur on fee-owned land. Northwest facilities improvements would require removal of existing equipment and adding new equipment. Some additional land would be necessary to accommodate some of the new equipment and, if constructed, to accommodate the new

Marcola Substation. New rights-of-way would have to be acquired for approximately eight miles of new transmission line. Improvements are consistent with the plans of the affected counties in Washington and Oregon and the U. S. Fish and Wildlife Service has agreed with the BPA finding of no effect on threatened and endangered species. Review of cultural resources literature and consultation with the Oregon State Historic Preservation Office~~,~~ indicate that there are no known important cultural resources sites or any Native American religious practices that would be adversely affected.

No significant impacts to forestry, vegetation, prime farmland, water quality, recreational facilities, earth resources or ambient noise levels are anticipated. Waste from the project would be recycled or disposed of at local landfills in accordance with Environmental Protection Agency regulations and practices, the Resource Conservation and Recovery Act, the Toxic Substances Control Act and Oregon's hazardous waste regulations. New equipment will not contain PCBs, and PCB-containing compensating capacitor banks that may be replaced at existing facilities will be disposed of in accordance with all applicable Department of Transportation and other local, state, and federal statutes governing the use, shipment, and destruction of this material. The PNW Reinforcement Project is discussed in more detail in this volume and Volume 2C of the Draft EIS/EIR.

~~Appendix D of Volume 3A~~ Section 1.5.4 of the Final EIS/EIR contains an updated summary of the information and analyses that will appear in the Final IDU EIS prepared by Bonneville Power Administration. ~~Section 8.0 of Appendix D~~ Section 7 of the summary discusses the potential environmental impacts associated with increases in Intertie capacity and use. These include potential impacts to sales levels, generation mixes, new resource development, use of land and non-renewable resources, air quality, water quality and consumption, resident and anadromous fish, wildlife, vegetation, cultural resources, irrigation, hydroelectric system operations, and electricity rates.

AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

~~The areas of controversy and issue to be resolved that are specifically addressed in this Draft EIS/EIR are:~~

~~1. The impacts of transmission lines on forest and agricultural lands.~~
~~2. Transmission system reliability and its effects on the location of the routing alternatives.~~
~~3. The visual impacts of transmission lines.~~
~~4. The benefits of increased transmission capacity and power transfers.~~

Four areas of controversy and issues were identified in the Draft EIS/EIR. Many of the route options presented in the Supplement to the Draft EIS/EIR were developed in response to these areas of controversy. They have been resolved as follows:

1. A summary of the impacts of transmission lines on forest and agricultural lands. There was concern for a route to be chosen that had the fewest impacts on timberland and agricultural land. These lands support a portion of the economic activity of the communities in the study area for the projects. Issues raised regarding timberland included the removal of productive timberland due to the restrictions on tree height under the conductors of the transmission line. Issues raised regarding agricultural land included the difficulty of farming around any transmission towers placed in actively farmed fields, and the difficulty of applying agricultural materials by aircraft on fields with towers and conductors.

Forest Lands:
The preferred route was selected in part because of its fewer overall impacts on forestlands than the other alternate routes. The route options in the Supplement to the Draft EIS/EIR help to reduce impacts. Route Segment N-10M2 is located on less productive forest lands than N-10 Alt.5.

Additional mitigation measures have been adopted such as: a vegetation management plan; off-site reforestation of areas of prime timberland that are currently supporting brush or non-commercial hardwoods; and reducing the potential for insect and disease buildups by coordinating the timing and method of slash disposal with land management agencies.

Agricultural Lands:
The preferred route was selected in part because it offers the opportunity to avoid most agricultural impacts. The route options in the Supplement to the Draft EIS/EIR help to reduce some of the impacts to less than significant levels. The Loveness-Graham route segment in the northern section avoids agricultural land and pivot irrigation systems. The South 1 and South 2 route segments cross less irrigated cropland and the South 2 segment bypasses two planned wind farm developments.

In addition, COTP staff has identified a tentative centerline in the Tulelake area which would cross less than half a mile of irrigated cropland. It would not be necessary to place any towers on irrigated farmland in the Tulelake area. However, the COTP will cross more than 20 miles of irrigated agricultural land in the Sacramento River Delta area. Western's 230 kV line which will be the upgrade portion of the COTP currently crosses approximately 70 miles of irrigated agricultural land in the Central Valley.

The implementation of adopted mitigation measures will reduce impacts to agricultural lands. These include: rehabilitating disturbed soil around tower bases; locating towers adjacent to field boundaries where possible; minimize creating obstacles for aerial applicators; and utilizing structure design to minimize the land removed from production by the tower bases.

2. Transmission system reliability and its effects on the location of the routing alternatives. There was concern that the need for reliability for the COTP was great enough to make some routing suggestions infeasible. One of these suggestions, that of abutting the existing Intertie, has the environmental advantages of concentrating development and avoiding the creation of new corridors where corridors already exist.

   The Forest Service has stated their belief that reliance on centerline separation, without consideration for fire suppression, would not significantly reduce risks of an outage due to forest fire. The Forest Service also stated their belief that locating a new line closer to the existing Intertie than route N-10 Alt.5 offers more protection from forest fires than placing it farther away in more dense timber stands. This may be true if forest fires were the only concern related to the reliability issue and fires such as the 1987 northern California events could be minimized through fuels management schemes. However, separation is the only effective means to reduce the probability of other types of common-mode outages such as those that are either human-caused or weather-related. Based on consultation with the Forest Service, a large portion of route segment N-10M was reevaluated and is now a part of the preferred route. This alternative route segment, which provides some degree of separation from the existing AC Intertie, is feasible only if a fuels management and fire response plan are implemented that will sufficiently reduce the fuel loads between the existing Intertie and the final preferred route and eliminate the potential for a forest fire-caused simultaneous outage of all three 500 kV transmission lines.

3. The visual impacts of transmission lines. There was concern that the newly constructed transmission towers and lines would be unsightly and would visually intrude on areas that are currently developed.

   The lead agencies and Project Participants recognize that transmission lines are visible and in most cases such visibility is not desirable. The routing guidelines emphasized minimizing visual impacts through careful siting. In addition, the use of nonspecular (non-reflective) conductor and darkened tower steel can reduce visual impacts in some instances. These mitigation measures have been adopted. Selective clearing of the right-of-way and vegetative screening will also reduce visual impacts in some landscapes.

4. The benefits of increased transmission capacity and power transfers. There was concern that the COTP would benefit only a few utilities and their customers, at the expense of many. There was also concern that the Pacific Northwest would be negatively affected by the sale of more power outside the region.

This project will benefit approximately ninety-eight percent of the utility customers in California. The project will also benefit utility customers in the Pacific Northwest. California utilities are major Bonneville Power Administration customers. This project provides another pathway for BPA and Northwest utilities to market surplus power in California. This will reduce the need for electric rate increases in the Northwest in addition to its benefits to California.

PUBLIC AND AGENCY CONSULTATION

Government agencies and the public have been encouraged to participate in the planning and environmental review process for the three projects. Since November 1984, numerous activities involving the public have produced a significant amount of public comments and data. Volume 1, Sections 7.1, 7.2, and 7.3 of the Draft EIS/EIR and Volume 1, Section 1.1.7 of this Final EIS/EIR summarize the public involvement programs. Table 1.1.7-7 in Section 1.1.7 of this document identifies the CEQA and NEPA public notification dates for the COTP and Los Banos-Gates Project.

The public involvement activities for the COTP were organized around scoping meetings, corridor workshops, and route workshops, respectively. As part of the public involvement program, newsletters have been distributed approximately every two to three ~~other~~ months, with updates made to the mailing list on a continuing basis. Numerous additional meetings have been conducted on a less formal basis throughout the process.

Thirty-four agency and public scoping meetings were held in California and Oregon from May 13 to May 23, 1985. These meetings were held to identify the issues, concerns, potential mitigation measures, and alternatives to be considered in the planning and environmental analyses of the COTP. The significant issues are addressed in the environmental consequences section of the EIS/EIR (Volume 1, Section 4.1 of the Draft EIS/EIR).

Information provided at the scoping meetings was used to help identify the least environmentally sensitive corridors (2-5 miles wide) for the COTP. Following the scoping meetings, public and agency workshops were held in July 1985 to review and obtain comments on these corridors. The information provided at the workshops was used to help develop alternative routes (1,500 feet wide) within the corridors. Volume 2A, Phase I Report Summary of the Draft EIS/EIR describes this process.

Another series of COTP agency pubic workshops followed in November and December 1985 to discuss preliminary alternative routes. Information provided at the workshops was used to revise preliminary routes and to help ~~to~~ identify the environmentally preferred alternative. Additional public involvement meetings were held in three communities in southern Oregon in January 1986 and nine communities in California and Oregon in May and June 1986. Other public meetings have been held in ~~May, June,~~ August, September, and November 1986. The purpose of these meetings was to describe and obtain additional data on route alternatives still under study.

Comments received from the COTP meetings and workshops in Oregon and California and the technical information gained from meetings with agencies have been integrated into the analyses ~~in this Draft EIS/EIR~~. Public and agency comments on the ~~this~~ Draft EIS/EIR ~~will be~~ are included in the Final EIS/EIR.

A Supplement to the Draft EIS/EIR was released in June 1987. Three public hearings were held in Burney, Newell, and Tracy, in early August 1987. The public comment period for the Supplement ended on August 17, 1987. Comments received during the comment period and from the hearings are contained in Volumes 2 and 3 of this Final EIS/EIR.

The public involvement activities for the Los Banos-Gates Transmission Project were organized around two series of public meetings: scoping meetings and route workshops. In addition to meeting-related activities, other public/agency information techniques were used on an ongoing basis. (See Volume 2B, Section 9, and Volume 3B, Appendix C of the Draft EIS/EIR for further information on public and agency consultation for the Los Banos-Gates Project.)

Three Los Banos-Gates scoping and corridor evaluation meetings were held on February 26 and 27, 1986, in Fresno, Coalinga, and Los Banos, California. The purposes of the meeting were to provide resource management agencies and the public with an overview of the Los Banos-Gates Project, present the preliminary corridor alternatives, receive comments regarding interests and concerns about the project that should be considered during preparation of the EIS/EIR, and fulfill scoping requirements of NEPA and CEQA.

Three route selection workshops were held in Fresno, Coalinga, and Los Banos from May 20 to 22, 1986. These provided a forum for public and agency review of the Los Banos-Gates preliminary route alternatives and the criteria used to select them. Workshop attendees participated in small group discussions of the route selection factors and the preliminary route alternatives.

Los Banos-Gates Project newsletters were issued approximately one month prior to each series of meetings and a final newsletter was issued following the selection of a preferred route. Copies were mailed to all persons on the project mailing list, made available at PGandE offices in the project area, and used as handouts at public meetings.

Since the public distribution of the Draft EIS/EIR, PGandE has continued to respond to ongoing informational requests from agencies and the general public. In addition, PGandE representatives attended hearings on the Draft EIS/EIR in Los Banos and Coalinga on January 14 and 15, 1987. These hearings were officiated by TANC and Western. At the hearings, TANC, Western, and PGandE representatives provided answers to questions posed by individuals and agencies during the informal discussion session.

Public involvement activities for the Pacific Northwest Reinforcement Project included contacts with agencies, information bulletins, and discussion of the facilities at scoping meetings. BPA and other PNW utilities were represented at scoping and other meetings for the COTP held in several Oregon communities including Ashland, Medford, Keno, Malin, Klamath Falls, and Portland. These entities were also represented at the public hearings held by TANC and Western to receive comments on the Draft EIS/EIR and Supplement to the Draft EIS/EIR.

~~The public will continue to be involved in the projects through review and comment on this EIS/EIR, information newsletters, public hearings, and lead agency and proponent responses to public inquiries and concerns.~~

An active public involvement program will continue through the distribution of newsletters, and lead agency and proponent responses to public inquiries and concerns.

The lead agencies continue to meet with landowners, agencies, and interested individuals with regard to their concerns on the centerline alignment and mitigation of impacts.

SUMMARY OF MAJOR COMMENTS AND RESPONSES

This section is new and is not underlined.

1. **Property Values**

   Comment: Visual and Aesthetic Impacts - Property owners expressed concern that the visual impact of the proposed transmission line will cause a decrease in the aesthetic quality of property with a consequent decrease in the property's monetary value. Examples of this comment can be found at L-184 A and L-244 A in Volume 2A, and T-82 C in Volume 3 of this document.

Response: Visual and Aesthetic Impacts - We recognize there is a perception that visual impacts could affect existing and future property values. This is addressed in Section 3.8 of Volume 2A of the Draft EIS/EIR, and in the responses to L-184 A, L-244 A, and T-82 C. Various studies on these impacts have been conducted; some have found no decrease in value attributable to transmission lines while others have shown the market value of adjacent property to be depressed.

Comment: Compensation - Property owners are concerned about just compensation for loss of property value or other adverse impacts to property (e.g., existing or future uses) by the construction, operation, and maintenance of the proposed transmission line. Examples of this comment can be found at L-176 D in Volume 2A, L-330 U14 in Volume 2B, and T-162 B in Volume 3 of this document.

Response: Compensation - Landowners are compensated for an easement on or purchase of their land including damages to their operations or to other parts of their land. This is addressed in Section 3.6 of Volume 2A of the Draft EIS/EIR, and in the responses to L-176 D, L-330 U14, and T-162 B. Issues concerning the amount to be paid must be resolved through land acquisition proceedings.

2. **Agricultural Impacts**

Comment: Impact to Prime Farmland and Development of Agricultural Lands - Farmers are concerned about the amount of land that would be removed from production as a result of tower placement along the preferred route. Construction of transmission lines is also seen as a limiting factor to the future development of agricultural land. Examples of this comment can be found at L-200 A in Volume 2A, L-366 D in Volume 2B, and T-175 D in Volume 3 of this document.

Response: Impact to Prime Farmland - Physical impacts to prime and/or unique farmland and loss of tillable land are described in Section 3.6 of Volume 2A of the Draft EIS/EIR. A study centerline shows that the new construction portions of the COTP preferred route would cross approximately 25 miles of irrigated cropland. Approximately 107 new towers would be located on irrigated cropland. Approximately 70 miles of the upgrade portion of the COTP is currently and would continue to be located on irrigated cropland. This and related comments are also addressed in the responses to L-200 A, L-366 D, and T-175 D.

Comment: Impact to Agricultural Crops and Practices - Farmers and aerial applicators are concerned about the impacts of transmission lines and towers on crop production and farming-related practices such as crop losses, operation of irrigation and drainage systems, and harvesting. Examples of this comment can be found at L-204 E and L-243 B in

Volume 2A, L-330 W15 in Volume 2B, and T-6 D and T-175 H in Volume 3 of this document.

Response: Impact to Agricultural Crops and Practices - Crop losses, including yield reduction and interference with or modification of agricultural practices are described in Section 3.6 of Volume 2A of the Draft EIS/EIR. Monetary impacts of crop losses are also addressed. This loss would be compensated by right-of-way settlements.

Soil compaction was identified as one factor that may contribute to yield reduction on tilled fields. Soil compaction could result from construction activities and from maneuvering farm equipment around transmission towers on tilled fields. Subsoiling and disking are adopted mitigation measures for areas where soil compaction would occur because of construction activities.

The impact of transmission towers on harvesting operations consists of the additional time and money expended on maneuvering a harvester around a tower. We recognize that there may be additional time expended on maneuvering harvesters around towers, however, we do not believe this to be a significant environmental impact, considering that economic damages are included in the land acquisition process. Responses to L-204 E, L-243 B, L-330 W15, T-6 D, and T-175 H provide further information.

Comment: Aerial Application - Farmers and aerial applicators are concerned that transmission lines and towers are obstacles and hazards, particularly at night, to aircraft performing aerial application of pesticides, fungicides, defoliants, seed, or fertilizer. Associated concerns are inadequate coverage of fields during aerial application around transmission line and towers, and the additional cost incurred by avoiding these obstacles. Examples of this comment can be found at L-14 A in Volume 2A and T-18 B in Volume 3 of this document.

Response: Aerial Application - We agree that in some cases transmission lines and towers present difficulties to aerial applicators. The response to L-14 A and Section 3.6 of Volume 2A of the Draft EIS/EIR describe some of the possible hazards. We will continue to review methods to increase visibility of conductors and towers.

Aerial applicators familiarize themselves with the terrain and potential hazards where they are scheduled to operate to allow adequate margins of safety between their aircraft and transmission lines and towers. Barring the presence of other obstacles such as telephone poles, distribution lines, tree, etc., and given adequate visibility, aerial applicators typically do fly beneath high voltage transmission lines; they also make cleanup passes around transmission lines in order to optimize coverage. Aerial applicators do not usually charge farmers for additional time, labor, or fuel costs in the Sacramento Delta area. Farmers are typically charged for the amount of pesticide materials used whether for performing cleanup passes or for spraying fields.

The effectiveness of aerial application coverage depends upon the orientation of the transmission line with respect to field rows or the direction the aerial applicator flies past with respect to the transmission line. The two most common directions are a flight pass perpendicular to the transmission line or parallel to the transmission line. Inadequate coverage can result when aerial applicators need to rise from application altitude in order to gain clearance over a transmission line in an adjacent field. This condition is usually corrected by performing a pass perpendicular to the normal flight direction.

3. **Bird Collision Hazards**

Comment: Many comments expressed concern about the potential hazard the transmission line would pose to raptors, waterfowl, and other sensitive bird species in the Butte Valley area, Tulelake/Newell area, along the Pit River, and in the Sacramento Delta area. Examples of this comment can be found at L-117 C and L-157 I in Volume 2A and L-333 Y in Volume 2B of this document.

Response: Recent studies conducted on avian mortality in areas of transmission lines do not indicate there are significant biological impacts to most species. Impacts to waterfowl and raptors may be significant in local areas. These are addressed in Section 3.5 of Volume 2A of the Draft EIS/EIR and in the responses to L-117 C, L-157 I, and L-333 Y. The visibility of overhead shield wires is a factor in bird collisions. Most collisions occur when the birds move to avoid the conductor and subsequently do not see the smaller shield wire. Collisions can also occur when visibility is obscured (e.g., night, foul weather). Movements of sensitive raptors up and down the Pit and Sacramento Rivers occur as a result of local flights to and from feeding areas, roosting areas, and nesting sites. Movements of waterfowl and other birds in the Sacramento Delta occur as a result of local migration. Bisecting routes of such movement with overhead transmission lines may result in mortality or injury to birds in flight. Delta waterfowl collision impacts would be significant and difficult to mitigate. In other critical areas, it is possible to mark shield wires to make them more visible. Wildlife management agencies will be consulted concerning the need for such marking.

4. Use of Public vs. Private Land

Comment: Many comments suggest routing the transmission line across public rather than private land. Examples include L-330 M in Volume 2B and T-38 D in Volume 3 of this document.

Response: In the Northern Section, approximately 50 percent of the environmentally preferred and Project preferred route is located on public land. The environmental studies and analysis were based on resources and land uses and not on land ownership or jurisdiction. However, routing guidelines for the COTP did emphasize the use of public land where resource impacts are similar and it was practical and feasible to do so. The location of the preferred route reflects the use of public land where resource values were similar. This is described in the responses to L-330 M and T-38 D.

5. Forest Land Impacts

Comment: Many comments expressed concern about the routing of the Project over prime timberlands or Timber Production Zones (TPZs). Examples of this comment can be found at L-159 L, L-179 C, and L-295 N in Volume 2A, and SL-121 A in Volume 2B of this document.

Response: The lead agencies and Project Participants recognize that timberland areas will be removed from production by the right-of-way. Section 1.1.4 of Volume 1 of this document shows the estimated impact. We have attempted to balance reliability considerations with the forestland impacts and believe an equitable compromise has been achieved with the Project preferred route. By implementing a fuels management and fire response plan to be developed in conjunction with the Forest Service between the existing Intertie and the preferred route, transmission system reliability should not be compromised. In addition, mitigation measures that have been adopted, such as reforestation of prime timberland areas currently supporting brush or non-commercial hardwoods where consultation with the California Department of Forestry and USDA Forest Service indicates the need, and selective clearing methods along the right-of-way, should help to reduce the impacts to forestlands. Section 1.1.5 and the responses to L-295 provide further information on mitigation to be implemented.

6. Transmission System Reliability and Separation

Comment: Many commentors questioned the validity of the reliability guidelines established by the Project Participants with regard to protection of the western U. S. interconnected bulk transmission system. Commentors also questioned the need for 5-mile separation in high fire danger areas and 2,000 feet in other areas as a matter of policy and requested more information concerning the basis for that particular criterion. Examples of this comment can be found at L-3 P, L-306 KK, and L-309 YY in Volume 2A of this document.

Response: Western Systems Coordinating Council (WSCC) reliability criteria simply state that utilities shall not do anything that will impact a neighboring utility. The WSCC was founded by the Western utilities after the 1965 blackout in the Northeast as an effort to prevent similar occurrences from happening in the West. It is the firm belief of the utility industry in the WSCC region based on years of operating experience of the interconnected transmission systems, that the location of the third AC Intertie adjacent (or in proximity) to the two existing Intertie lines will severely decrease the reliability of the interconnected transmission system in the western United States. The efforts of the WSCC since the Northwest blackout in 1965 to prevent western wide outages would be negated if the three lines were to be located such that there was no separation. At present, the two existing Intertie lines are the major north-south pathway for electric transmission between the Pacific Northwest and California. Sufficient technology does not exist at this time to prevent a simultaneous three-line outage should all three 500 kV transmission lines be located immediately adjacent to one another; some degree of separation is required. Common-mode outages for 500 kV systems can be human-caused or weather- or fire-related. In forested areas, separation is of concern because of the chance of a forest fire causing a simultaneous outage of all three transmission lines. Separation is important because it increases the probability that electricity could flow down one of the other transmission paths if either the two existing Intertie lines were to become inoperable or if the COTP were out of service. If all three lines were placed adjacent to one another, where a single incident could result in an outage of all three, the reliability of the entire system is reduced. Further discussion of reliability and separation is presented in the responses to L-3 P, L-306 KK, and L-309 YY, and in Appendix A of Volume 3A of the Draft EIS/EIR.

7. **Project Economics and Benefits**

Comment: Many comments expressed concern about the consistency of the COTP economic analysis with the California Energy Commission's Forecasts. Examples of this comment can be found at L-306 EE, L-306 UU, L-306 ZZ, and L-307 X in Volume 2A of this document.

Response: The forecasted price of Pacific Northwest energy for sale to California in the 1986 Electricity Report falls within the range of the sensitivity cases evaluated in the economic analyses supporting the Draft EIS/EIR for the

COTP. The forecast of statewide demand for electricity presented in the 1986 Electricity Report falls within the range of demand forecasts used in the sensitivity cases evaluated in the Draft EIS/EIR. This is further discussed in Section 1.1 of this document and in the responses to L-306 EE, L-306 UU, L-306 ZZ, and L-307 X.

Comment: Many comments expressed concern about the viability of the COTP if there is uncertainty regarding the long-term availability of firm surplus power in the Pacific Northwest. Examples of this comment can be found at L-3 T in Volume 2A, L-320 E in Volume 2B, and T-67 B and T-81 J in Volume 3.

Response: Although the current firm power surplus in the Northwest and the possibility that it may be declining demonstrate the prudence of building the COTP on the planned schedule, the benefits of the COTP do not depend on continuation of the current firm power surplus in the Northwest. The COTP will continue to provide firm capacity and nonfirm energy to California even if the firm surpluses in the Northwest cease to exist. These benefits are available (1) from power that is available when river flows are better than critical dry conditions used for planning, (2) due to the fact that California has its highest power demands in the summer whereas the Northwest has its highest demands in the winter, and (3) due to the fact that generating resources added in the Northwest to meet energy load growth will provide ability to meet peak demands in excess of the peak loads in the Northwest. No resources need be built in the Northwest for the purpose of making power available to sell to California. This is also addressed in the responses to L-3 T, L-320 E, and T-67 B, and in Appendix B of Volume 3A of the Draft EIS/EIR.

Comment: Comments were received that Northwest prices should be at a higher percentage of the cost of fuel burned in a combustion turbine. Examples of this comment can be found at L-306 WW and L-306 B1 in Volume 2A of this document.

Response: The power delivered over the COTP is expected to reduce operation of oil/gas-fired steam plants which have a substantially more efficient operation (lower heat rate) than a combustion turbine. The cost of 60 to 75 percent of the cost of fuel burned in a combustion turbine is equal to approximately 75 to 90 percent of the cost (in cents per kilowatt hour) of gas burned in a gas-fired steam or combined cycle plant.

The Pacific Northwest utilities' price for power sales to California must be based on the value of such purchases to the California utilities. The price of Pacific Northwest energy at prices equal to 75 to 90 percent of the avoided cost of gas steam plant operation (equal to 60 to 70 percent of combustion turbine fuel cost/kWh) is higher than the Northwest's costs to generate such energy and is below California's cost to generate from oil/gas-fired plants; the pricing assumptions for Pacific Northwest energy used in the economic analysis are reasonable. This is further addressed in the responses to L-306 WW and L-306 B1, and Section 1.1 of Volume 1 of this document.

8. **Health Effects**

Comment: Many comments were received concerning the electromagnetic fields of transmission lines and the potential for adverse impacts to humans and animals. Examples of this comment can be found at L-309 E2 in Volume 2A, and L-330 F3, L-330 F13, and SL-51 A in Volume 2B of this document.

Response: The New York State Power Lines Project is the most recent study completed on the subject of health effects from electromagnetic fields. The following information was released by the New York State Department of Health: "The New York State Power Lines Project, designed to investigate possible health impacts of high voltage transmission lines, has identified 'several areas of potential concern for public health' requiring further study. Most research showed no health effects of concern."

Additional health studies are referenced in Section 3.10 of the Phase III Report in Volume 2A of the Draft EIS/EIR, and the New York State Power Lines Project is further discussed in Section 1.2.3 of this Final EIS/EIR. Additional discussion of this comment is presented in the responses to L-309 E2, L-330 F3, L-330 F13, and SL-51 A.

9. **Mitigation**

Comment: Many commentors expressed concern over the lack of specificity in the mitigation measures and wanted a fuller explanation of the monitoring and compliance mechanisms. Examples of this comment can be found at L-295 C in Volume 2A, L-362 O and L-364 BB in Volume 2B, and T-81 I in Volume 3.

Response: The mitigation measures have been revised to be more specific. Many of the site-specific details of the implementation of the mitigation cannot be developed until tower locations and access road designs are completed. Site specific engineering design cannot take place before tower locations are identified. The lead agencies have adopted, in this Final EIS/EIR, a framework of mitigation measures that will be augmented by a site-specific compliance monitoring plan developed through consultation with the state and federal agencies that will be involved in monitoring its implementation. The entire section on mitigation for the

COTP is reproduced in Section 1.1.5 of this Final EIS/EIR. Further discussion of mitigation, specifically, monitoring and compliance is also presented in responses to L-295 C, L-364 BB, and T-81 I.

TABLE 1A
SUMMARY OF ROUTING ALTERNATIVES: COTP

	North					Upgrade[a]	South		
	A	B	C	D[a]	Grizzly Peak-Redding[a]		A	B[a]	C
1. Project Requirements									
Length (miles)	73.94	66.28	68.87	79.64	68.93	169.74	31.38	34.30	34.60
New R.O.W. required (acres)	1776	1604	1667	1929	1464	0	728	800	806
New access roads (miles)	96.77	80.45	93.56	109.87	74.70	0	0	0	0
Clearing:									
a. Access roads (acres)	234.60	195.02	226.80	266.33	181.05	0	0	0	0
b. Right-of-way (acres)	891.55	715.52	846.99	694.53	834.18	0	0	0	0
Estimated construct cost[b]	$36,619	$30,259	$33,507	$34,932	$32,672	$5,246	$20,149	$24,898	$26,031
2. Earth Resources									
~~Soil loss tons/year~~	~~1,024.94~~	~~779.28~~	~~869.70~~			~~0~~	~~0~~	~~0~~	~~0~~
Percent of area over which soil loss exceeds tolerances	90	44	64	40	84	0	0	0	0
Average exceedance (tons/acre/year)	3.6	1.9	2.1	2.0	1.5	0	0	0	0
3. Vegetation									
Tall-growing vegetation removed, forestland (acres)	1,217.92	947.83	1,147.51	884.94	983.76	0	0	0	0
Permanent clearing of roads and tower sites (acres):									
a. Rangeland	33.38	1.52	38.28	92.97	7.67	0	0.64	0.64	0.64

(a) Project preferred routes as revised since publication of the Draft EIS/EIR. See Table 1B in this Summary for a comparison between the revised and the previous Project preferred routes. No changes have occurred to the location of the upgrade section since the Draft EIS/EIR.

(b) All monetary values are in thousands of dollars.

TABLE 1A (CONTINUED)

	North					Upgrade[a]	South		
	A	B	C	D[a]	Grizzly Peak-Redding[a]		A	B[a]	C
b. Forest	206.64	144.98	187.59	146.03	177.62	0	0	0	0
Structures in wetlands or floodplains	2	2	4	0	4	5	104	112	108
4. Wildlife									
Length of high collision potential for birds (miles)	3.00	4.50	4.00	.50	5.00	0	17.10	24.25	21.40
Miles of deer, elk range crossed	38.26	23.00	35.80	45.80	2.00	0	0	0	0
Miles of raptor nesting area crossed	5.60	3.00	3.60	2.60	3.50	0	0	0	0
5. Land Use and Land Status									
Number of dwellings within R.O.W. (200 feet)	1	1	0	2	7	0	7	1	11
Number of dwellings within 1,000 feet of reference centerline	9	2	4	5	53	175	79	77	85
Dwellings per mile within 1,000 feet of centerline	0.1	0.0	0.0	0.1	0.8	1.0	2.5	2.2	2.5
Forest Service administered land crossed (acres)	741.82	931.15	657.69	1109.96	301.17	0	0	0	0
Miles crossed of prime timber on Forest Service lands:									
a. Prime timber	14.85	12.97	12.67	9.66	4.88	0	0	0	0
b. Nonprime timber	6.78	11.18	4.18	19.29	7.61	0	0	0	0

(a) Project preferred route.

TABLE 1A (CONTINUED)

	North					Upgrade[a]	South		
	A	B	C	D[a]	Grizzly Peak-Redding[a]		A	B[a]	C
Total prime timber crossed (in miles)	32.46	29.13	28.63	17.85	19.55	0	0	0	0
Miles crossed of timber production zones[c]	10.00	10.50	10.50	11.10	18.79	0	0	0	0
Miles crossed of agricultural preserve lands	14.83	4.10	0.96	0	5.00	76.70	6.85	14.90	1 .33
Irrigated cropland (miles)	0.23	2.51	1.12	0.53	2.62	68.92	19.46	23.17	24.10
Total agricultural acreage removed	2.12	2.60	1.55	3.36	1.58	9.26	4.01	11.73	4.10
6. Visual Resources									
Number of crossings of recreational travel routes:									
a. Scenic highways (state/county)	3	3	3	3	3	8	6	6	6
b. Wild and scenic rivers (existing/eligible)	1	1	1	0	1	0	0	0	0
c. National trails	0	0	0	0	1	0	1	0	1
Dwelling units in the foreground (1.2 miles)	84	50	13	65	1077	1377	591	537	458
7. Socioeconomics									
Transmission line payroll[b]	$5,193	$4,593	$4,772	$5,803	$4,777	$6,197	$1,146	$1,926	$1,205
Non-local workers expenditures[b]	$1,308	$1,157	$1,202	$1,462	$1,204	$1,388	$256	$463	$207
Average number of dwellings per route mile (within 1.2 miles)	1.12	0.75	0.19	0.82	15.62	8.20	18.83	15.66	13.24

(a) Project preferred route.
(b) All monetary values are in thousands of dollars.
(c) Significance is based on crossing 40 acres or more of prime timberland.

TABLE 1A (CONTINUED)

	North					Upgrade[a]	South		
	A	B	C	D[a]	Grizzly Peak-Redding[a]		A	B[a]	C
New miles of access road per route mile	1.29	1.25	1.37	1.38	1.08	0	0	0	0
Average short-term agricultural losses per route mile[b]	$0.02	$0.15	$0.1	$0.05	$0.06	$1.3	$1.9	$1.69	$1.52
Average long-term agricultural losses per route mile[b]	$0.01	$0.03	$0.02	$0.01	$0.03	$0.3	$0.53	$0.62	$0.42
Total lost timber jobs	3.60	3.36	2.98	2.66	2.63	0	0	0	0
8. Cultural Resources									
Prehistoric site sensitivity	2.4	2.8	2.6	3.0	2.6	2.0	3.4	3.50	3.3
Native American sites within 1,000 feet of line	2	0	0	1	1	0	0	0	0
Native American sites within 3.4 miles of line	20	16	16	26	132	2	7	6	7

(a) Project preferred route.
(b) All monetary values are in thousands of dollars.

TABLE 1B
COMPARISON BETWEEN THE ORIGINAL AND (a)
REVISED COTP PREFERRED ROUTES

	North D		Grizzly Peak-Redding		South B	
	Original	Revised	Original	Revised	Original	Revised
1. COTP Requirements						
Length (miles)	74.28	79.64	70.84	68.93	32.93	33.40
New R.O.W. required (acres)	1797	1929	1507	1464	765	777
New access roads (miles)	97.78	109.87	80.38	74.70	0	0
Clearing:						
a. Access roads (acres)	237.04	266.33	194.86	181.05	0	0
b. Right-of-way (acres)	742.44	694.53	826.27	834.18	0	0
Estimated construct cost[(b)]	$32,147	$34,932	$36,690	$32,672	$23,244	$25,419
2. Earth Resources						
"Percent of area over which soil loss exceeds tolerances	88	40	82	84	0	0
Average exceedance (tons/acre/year)	1.6	2.0	1.3	1.5	0	0
3. Vegetation						
Tall-growing vegetation removed, forestland (acres)	979.06	884.94	1,118.38	983.76	0	0
Permanent clearing of roads and tower sites (acres):						

(a) Project preferred routes as revised since publication of the Draft EIS/EIR. No changes have occurred to the location of the upgrade section since the Draft EIS/EIR.

(b) All monetary values are in thousands of dollars.

TABLE 1B (CONTINUED)

	North D		Grizzly Peak-Redding		South B	
	Original	Revised	Original	Revised	Original	Revised
a. Rangeland	74.43	92.97	4.51	7.67	0.64	0.64
b. Forest	164.54	146.03	196.09	177.62	0	0
Structures in wetlands or floodplains	0	0	4	4	95	92
4. Wildlife						
Length of high collision potential for birds (miles)	0.50	0.50	5.00	5.00	26.20	23.35
Miles of deer, elk range crossed	44.80	45.80	4.00	2.00	0	0
Miles of raptor nesting area crossed	2.60	2.60	2.50	3.50	0	0
5. Land Use and Land Status						
Number of dwellings within R.O.W. (200 feet)	4	2	8	7	6	0
Number of dwellings within 1,000 feet of reference centerline	9	5	54	53	73	73
Dwellings per mile within 1,000 feet of centerline	0.4	0.1	0.9	0.8	1.8	2.2
Forest Service administered land crossed (acres)	1,333.82	1,109.96	354.41	301.17	0	0
Miles crossed of prime timber on Forest Service lands:						
a. Prime timber	15.41	9.66	6.23	4.88	0	0
b. Nonprime timber	20.64	19.29	9.21	7.61	0	0

TABLE 1B (CONTINUED)

	North D Original	North D Revised	Grizzly Peak-Redding Original	Grizzly Peak-Redding Revised	South B Original	South B Revised
Total prime timber crossed (in miles)	20.64	17.85	22.42	19.55	0	0
Miles crossed of timber production zones[c]	1.00	11.10	21.25	18.79	0	0
Miles crossed of agricultural preserve lands	1.00	0	5.00	5.00	13.55	13.53
Irrigated cropland (miles)	1.37	0.53	2.62	2.62	21.46	21.77
Total agricultural acreage removed	3.36	3.36	1.58	1.58	4.00	4.48
6. Visual Resources						
Number of crossings of recreational travel routes:						
a. Scenic highways (state/county)	2	3	3	3	6	6
b. Wild and scenic rivers (existing/eligible)	0	0	1	1	0	0
c. National trails	0	0	1	1	0	0
Dwelling units in the foreground (1.2 miles)	74	65	1068	1077	536	513
7. Socioeconomics						
Transmission line payroll[b]	$5,147	$5,803	$4,909	$4,777	$1,144	$1,817
Non-local workers expenditures[b]	$1,297	$1,462	$1,237	$1,204	$256	$438

(c) Significance is based on crossing 40 acres or more of prime timberland.

TABLE 1B (CONTINUED)

	North D Original	North D Revised	Grizzly Peak-Redding Original	Grizzly Peak-Redding Revised	South B Original	South B Revised
Average number of dwellings per route mile (within 1.2 miles)	1.83	0.82	25.88	15.62	12.72	15.36
New miles of access road per route mile	1.16	1.38	1.21	1.08	0	0
Average short-term agricultural losses per route mile(b)	$0.84	$0.05	$0.06	$0.06	$1.41	$1.56
Average long-term agricultural losses per route mile(b)	$0.03	$0.01	$0.03	$0.03	$0.43	$0.59
Total lost timber jobs	2.93	2.66	2.79	2.63	0	0
8. Cultural Resources						
Prehistoric site sensitivity	3.6	3.0	2.1	2.6	3.6	3.5
Native American sites within 1,000 feet of line	1	1	5	1	0	0
Native American sites within 3.4 miles of line	17	26	132	132	7	6

TABLE 1C

SUMMARY OF ROUTING ALTERNATIVES: LOS BANOS-GATES

	West												East
	1[a]	2[a]	3	4[a]	5[a]	6	7[a]	8	9[a]	10	11[a]	Total	
1. Project Requirements													
Length (miles)	1.9	12.7	12.9	5.3	8.5	9.0	41.0	10.3	10.5	11.7	4.0	127.8	85.7
New R.O.W. required (acres)	46.0	307.0	313.0	128.0	206.0	218.0	993.0	249.0	254.0	283.0	97.0	3,094.0	2,074.0
New access roads (miles)	1.9	12.7	37.2	15.3	8.5	26.0	118.5	29.6	30.4	33.8	11.6	325.5	247.7
Clearing for access roads (acres)	3.2	21.6	21.9	9.0	14.5	15.3	69.7	17.5	17.9	19.9	6.8	217.3	145.7
2. Earth Resources													
Areas with high erosion potential (miles crossed)	0.5	10.5	9.0	4.0	6.0	8.5	30.0	0.5	4.0	4.5	0.0	77.5	10.0
3. Vegetation													
Permanent clearing (acres)													
a. Grassland and scrub	2.4	22.6	22.0	9.6	14.7	16.1	63.2	1.7	6.8	19.2	0.0	178.3	24.0
b. Agricultural and other land	1.0	0.0	0.0	0.0	3.0	15.0	11.2	16.7	11.6	1.9	7.3	67.7	132.0
4. Land Use and Land Status													
Irrigated cropland (miles)	1.1	0.0	0.0	0.0	0.2	0.0	3.7	6.2	3.4	1.3	2.6	18.5	72.3
5. Cultural Resources													
Archaeological resources	0	1	2	0	1	2	2	0	0	0	0	8	1

[a] These routes combined represent the Project preferred alternative.

TABLE 2A

SUMMARY OF SIGNIFICANT ENVIRONMENTAL IMPACTS,
APPLICABLE MITIGATION MEASURES,
AND MITIGATION EFFECTIVENESS FOR COTP

Significant Impacts Prior to Mitigation	Preferred Alternative Route Segment for Which Significant Impacts are Expected[1/] Before Mitigation	After Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
AIR QUALITY			• Comply with air quality regulations. • Implement dust control measures.		
None					
EARTH RESOURCES (See Section 3.2.3.3 in Volume 2A, Draft EIS/EIR)[2/]					
Excessive soil erosion	1, 2, 3, 4, 5, 6, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23		• Construct access roads to meet the minimum requirements necessary for construction and maintenance vehicles. • Close roads not required for regular and emergency maintenance activities and reclaim to near original condition. • Avoid unnecessary road construction. • Control water runoff on access roads[3/]. • Revegetate exposed areas around tower bases and on slopes. • Helicopter construction in areas having steep slopes greater than 30% and highly erodable soils if the impacts cannot be otherwise mitigated. • Locate roads away from stream bottoms in areas having steep slopes greater than 30% and highly erodable soils. • Apply USFS Best Management Practices and Forest Practice Rules of California Department of Forestry. • Existing roads damaged as a result of construction or maintenance activities will be repaired. • Maintain, repair, or replace runoff control structures.	Partially effective[3/]	No
Lava tube collapse	6		• Use routing adjustments, centerline adjustments and foundation design.	Totally effective	No
Low soil bearing capacities	29-39		• Use standard engineering and design practices such as importing high intensity fill.	Totally effective	No

1/ 1 = North 1; 2 = N-10G; 3 = N-10J; 4 = N-10K, 5 = N-10L; 6 = N-10M1; 7 = N-10M2(A1); 8 = N-10M2(A); 9 = North 2B; 10 = N-10 Alt.5(B); 11 = N-10 Alt.5(C); 12 = N-10 Alt.5(D); 13 = N-7 Alt.1(A); 14 = N-7 Alt.1(B); 15 = North 3J; 16 = N-8A(3); 17 = N-8C; 18 = North 4; 19 = N-8 Alt.2(A); 20 = N-9A; 21 = N-9C; 22 = N-9D; 23 = N-9G; 24 = N-9J; 25 = N-9N; 26 = N-9O; 27 = N-9Q; 28 = N-13A; 29 = Upgrade (S-1A); 30 = S-8B; 31 = S-8C; 32 = S-8 Alt.1; 33 = S-8E1(A); 34 = South 1; 35 = S-8K; 36 = S-9D; 37 = S-9G; 38 = South 2; 39 = S-8 Alt.3.

2/ Threshold values for determining significance of impacts can be found in these sections of the Draft EIS/EIR.

3/ Drainage controls, if properly installed, maintained, repaired, and/or replaced, can substantially reduce soil loss due to water erosion. However, additional adopted mitigation such as the placement of straw or hay mulch, the avoidance of wet weather construction, the installation of energy dissipators to prevent off-site erosion and the placement of water bars to reduce slope length may also be necessary. This will be determined based on site-specific field studies and agency consultation.

TABLE 2A (CONTINUED)

Significant Impacts Prior to Mitigation	Preferred Alternative Route Segment for Which Significant Impacts are Expected[1/] Before Mitigation	After Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
Earthquakes	14, 15		• Line will be designed and sited to minimize earthquake damage to COTP facilities.	Partially effective	No
Future interference with the potentially important 38,500 acre Glass Mountain known geothermal resource area, copper-zinc, coal, natural gas, and mercury mining areas	6		• Negotiated access with landowners to allow mineral extraction uses.	Totally effective	No
Landslides	None		• Design and site COTP facilities to minimize landslides. • Minimize cut and fill road construction. • Helicopter construction where impacts cannot otherwise be mitigated.		
Wind erosion	None		• Implement dust control measures. • Minimize removal of vegetation. • Encourage rapid revegetation of disturbed areas. • Leave ground rough and cloddy.		
WATER RESOURCES/FISHERIES (See Section 3.3.3.3 in Volume 2A, Draft EIS/EIR)					
Sedimentation of streams as a result of increased soil erosion	1, 7, 8, 11, 13, 14, 18, 19, 20, 21, 22, 23, 24		• Vegetative buffers of undisturbed vegetation along all lakes and streams. • Make efforts to avoid more than one new access road stream crossing per mile. • Minimize access road construction in stream drainages supporting special-status aquatic species. • Size culverts on access roads to match storms which may occur during the life of the COTP. • Locate roads away from stream bottoms. • Right angle stream crossings, where possible.	Totally effective	No
Reduction of water quality introduction of pollutants	1-28		• Vegetative buffers. • Erosion control measures. • Strict control of toxic waste. • Hand application of herbicides to stumps of c_ cutting brush and trees. • Comply with all regulations concerning use of herbicides.	Totally effective	No

1/ 1 = North 1; 2 = N-10G; 3 = N-10J; 4 = N-10K, 5 = N-10L; 6 = N-10M1; 7 = N-10M2(A1); 8 = N-10M2(A); 9 = North 2B; 10 = N-10 Alt.5(B); 11 = N-10 Alt.5(C); 12 = N-10 Alt.5(D); 13 = N-7 Alt.1(A); 14 = N-7 Alt.1(B); 15 = North 3J; 16 = N-8A(3); 17 = N-8C; 18 = North 4; 19 = N-8 Alt.2(A); 20 = N-9A; 21 = N-9C; 22 = N-9D; 23 = N-9G; 24 = N-9J; 25 = N-9N; 26 = N-9O; 27 = N-9Q; 28 = N-13A; 29 = Upgrade (S-1A); 30 = S-8B; 31 = S-8C; 32 = S-8 Alt.1; 33 = S-8E1(A); 34 = South 1; 35 = S-8K; 36 = S-9D; 37 = S-9G; 38 = South 2; 39 = S-8 Alt.3.

TABLE 2A (CONTINUED)

Significant Impacts Prior to Mitigation	Preferred Alternative Route Segment for Which Significant Impacts are Expected[1/] Before Mitigation	After Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
Reduced water supply	1-28		• Site right-of-way to avoid wells aquifer recharge areas and streams.	Totally effective	No
Barriers to fish migration	1-28		• Proper construction of road crossings. • Locate roads away from stream bottoms. • Proper sizing of culverts to avoid debris-loading. • Minimize stream crossings by the transmission line and their access roads.	Totally effective	No
Siting of transmission structures or access roads in areas with special-status aquatic species	10, 14		• Construction of new access roads will be minimized in stream drainages which support special-status aquatic species. • Preclude access roada in sensitive areas until after biological surveys are completed and mitigation coordinated with appropriate agencies.	Totally effective if all populations are avoided	No
Degradation/destruction of Redband trout habitat	10, 14		• Site right-of-way to avoid sensitive areas. • Preclude access roads in sensitive areas after detailed surveys are completed.	Totally effective if all populations are avoided	No
Areas with potential for flooding (Ref. Executive Order 11988)	30, 31, 32, 33, 34, 35, 36, 37, 38		• Flood-proof structures and design COTP facilities to avoid decreasing the conveyance efficiency of the floodplain.	Totally effective	No
VEGETATION (See Section 3.4.3.3 in Volume 2A, Draft EIS/EIR)					
Right-of-way vegetation management using non-selective methods in forest, woodland, or shrubland vegetation	1-28		• Use brush blades to preserve existing low growing vegetation. • Selective clearing, removing only tall-growing vegetation from the right-of-way where it will interfere with the conductors. • Avoid clearing to a harsh right of way edge (feather edges).	Totally effective	No
Right-of-way clearing through forest or woodland in regions where such stands are rare or scattered	7, 8, 11, 12		• Site right-of-way to avoid such stands.	Totally effective	No
Siting of COTP facilities in wetlands (Ref. Executive Order 11990)	4, 12, 16, 24, 26, 29, 33, 34, Olinda Substation		• Site structures to span wetland area and place access roads (either temporary or permanent) outside wetland area.	Totally effective if all wetland areas are avoided	No

1/ 1 = North 1; 2 = N-10G; 3 = N-10J; 4 = N-10K, 5 = N-10L; 6 = N-10M1; 7 = N-10M2(A1); 8 = N-10M2(A); 9 = North 2B; 10 = N-10 Alt.5(B); 11 = N-10 Alt.5(C); 12 = N-10 Alt.5(D); 13 = N-7 Alt.1(A); 14 = N-7 Alt.1(B); 15 = North 3J; 16 = N-8A(3); 17 = N-8C; 18 = North 4; 19 = N-8 Alt.2(A); 20 = N-9A; 21 = N-9C; 22 = N-9D; 23 = N-9G; 24 = N-9J; 25 = N-9N; 26 = N-9O; 27 = N-9Q; 28 = N-13A; 29 = Upgrade (S-1A); 30 = S-8B; 31 = S-8C; 32 = S-8 Alt.1; 33 = S-8E1(A); 34 = South 1; 35 = S-8K; 36 = S-9D; 37 = S-9G; 38 = South 2; 39 = S-8 Alt.3.

TABLE 2A (CONTINUED)

Significant Impacts Prior to Mitigation	Preferred Alternative Route Segment for Which Significant Impacts are Expected[1/] Before Mitigation	After Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
Degradation of wetlands due to use of herbicides or heavy equipment for right-of-way vegetation management	4, 12, 16, 24, 26, 33, 34		• Avoid use of these methods in or near wetlands.	Totally effective	No
Siting of transmission structures or access roads in unique or sensitive plant communities such as riparian woodland, old-growth forests, and vernal pools	2, 3, 4, 5, 7, 8, 11, 20, 22, 23, 24, 25, 26, 27, 32, 33, 34, 35, Olinda Substation		• Avoid siting of transmission line towers, access roads and/or construction work areas in those unique or sensitive plant communities to the maximum extent possible.	Totally effective	No
Loss or reduction of special-status plant species or their habitats	2, 3, 4, 5, 20, 22, 23, 24, 25, 26, 27, 29, 32, 33, 34		• Site facilities to avoid special-status plant populations following biological surveys. • Use only selective vegetation management methods to avoid impacts to special-status plants. • Prepare a vegetative management plan. • Mitigation will be developed in accordance with U. S. Fish and Wildlife Service mitigation policy.	Totally effective if all such populations or habitats are avoided	No
Clearing or loss of riparian woodland along Sacramento River	26		• Site COTP facilities to avoid disturbance to woodland and avoid tree removal.	Totally effective if no trees or shrubs are removed	No
Disturbance to or loss of high quality vernal pools (high quality vernal pools are those that qualify as wetlands, those that support special-status plant species, those that have a high diversity of vernal pools species and/or those in undisturbed condition)	2, 3, 4, 5, 11, 20, 22-27, 29, 32, 33, 34 Olinda Substation		• Site COTP facilities to avoid disturbance to high quality vernal pools found during biological surveys.	Totally effective if all vernal pools of high quality are avoided and not disturbed	No
Disturbance to or loss of Valley Sink (Iodine Bush) Scrub[2/]	32, 33, 34		• Site COTP facilities to avoid disturbance to or loss of this community type.	Totally effective	No
Loss of prime timberland due to right-of-way clearing	7, 8, 9, 11, 13, 14, 15, 16, 17, 18, 20, 21	7, 8, 9, 11, 13, 14, 15, 16, 17, 18, 20,21	• Emphasize selective clearing removing only tall growing vegetation which would interfere with the conductors. • Prepare a vegetative management plan which will consider clearing requirements and long-term right-of-way management needs. • Off-site mitigation such as reforestation of prime timber areas currently occupied by brush or non-commercial hardwoods.	Partially effective	Yes

1/ 1 = North 1; 2 = N-10G; 3 = N-10J; 4 = N-10K, 5 = N-10L; 6 = N-10M1; 7 = N-10M2(A1); 8 = N-10M2(A); 9 = North 2B; 10 = N-10 Alt.5(B); 11 = N-10 Alt.5(C); 12 = N-10 Alt.5(D); 13 = N-7 Alt.1(A); 14 = N-7 Alt.1(B); 15 = North 3J; 16 = N-8A(3); 17 = N-8C; 18 = North 4; 19 = N-3 Alt.2(A); 20 = N-9A; 21 = N-9C; 22 = N-9D; 23 = N-9G; 24 = N-9J; 25 = N-9N; 26 = N-9O; 27 = N-9Q; 28 = N-13A; 29 = Upgrade (S-1A); 30 = S-8B; 31 = S-8C; 32 = S-8 Alt.1; 33 = S-8E1(A); 34 = South 1; 35 = S-8K; 36 = S-9D; 37 = S-9G; 38 = South 2; 39 = S-8 Alt.3.

2/ Valley Sink (Iodine bush) Scrub is considered a significant natural community by the Nature Conservancy because of its rarity in California.

TABLE 2A (CONTINUED)

Significant Impacts Prior to Mitigation	Preferred Alternative Route Segment for Which Significant Impacts are Expected[1/] Before Mitigation	After Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
WILDLIFE (See Section 3.5.3.2 of Volume 2A, Draft EIS/EIR)					
Potential for collision with shield wires by special-status and sensitive bird species in concentration areas where topographic variation and vegetative screening exist and visibility conditions are generally good during periods when species are present (Northern Section)	19, 26		• Site rights-of-ways to take advantage of natural of existing flight obstacles such as ridge lines. • Mark shield wire as appropriate for site-specific conditions in areas where extreme potential for collision exists. • If impacts cannot be effectively mitigated, provide compensation by improving habitat off-site.	Partially effective	No
Potential for collision of special-status and sensitive bird species with conductors and shield wires in areas supporting significant concentrations of those species and where low topography and frequent poor visibility conditions exist during period when species are present (Southern Section)	30-39	30-39	• Mark static wire as appropriate in areas where extreme potential for avian collisions exist, in consultation with wildlife management agencies.	All known mitigation is ineffective in reducing this impact	Yes
Increase in human disturbance which exceeds species tolerance levels in important big game habitat areas	4, 5, 6, 7, 8		• Minimize new road construction in winter-range areas . • Close roads in areas where vehicle use could cause impacts. • Construction and maintenance activities will be limited in critical habitat areas. • Improve habitat off site to offset impacts that cannot be mitigated on site according to U. S. Fish and Wildlife Service mitigation policy.	Totally effective in most areas	No
Disturbance to nest and den sites of sensitive wildlife and special-status species during clearing and construction activities	2, 16		• Avoid nests and dens and their buffer zones. • Restrict activities during breeding periods that could disturb species sufficiently to cause reproductive failure and other important activity timeframes. • Attach raptor nesting platforms to towers.	Totally effective	No
Removal of snags from forested areas, affecting cavity-dependent wildlife species	5, 6, 7, 8, 9, 10		• In areas where rights-of-way clearing would remove snags, create new snags to offset losses. • A snag component to the vegetation management plan will be prepared to provide for replacement snags for cavity dependent wildlife species.	Totally effective	No

1/ 1 = North 1; 2 = N-10G; 3 = N-10J; 4 = N-10K, 5 = N-10L; 6 = N-10M1; 7 = N-10M2(A1); 8 = N-10M2(A); 9 = North 2B; 10 = N-10 Alt.5(B); 11 = N-10 Alt.5(C); 12 = N-10 Alt.5(D); 13 = N-7 Alt.1(A); 14 = N-7 Alt.1(B); 15 = North 3J; 16 = N-8A(3); 17 = N-8C; 18 = North 4; 19 = N-8 Alt.2(A); 20 = N-9A; 21 = N-9C; 22 = N-9D; 23 = N-9G; 24 = N-9J; 25 = N-9N; 26 = N-9O; 27 = N-9Q; 28 = N-13A; 29 = Upgrade (S-1A); 30 = S-8B; 31 = S-8C; 32 = S-8 Alt.1; 33 = S-8E1(A); 34 = South 1; 35 = S-8K; 36 = S-9D; 37 = S-9G; 38 = South 2; 39 = S-8 Alt.3.

TABLE 2A (CONTINUED)

Significant Impacts Prior to Mitigation	Preferred Alternative Route Segment for Which Significant Impacts are Expected[1/] Before Mitigation	After Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
LAND USE (See Section 3.6.3.3 in Volume 2A, Draft EIS/EIR)					
Crossing 40 or more acres of prime timberland	7, 8, 9, 15, 16, 17 18, 20, 21	7, 8, 9, 15, 16, 17 18, 20, 21	• Use directional felling on right-of-way. • Minimize locating right-of-way on ridge tops where potential windthrow is maximized. • Off-site mitigation such as reforestation of areas supporting brush or non-commercial hardwood species.	Partially effective	Yes
Timberland Production Zone (TPZ) crossing 40 or more acres of prime timberland	7, 15, 16, 17, 18, 20, 21	7, 15, 16, 17, 18, 20, 21	• Use directional felling on right-of-way. • Minimize locating right-of-way on ridge tops where potential windthrow is maximized. • Off-site mitigation such as reforestation of prime timber areas supporting brush of non-commercial hardwood species. • Prepare a vegetative management plan which will consider clearing requirements and long-term right-of-way management needs. • Emphasize selective clearing, removing only tall-growing vegetation which would interfere with the conductors.	Partially effective	Yes
Crossing at least one-half mile of Prime Farmland or Farmland of Statewide Importance or irrigated, cultivated farmland	29, 30-37, 39	29, 30-37, 39	• Locate towers near field boundaries or service roads either perpendicular or parallel to crop rows. • Alternative structure design to minimize acreage removed from production • Minimize creating obstacles to aerial applicators.	Partially effective	Yes
Crossing an agricultural preserve	22, 24, 29, 30-39	22, 24, 29, 30-39	• Locate towers near field boundaries or service roads; avoid diagonal crossings of fields. • Alternative structure design to minimize acreage removed from production. • Minimize creating obstacles to aerial applicators.	Partially effective	Yes
VISUAL (See Section 3.7.3.3 in Volume 2A, Draft EIS/EIR)					
Incompatibility (contrast) and visibility from sensitive land uses, the upgrade area, and the Sacramento River Delta	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 17, 18, 19, 20, 21, 22, 24, 26, 28, 29, 30, 31, 33, 34, 35, 37, 38, 39	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 17, 18, 19, 20, 21, 22, 24, 26, 28, 29, 30, 31, 33, 34, 35, 37, 38, 39	• Use non-specular conductors. • Minimize vegetation clearing along roads and highways, rivers, trails and residential areas. • Minimize sitings on towers on ridgelines/hilltops.	Partially effective Reduces visibility but not contrast	Yes

1/ 1 = North 1; 2 = N-10G; 3 = N-10J; 4 = N-10K, 5 = N-10L; 6 = N-10M1; 7 = N-10M2(A1); 8 = N-10M2(A); 9 = North 2B; 10 = N-10 Alt.5(B); 11 = N-10 Alt.5(C); 12 = N-10 Alt.5(D); 13 = N-7 Alt.1(A); 14 = N-7 Alt.1(B); 15 = North 3J; 16 = N-8A(3); 17 = N-8C; 18 = North 4; 19 = N-8 Alt.2(A); 20 = N-9A; 21 = N-9C; 22 = N-9D; 23 = N-9G; 24 = N-9J; 25 = N-9N; 26 = N-9O; 27 = N-9Q; 28 = N-13A; 29 = Upgrade (S-1A); 30 = S-8B; 31 = S-8C; 32 = S-8 Alt.1; 33 = S-8E1(A); 34 = South 1; 35 = S-8K; 36 = S-9D; 37 = S-9G; 38 = South 2; 39 = S-8 Alt.3.

Significant Impacts Prior to Mitigation	Preferred Alternative Route Segment for Which Significant Impacts are Expected[1/] Before Mitigation	After Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
			• Feather edges of right-of-way clearing. • Use opaque porcelain insulators. • Darkened tower steel will be used where it can be expected to reduce visual impacts.		
Visibility from Lava Beds National Monument	2, 3, 4, 5, 6	2, 3, 4, 5, 6	• Use non-specular conductors. • Use opaque procelain insulators. • Use darkened tower steel where it can be expected to reduce impacts.	Partially effective	Yes
Crossing a sensitive land use such as roads, highways, rivers, and entrance to Lava Beds National Monument	All	All	• Use non-specular conductors. • Minimize vegetation clearing. • Use opaque porcelain insulators. • Feather edges of right-of-way clearing. • Use darkened tower steel where it can be expected to reduce impacts.	Partially effective	Yes
Crossing of federal lands managed for scenic quality values	1, 3, 4, 5, 7, 8, 9, 14, 16	1, 3, 4, 5, 7, 8, 9, 14, 16	• Use non-specular conductors. • Minimize vegetation clearing. • Feather edges of right-of-way clearing. • Use opaque insulators. • Use darkened tower steel where it can be expected to reduce impacts.	Partially effective	Yes
SOCIOECONOMICS (See Section 3.8.3.3 in Volume 2A, Draft EIS/EIR)					
Location of transmission line within 1.2 miles of a residential community or averaging more than 50 dwellings per corridor mile	27, 28, 32, 34	27, 28, 32, 34	• Avoid these areas where possible.	Partially effective	Yes
More than 1.7 miles of new access roads per corridor mile	12, 14, 15, 16, 18, 21	12, 14, 15, 16, 18, 21	• Minimize new access road construction. • Close all roads not needed for long-term maintenance activities.	Partially effective	Yes
Loss of $2,500 in agricultural production (both long- and short-term) per corridor mile	2, 26, 31, 32, 33, 34, 36, 37	2, 26, 31, 32, 33, 34, 36, 37	• Negotiate gate management program (compensation for losses is a standard practice during negotiation of easements).	Totally effective	No
CULTURAL RESOURCES (See Section 3.9.3.3 in Volume 2A, Draft EIS/EIR)					
Siting of transmission structures or access roads on archaeological or historic sites[2/]			• Site structures to span sites. • Plan access roads to avoid these sites and monitor construction to minimize impact.	Totally effective	No

1/ 1 = North 1; 2 = N-10G; 3 = N-10J; 4 = N-10K, 5 = N-10L; 6 = N-10M1; 7 = N-10M2(A1); 8 = N-10M2(A); 9 = North 2B; 10 = N-10 Alt.5(B); 11 = N-10 Alt.5(C); 12 = N-10 Alt.5(D); 13 = N-7 Alt.1(A); 14 = N-7 Alt.1(B); 15 = North 3J; 16 = N-8A(3); 17 = N-8C; 18 = North 4; 19 = N-8 Alt.2(A); 20 = N-9A; 21 = N-9C; 22 = N-9D; 23 = N-9G; 24 = N-9J; 25 = N-9N; 26 = N-9O; 27 = S-9O; 28 = N-13A; 29 = Upgrade (S-1A); 30 = S-8B; 31 = S-8C; 32 = S-8 Alt.1; 33 = S-8E1(A); 34 = South 1; 35 = S-8K; 36 = S-9D; 37 = S-9G; 38 = South 2; 39 = S-8 Alt.3.

2/ Exact placement of roads and towers in relation to sites cannot be determined until completion of archaeological survey.

TABLE 2A (CONTINUED)

Significant Impacts Prior to Mitigation	Preferred Alternative Route Segment for Which Significant Impacts are Expected[1/] Before Mitigation	After Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
			• If sites cannot be avoided, scientific excavation to recover data or stabilization and protection of sites.	Totally effective	No
Siting transmission structures or access roads on or near Native American sites	3, 12, 15, 16, 17, 19, 21	Unknown, pending final consultation with Native Americans	• Site structures to span sites. • Plan access roads to avoid such sites.	Totally effective	No
			• If cultural sites cannot be avoided, consult with Native Americans concerning potential mitigation measures.	Totally effective, given approval of tribal entity	No
			• If traditional food and medicine gathering areas cannot be avoided, consult with Native Americans concerning potential mitigation measures.	Totally effective, given approval of tribal entity	No
			• If cemeteries cannot be avoided, arrange for reburial.	Totally effective, given approval of tribal entity	No
CORONA, FIELD, AND SAFETY			• Recover blasting debris. • Use controlled blasting techniques. • Pick up trash. • Comply with aircraft safety regulations. • Cover open excavations at the end of each working day. • Conduct all work in accordance with applicable laws and regulations regarding safety, water quality, herbicide use and public health. • Use fully contained temporary sanitary facilities. • Use noise control techniques to minimize sound disturbance. • Implement a health and safety program. • Keep accurate records of death, occupational disease or traumatic injuries to employees or to the public. • Equip all vehicles with spark arrestors. • Prepare a comprehensive fire plan. • Secure motor vehicles when not in use to prevent rollaways. • Resolve radio and television interference complaints where the interference is caused by the Project facilities. • Prepare a comprehensive fire response plan. • Remove all flammable vegetation a minimum distance of 30 feet from towers and conductors. • Equip construction vehicles with fire fighting equipment. • Herbicides will not be used without permission from landowners, land management or other regulatory agencies.		
None					

1/ 1 = North 1; 2 = N-10G; 3 = N-10J; 4 = N-10K, 5 = N-10L; 6 = N-10M1; 7 = N-10M2(A1); 8 = N-10M2(A); 9 = North 2B; 10 = N-10 Alt.5(B); 11 = N-10 Alt.5(C); 12 = N-10 Alt.5(D); 13 = N-7 Alt.1(A); 14 = N-7 Alt.1(B); 15 = North 3J; 16 = N-8A(3); 17 = N-8C; 18 = North 4; 19 = N-8 Alt.2(A); 20 = N-9A; 21 = N-9C; 22 = N-9D; 23 = N-9G; 24 = N-9J; 25 = N-9N; 26 = N-9O; 27 = N-9Q; 28 = N-13A; 29 = Upgrade (S-1A); 30 = S-8B; 31 = S-8C; 32 = S-8 Alt.1; 33 = S-8E1(A); 34 = South 1; 35 = S-8K; 36 = S-9D; 37 = S-9G; 38 = South 2; 39 = S-8 Alt.3.

TABLE 2A (CONTINUED)

Significant Impacts Prior to Mitigation	Preferred Alternative Route Segment for Which Significant Impacts are Expected[1/] Before Mitigation	After Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
			• Electrical and magnetic field strength measurements will be made where necessary at appropriate locations to provide base level information on radio or television reception quality. • Herbicides will be used to hand treat stumps of sprouting tall-growing vegetation. • Herbicide use will be conducted in accordance with all applicable federal, state, and local requirements.		

1/ 1 = North 1; 2 = N-10G; 3 = N-10J; 4 = N-10K, 5 = N-10L; 6 = N-10M1; 7 = N-10M2(A1); 8 = N-10M2(A); 9 = North 2B; 10 = N-10 Alt.5(B); 11 = N-10 Alt.5(C); 12 = N-10 Alt.5(D); 13 = N-7 Alt.1(A); 14 = N-7 Alt.1(B); 15 = North 3J; 16 = N-8A(3); 17 = N-8C; 18 = North 4; 19 = N-8 Alt.2(A); 20 = N-9A; 21 = N-9C; 22 = N-9D; 23 = N-9G; 24 = N-9J; 25 = N-9N; 26 = N-9O; 27 = N-9Q; 28 = N-13A; 29 = Upgrade (S-1A); 30 = S-8B; 31 = S-8C; 32 = S-8 Alt.1; 33 = S-8E1(A); 34 = South 1; 35 = S-8K; 36 = S-9D; 37 = S-9G; 38 = South 2; 39 = S-8 Alt.3.

TABLE 2B

SUMMARY OF SIGNIFICANT ENVIRONMENTAL IMPACTS,
APPLICABLE MITIGATION MEASURES,
AND MITIGATION EFFECTIVENESS FOR LOS BANOS-GATES

Significant Impacts Prior to Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
CLIMATE AND AIR QUALITY			
None	Soil surfaces will be wetted at a rate of 0.5 gallons of water per square yard two times per day for dust control.	Partially effectiva	No
	When possible, construction activities should be scheduled during periods of low wind to reduce fugitive dust emissions.	Partially effective	No
	All construction equipment should be frequently monitored and serviced to ensure conformance with exhaust standards.	Totally effective	No
EARTH RESOURCES			
Soil erosion	• To the extent possible, minimize number and length of new construction access roads. • Use lightest duty construction that is practical; use temporary spur roads to towers and remove after construction. • Minimize vegetation disturbance along the alignment. • Design drainage control structures to carry runoff at appropriate velocities. Use properly sized and installed culverts under permanent access road field sections and discharge runoff to natural drainages that will not be overloaded. • Minimize steepness and unobstructed length of fill slopes. Protect new constructed fills from rain, splash, and surface runoff with slope protection, such as mulch, tackifier, or jute netting. • Replant temporarily disturbed areas with a mixture of perennial grasses, forbs, brush, shrubs, and tree species that will provide effective erosion control. Consider reseeding with native plants only in sensitive areas not subject to grazing.	Totally effective	No
Soil Compaction and Horizon Mixing	In agricultural areas where sites would be graded, topsoils should be stock-piled. After construction, topsoil would be replaced and the site graded to the original contours. If appropriate, the site should be reseeded in accordance with agency and/or landowner objective.	Totally effective	No

TABLE 2B (CONTINUED)

Significant Impacts Prior to Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
	Perform contour disking or ripping operations at the conclusion of construction.		
	Add chemical additives to soil during revegetation to counteract chemical imbalances caused by horizon mixing.		
Slope Stability	Base the tower design on geotechnical foundation evaluation and sound geotechnical engineering practice, including analysis for cut and fill slopes, compaction requirements, and surface or slope drainage.	Totally effective	No
Soil Hydro Compaction	Base the tower design on geotechnical evaluation and sound geotechnical engineering practice.		
WATER RESOURCES/FISHERIES			
Water Quality	• Where possible, avoid road construction on very steep slopes to minimize surface erosion and slumping. • Recontour, prepare the surface, and seed all roads, construction sites, and other disturbed areas not required for Project operation and maintenance. • As much as possible, avoid construction activities and land service disturbance in the immediate vicinity of unique plant communities and habitat features, such as remnant sand dunes, rock outcrops, riparian zones, alkali areas, other wet-, lands, kit fox natal dens, and raptor nesting cliffs. These unique features will be determined in consultation with resource agencies. • Avoid construction activities in water courses and wetlands, since these areas are both infrequent and sensitive in the generally arid project area.	Totally effective	No
VEGETATION			
Temporary removal of vegetation	• Where possible, avoid road construction on very steep slopes to minimize surface erosion and slumping. • Avoid work on unstable slopes and rock out-crops. • Minimize surface-distu[illegible]ing activities such as grubbing, grading, ditching, and filling to the extent possible. • Consider the use of various acceptable surface restoration practices such as tilling compacted soils, restoring natural surface contours and drainage patterns, reseeding with species mixtures that will provide effective erosion control.	Partially effective	No

Significant Impacts Prior to Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
	• Provide fire protection measures and avoid release of fuels, oils, and other hazardous substances to the ground and water.		
Permanent loss of vegetation	• Conduct site-specific scoping sessions as required under Section 7 of the Endangered Species Act. • Conduct ground surveys of potential sensitive plant habitat during the appropriate period prior to the selection of final alignments. • Avoid construction activities in water courses and wetlands and in unique or sensitive plant community areas. • Detailed mitigation plans for any impacts identified in alignment studies would be developed. Construction and siting details will be developed and presented to regulatory agencies for review and comment. Biologists from the concerned agencies could accompany crews during site selection and construction phases. • Avoid permanent access road clearing to the extent possible, allowing short annual grasses to cover the road surface.	Partially effective	No
WILDLIFE			
Surface clearing of wildlife habitat Temporary wildlife displacement during construction	• Technical specialists, including biologists, will survey the preliminary alignment in the field to determine any site-specific conditions that can be avoided, including fox burrows in denning areas, rat burrows, raptor nesting areas, and productive wetland areas. • Schedule activities to minimize construction in the specific vicinity of golden eagle nests or kit fox natal dens during the periods of greatest sensitivity, i.e., February through the end of the nesting or denning period.	Partially effective	No
Avian collisions with transmission lines	• Attach and maintain raptor nesting platforms to towers at intervals greater than one mile in raptor use areas. Place these on the towers between the structural steel members in a position least likely to cause operation and maintenance problems.	Partially effective	No
LAND USE AND LAND STATUS			
Loss of productive agricultural land	• Locate new access roads parallel to contours of land form whenever feasible. • Avoid diagonal orientations of transmission lines across cultivated fields.	Partially effective	Yes

Significant Impacts Prior to Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
	• Construction staging areas and pulling sites should be located adjacent to roads where practical. Soil from construction activity should be properly disposed. Wherever possible, shift construction areas to non-agricultural land or less sensitive crops. • All access roads not required for maintenance should be either permanently closed using the most effective and least environmentally damaging methods or be re-graded, put to bed, and revegetated with concurrence of the landowner.		
Impacts on irrigation practices	• Place towers away from the field where canals or irrigation ditches are located. • Avoid mechanical-move irrigation systems. • Select grazing lands or crops using flood or border-check irrigation over those using furrow irrigation (i.e., row crops). • Where towers must be located in row crops, tower footings and the transmission line alignments parallel to the rows are preferred over those perpendicularly aligned. • If practical, tower placement will be adjusted to avoid orchards and vineyards, row crops and furrow irrigation crops with tower-furrow angles greater than 61 percent. The alignment should avoid more heavily cultivated crops in preference for non-agricultural land or crops such as alfalfa, corn, and small grains.	Partially effective	Yes
Impacts on aerial applications	• Avoiding side by side transmission lines (as would be the case if the east alternative route were selected). • Avoid angular joining of route segments. • Avoid diagonal orientation of transmission lines and fields. • Placing transmission lines and towers toward the center of the field, where canals or irrigation ditches are located.	Partially effective	Yes
Impacts on recreation opportunities	• Use existing access roads wherever possible. • Control dust by watering roads. • Avoid construction at night to minimize noise, disturbance of campers and residents at the recreation areas.	Totally effective	No

TABLE 2B (CONTINUED)

Significant Impacts Prior to Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
	• Fence construction areas and laydown areas for public safety. • Provide adequate public access to recreation areas during periods of construction traffic congestion. • Repair any damage to recreation access roads. • Minimize visual impacts. • Site transmission line away from recreation facilities or areas of high recreation use.		
VISUAL RESOURCES			
Impacts on scenic quality	• Construction of new roads should be minimized; existing roads should be used to the maximum extent possible. • Design access roads to minimum standard necessary for construction and maintenance vehicle access. • Regrade and revegetate all roads not required for regular maintenance activities. • Avoid siting towers on ridgelands and hilltops wherever feasible to minimize the incidence of skylining towers. • Minimize number of towers visible from sensitive viewpoints within recreation areas by such means as extending the distance between towers, locating towers on site which would not be visible from sensitive viewpoints. • The finish on transmission towers should be dull and non-reflective, and conductors should be constructed of non-specular material. • Temporary facilities such as construction yards and conductor tensioning and splicer sites should be sited to minimize disruption of the landscape by landform alteration and vegetation removal.	Partially effective	Yes
SOCIOECONOMICS			
	• PG&E will provide clear information about right of way acquisition, construction and maintenance activities, and Project schedules.		
CORONA, FIELD AND SAFETY			
	• Appropriate selection of design parameters and proper location of the transmission line route to avoid critical locations will reduce corona-induced radio and television interference to acceptable levels.	Totally effective	No

TABLE 2B (CONTINUED)

Significant Impacts Prior to Mitigation	Mitigation Measures That Apply	Effectiveness of Mitigation	Will Significant Residual Impact Remain
	• An ambient noise survey will be conducted at selected sensitive sites prior to construction and operation of the line. These measurements will then be available if complaints are received after the line is placed in operation. • PGandE will resolve AM radio and television interference complaints when the cause of the interference has been determined to be from PGandE facilities. • To provide a basis for evaluating and correcting any adverse effects, radio and television field strength measurements will be made after selection of the final transmission line alignment and prior to construction of the Project.		
CULTURAL AND PALEONTOLOGICAL RESOURCES			
	• Conduct preconstruction field surveys to locate and record cultural and paleontological resources. • Avoid sensitive resources by locating construction activities in non-sensitive locations. • Conduct cultural resources data recovery program. • Consult with Native Americans concerning Native American resources that cannot be mitigated through avoidance. • Assess resources for value through consultation with Native American State Historic Preservation officers, other agencies and recognized professionals. • If significant resources are present and avoidance is not possible, data recovery will be performed.	Totally effective	No

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SECTION 1.0
CHANGES TO THE DRAFT EIS/EIR

1.0 CHANGES TO VOLUME 1 OF THE DRAFT EIS/EIR

There have been a number of changes to the data and analyses presented in Volume 1 of the Draft EIS/EIR. This section of the Final EIS/EIR documents those changes.

1.1 VOLUME 1

The sections of Volume 1 of the Draft EIS/EIR updated by information in Section 1.0 are listed below:

Draft EIS/EIR Volume 1 Section		Final EIS/EIR Volume 1 Section	
1.0	Purpose of and Need for Actions	1.1.1	Purpose of and Need for Actions
2.0	Alternatives Including the Proposed Actions	1.1.2	Alternatives Including the Proposed Actions
3.0	Affected Environment	1.1.3	Affected Environment
4.0	Environmental Consequences	1.1.4	Environmental Consequences
5.0	Mitigation Measures for Alternatives	1.1.5	Mitigation Measures
6.0	Compliance with Laws and Regulations	1.1.6	Compliance with Laws and Regulations
7.0	Summary of Public and Agency Consultation	1.1.7	Summary of Public and Agency Consultation
8.0	List of Preparers	1.1.8	List of Preparers
9.0	Individuals and Organizations Receiving a Copy of the Draft EIS/EIR	1.1.9	Individuals and Organizations Receiving a Copy of the Draft EIS/EIR
10.0	Glossary and Abbreviations	1.1.10	Glossary and Abbreviations
11.0	References	1.1.11	References
12.0	Index	1.1.12	Index

Purpose of and Need for Actions

1.1.1 CHANGES TO THE DRAFT EIS/EIR VOLUME 1 SECTION 1.0 - PURPOSE OF AND NEED FOR ACTIONS

1. Page 1.0-1

   Paragraph 1, preceding Line 1.
   Add: "This and the following sections contain terms that may be unfamiliar to reviewers of the document. To aid the reviewer, a glossary and list of abbreviations are provided in Section 10.0 of the Draft EIS/EIR and in Section 1.1.10 of this document."

2. Page 1.2-1

   Paragraph 4, Line 11.
   Add: "However, a portion of the spill occurring during 1982 and 1983 was planned spill needed to assist fish passage. An additional amount was spilled because of turbine capacity limits. A portion could have been made available to California if additional Intertie capacity had been available at that time." after "$320 million."

3. The following information is added to Section 1.5 of the Draft EIS/EIR and addresses some of the more frequently encountered topics included in comments received on the Draft EIS/EIR on the general subject of need for the projects and project economics and benefits. These topics include:

   - Consistency of the analysis of the COTP with the California Energy Commission's 1986 Electricity Report.
   - Assumptions used regarding the price of energy from the Pacific Northwest.
   - Economic analysis of the Los Banos-Gates transmission line segment.
   - Potential for displacement of conservation, cogeneration, and renewable energy project development by power delivered over the COTP.

1986 CEC Electricity Report Comparisons

When the extensive analysis of the effects of the COTP on the California electric utility system was performed, the 1986 CEC Electricity Report had not been completed. Since completion of the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the COTP, the CEC has adopted the 1986 Electricity Report. The major components of that report which are most relevant to the determination of need for the COTP are the utilities' resource plans, the projected statewide demand for energy, and the prices for natural gas and Northwest energy.

As shown in Figure 1.1.1-1 in this addendum, the price of Pacific Northwest energy for sale to California that was forecasted in the draft 1986 Electricity Report falls within the range of the sensitivity cases evaluated in the analyses supporting the Draft EIS/EIR for the COTP. Similarly, as shown in Figures 1.1.1-2 and 3, the forecast of statewide demand for electricity presented in the 1986 Electricity Report falls within the range of demand forecasts used in the sensitivity cases evaluated in the Draft EIS/EIR. There have been some changes in the statewide utility resource plans since completion of the CEC 1986 report referenced in the Draft EIS/EIR. However, the capacity and energy expected to be available to California through the added transmission capability to be provided by the COTP is still expected to 1) displace oil- and gas-fired power production from existing oil/ gas-fired capacity and to 2) displace the need for new combustion turbines and combined cycle facilities. The power resources that would be displaced, the oil/gas prices, and the demand for energy in the state evaluated in the analysis presented in Volume 3A of the Draft EIS/EIR remain representative of the findings in the 1986 Electricity Report.

Pacific Northwest Energy Prices to California

As can be seen by a review of the comments on the Draft EIS/EIR in Volumes 2A, 2B and 3 of this Final EIS/EIR, there were several comments on the issue of price of energy purchases from the Pacific Northwest. The economic analysis of the COTP presented in Appendix B to Volume 3A in the Draft EIS/EIR (Section 1.5 in Volume 1 of the Final EIS/EIR) estimated the price of energy from the Pacific Northwest at 60 percent to 75 percent of the price of oil/gas burned in a combustion turbine.

Several comments on the Draft EIS/EIR stated that Northwest energy prices should be at a higher percentage of the cost of fuel burned in a combustion turbine. As is explained in many of the responses to comments presented in Volumes 2A, 2B and 3 to this Final EIS/EIR, the power delivered over the COTP is expected to reduce operation of oil/gas-fired steam plants which have a substantially more efficient operation (lower heat rate) than a combustion turbine. Consequently, the cost of 60 percent to 75 percent of the cost of fuel burned in a combustion turbine is equal to approximately 75 percent to 90 percent of the cost (in cents per kilowatthour) of gas burned in a gas-fired steam plant or combined cycle plant.

As explained in Volume 3A of the Draft EIS/EIR and in the responses to comments in Volumes 2A, 2B and 3 to this Final EIS/EIR, the Pacific Northwest utilities' price for power sales to California must be based on the value of such purchases to the California utilities. Since the price of Pacific Northwest energy at prices equal to 75 percent to 90 percent of the avoided cost of gas steam plant operation (equal to 60 percent to 75 percent of combustion turbine fuel cost/kWh) is higher than the Northwest's costs to generate such energy and is below California's cost to generate from oil/gas-fired plants, the pricing assumptions for Pacific Northwest energy used in the economic analysis presented in the Draft EIS/EIR are reasonable.

Figure 1.1.1-4 compares the projected price of natural gas used in the economic analysis of the Project as presented in this Final EIS/EIR with the CEC forecast of natural gas prices as presented in the 1986 Electricity Report. The CEC forecast of natural gas prices is between the "weak OPEC" and "strong OPEC" pricing scenarios used in the analysis.

The comparison of assumptions used in this report with those of the CEC in the 1986 Electricity Report as shown in Figure 1.1.1-1 and in Figure 1.1.1-4 is further evidence of the reasonableness of those pricing assumptions.

Los Banos-Gates Line Segment

The Draft EIS/EIR includes 7/16 of the cost of the 500 kV line between the Pacific Gas and Electric Company (PGandE) Los Banos and Gates Substations as part of the facilities associated with development of the COTP. Since completion of the Draft EIS/EIR, PGandE has indicated that after further analyses the Los Banos-Gates line segment may not be needed, at least in the early years of the life of the COTP. The determination of the need for, the cost basis, or the timing of the future need for this line segment may require final design and further transmission system studies. For purposes of this Final EIS/EIR, the analysis of the Los Banos-Gates segment has been retained. In the event the Los Banos-Gates line is not required to achieve the benefits of the COTP, the cost of the Projects would be modified and would likely be reduced, thereby further improving the anticipated net economic benefits of the COTP.

Displacement of Conservation, Cogeneration, and Renewable Resource Projects

Some of the comments received indicated concern that the COTP would displace the development of conservation, cogeneration, or other renewable and efficient energy resources. As shown in Appendix B to the Draft EIS/EIR, the resource plans assumed to be developed <u>with</u> the COTP in place include conservation, cogeneration, and renewable power resource development (the latter two types of facilities are referred to as "Qualifying Facilities") equal to or greater than the levels assumed by the California Energy Commission and the California utilities. Consequently, power delivered over the COTP is not expected to displace anticipated conservation, cogeneration, or other renewable energy resources.

To the extent power delivered over the COTP reduces the marginal cost of power to California utilities, it could potentially affect the extent of new cogeneration or renewable resources not yet planned or anticipated. Cogeneration or other Qualifying Facilities are preferred resources as alternatives to the use of non-renewable fossil fuels or as alternatives to the construction of power plants to use such fuels. Consequently, to the extent the COTP could at some time in the future reduce the amount of new cogeneration or renewable energy generation facilities, it would only be because the power delivered over the COTP has displaced more expensive oil/gas-fired capacity and energy to the point where the marginal cost of capacity and energy to California utilities is lower than can be achieved by conservation or

Qualifying Facility development. If this level of cost reduction is achieved, it would be a temporary situation until demand increased to the point where new Qualifying Facilities could cost-effectively compete with other generation alternatives.

Figure 1.1.1-1

Northwest Price Forecasts

Draft COTP EIS/EIR vs Draft CEC 1986 Electricity Report

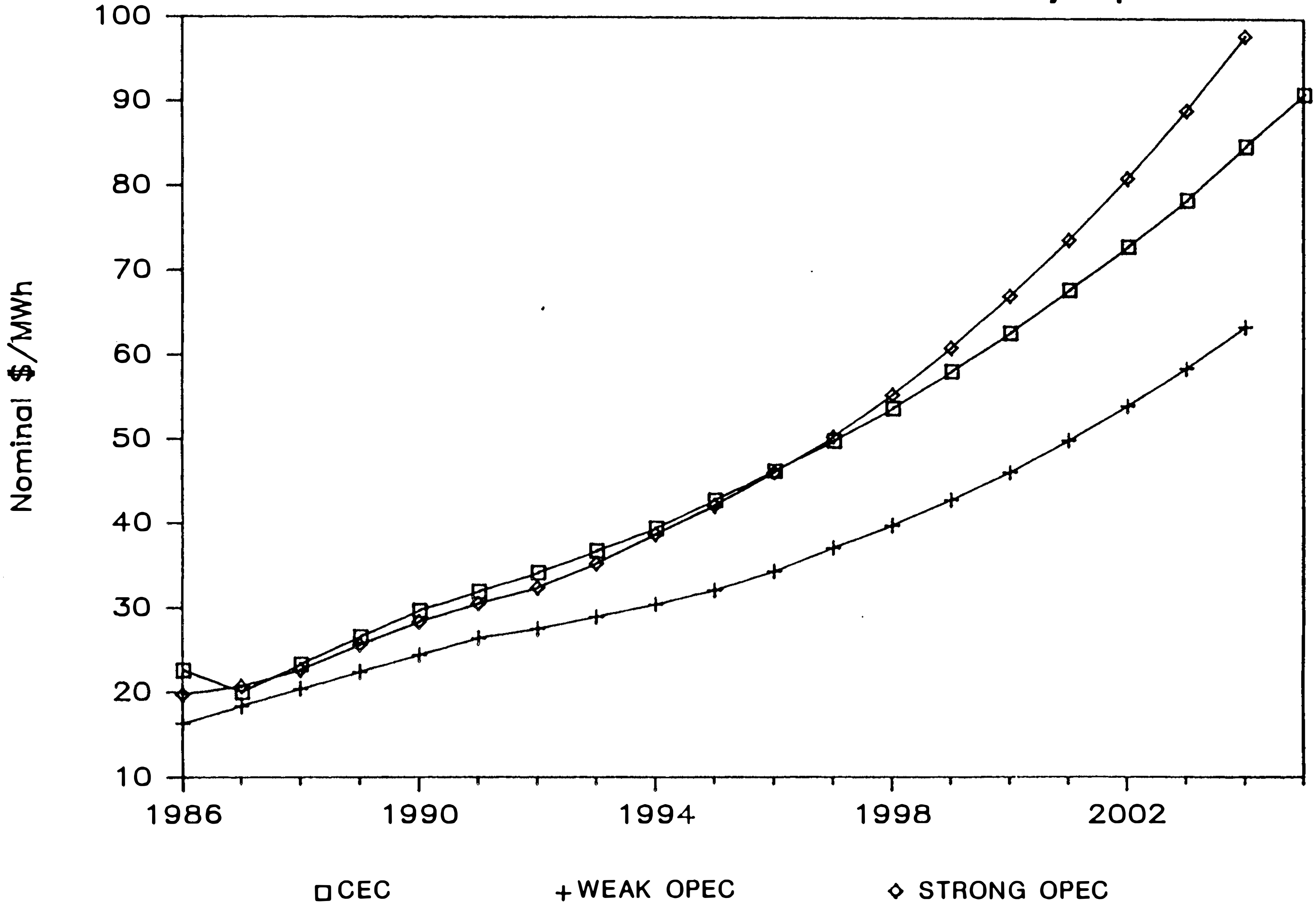


Figure 1.1.1-2

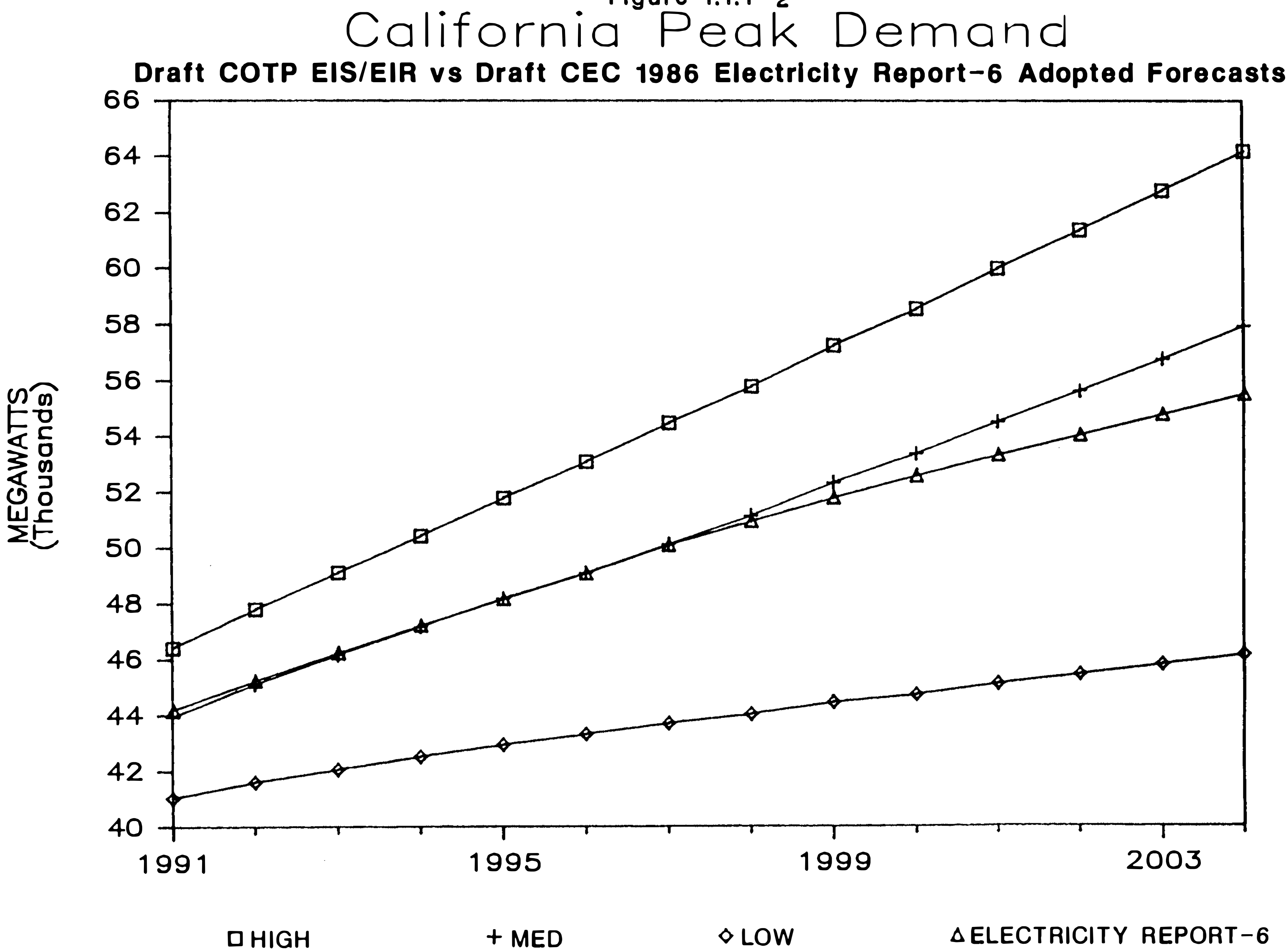

California Peak Demand
Draft COTP EIS/EIR vs Draft CEC 1986 Electricity Report-6 Adopted Forecasts
MEGAWATTS (Thousands)
66
64
62
60
58
56
54
52
50
48
46
44
42
40
1991
1995
1999
2003
HIGH
+ MED
LOW
ELECTRICITY REPORT-6

Figure 1.1.1-3

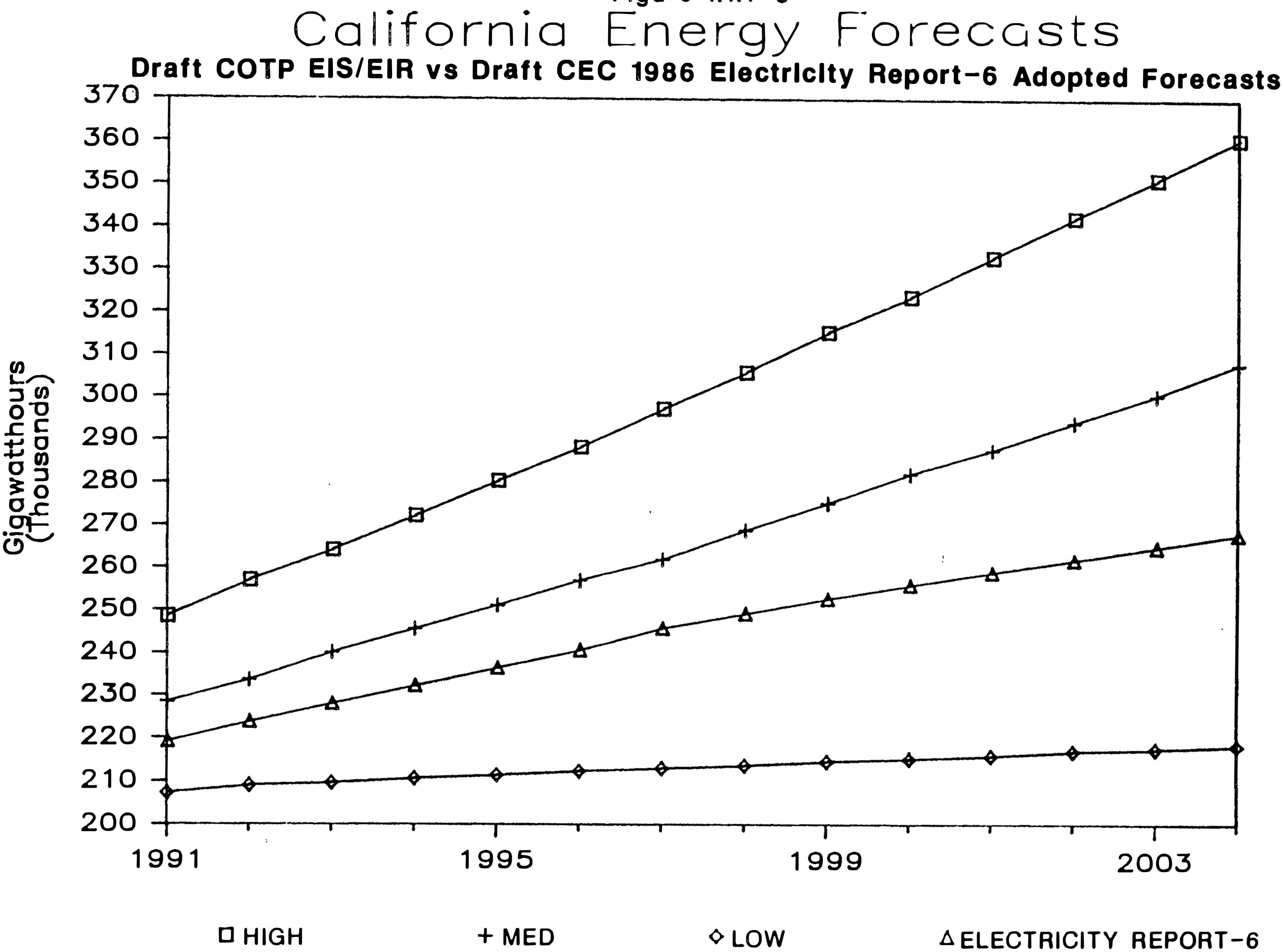
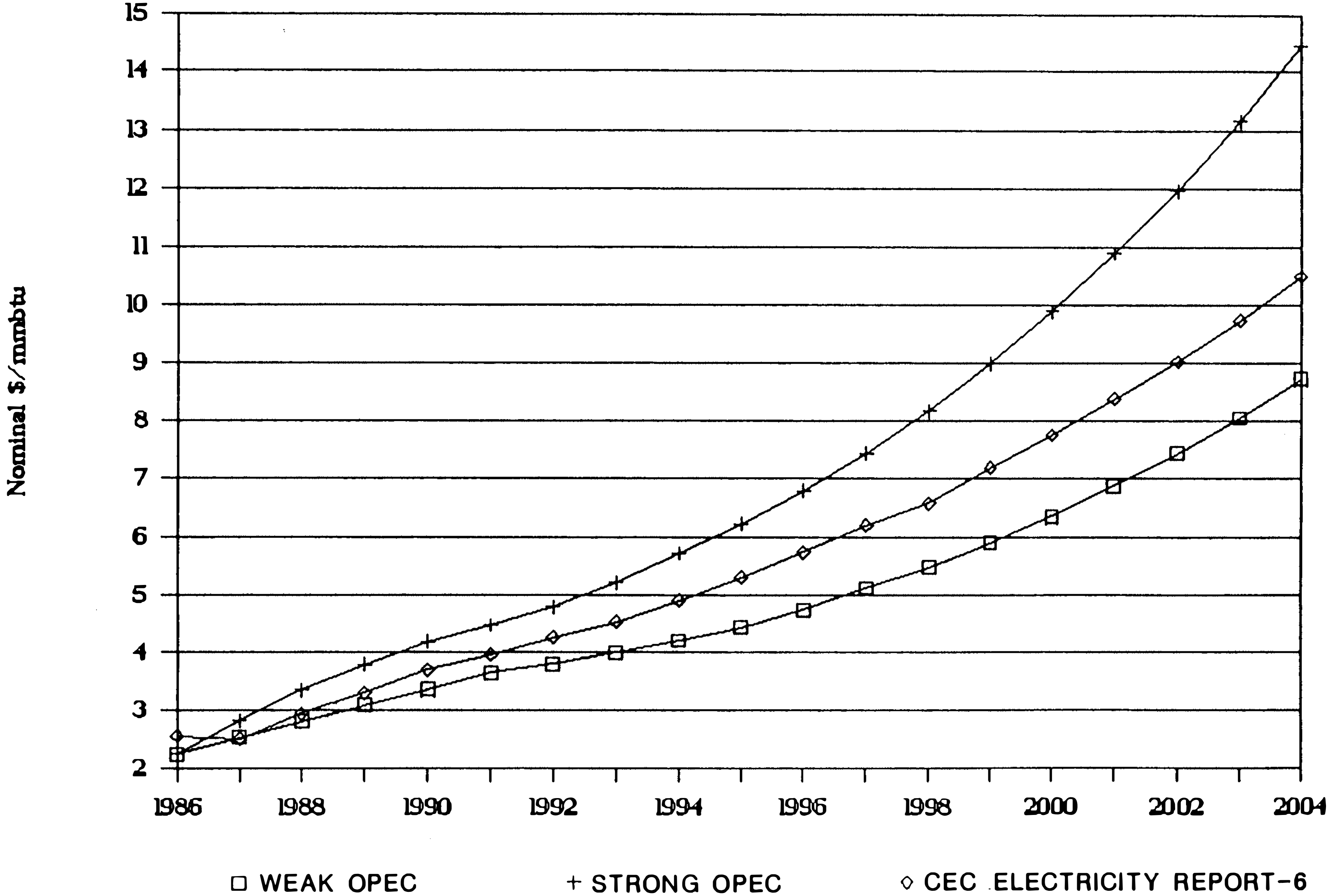

California Energy Forecasts
Draft COTP EIS/EIR vs Draft CEC 1986 Electricity Report-6 Adopted Forecasts
Gigawatthours (Thousands)
370
360
350
340
330
320
310
300
290
280
270
260
250
240
230
220
210
200
1991
1995
1999
2003
HIGH
+ MED
LOW
ELECTRICITY REPORT-6

FIGURE 1.1.1-4

NATURAL GAS PRICE FORECASTS



Alternatives Including the Proposed Actions

1.1.2 CHANGES TO THE DRAFT EIS/EIR VOLUME 1 SECTION 2.0 - ALTERNATIVES INCLUDING THE PROPOSED ACTIONS

1. Section 2.1 has been revised to describe the final COTP proposed action. The numbers in parentheses following the subheadings indicate the corresponding section in the Draft EIS/EIR.

   Several facilities would be required as part of the COTP. These include transmission lines, substations, and communication facilities. All facilities would be constructed to satisfy electrical system requirements and regulations and would be designed for expected naturally occurring phenomena such as wind, icing, storms, and earthquakes. Figure 1.1.2-1 is a general map showing the major COTP features. The design, construction, operation, and maintenance of the COTP would include certain mitigation measures. These measures are listed in Section 1.1.5 of this volume.

   Transmission Lines (2.1.1)

   This section briefly discusses system planning, system design, right-of-way acquisition, construction practices, and operation and maintenance practices related to the COTP transmission line. These activities are more fully described in Volume 3A, Appendix A of the Draft EIS/EIR.

   The proposed transmission lines include:

   - Constructing a new 500 kV alternating current (AC) transmission line (approximately 146 miles long) from the California-Oregon border area to the Redding, California area.
   - Upgrading an existing double-circuit 230 kV AC line (approximately 170 miles long) owned by the Western Area Power Administration to a single-circuit 500 kV AC line from the proposed Olinda Substation to the Sacramento River.
   - Constructing approximately 20 miles of new 500 kV transmission line from the Sacramento River to the existing Tracy Substation.
   - Constructing a new 500 kV AC double-circuit link (approximately 6 miles long) between the Tracy Substation and the existing Tesla Substation. The 500 kV double-circuit line would interconnect with the existing Tesla-Los Banos No. 2 500 kV line, thus creating the Tracy-Tesla 500 kV transmission line, and the Tracy-Los Banos 500 kV transmission line. This interconnection would be made slightly south of the Tesla Substation. The option of building two single circuit lines discussed in the Draft EIS/EIR has been eliminated because of right-of-way limitations between Tracy and the Tesla area.

   System Planning

   The Preferred Route Plan of Service for the COTP (1987) describes many system planning considerations that are refinements to the Preliminary Plan of Service described in the Draft EIS/EIR. The Preferred Route Plan of Service also documents continuing studies to determine the technical requirements and feasibility of meeting the defined transfer levels. The electrical parameters of the COTP will continue to require refinement as substation design proceeds and electrical equipment specifications are finalized.

   The results of the above and other studies described in Volume 3A, Appendix A of the Draft EIS/EIR, indicate the importance of providing sufficient reliability to assure that a system-wide outage does not occur.

   Transmission Line Design

   The proposed transmission line would be supported on steel structures and would be designed to meet or exceed the requirements of California Public Utilities Commission General Order No. 95 or the National Electric Safety Code (NESC), whichever is more stringent. The structures would support bundled conductors on "V" string insulator assemblies. Two lightning protection shield wires would be used except for the Western upgrade towers that would have one shield wire. A bundle of three sub-conductors for each phase would be used from southern Oregon to the Tracy Substation. Between the Tracy Substation and Tesla Substation, a bundle of two sub-conductors would likely be used.

Several types of towers may be used for the COTP. Typical structures are illustrated in Figure 1.1.2-2. The single-circuit lattice design is being considered for areas north of Olinda, the proposed Redding area substation with some exceptions. A double circuit tower is being considered between the Cottonwood area and the Olinda Substation. South of the Sacramento River, angle structures will be of the upgrade design (Figure 1.1.2-3), and the remaining structures will be either of the upgrade design or the single circuit H-frame structure shown in Figure 1.1.2-2. The double-circuit tubular design will likely be used between the Tracy Substation and Tesla Substation.

Figure 1.1.2-3 shows the Western 230 kV double-circuit tower to be upgraded between the Olinda Substation and the Tracy Substation. The upgrade would add steel members to the existing lattice towers to convert them to 500 kV towers. Approximately ten percent of the existing towers on the upgrade section will need to be either relocated along the existing right-of-way, or will require modifications to their foundations.

For all designs, minimum conductor-to-ground clearances would typically be 36.3 feet, approximately 170 feet for navigable river crossings such as the Sacramento River, and 40.3 feet above railroad tracks. The average span length would be approximately 1,200 feet, with an average of 4.8 structures per mile. Two shield wires would be strung on the top of towers north of the Olinda Substation and south of the Tracy Substation to shield the conductors from direct lightning strikes. One overhead wire is proposed on Western's upgrade north of the Sacramento River and on some tubular steel designs.

Right-of-Way Acquisition

Some activities that normally precede right-of-way acquisition have begun. A listing of landowners along alternative routes has been prepared. Title reports and appraisal information are being developed. The next step is for the COTP land services representative to contact landowners and explain the right-of-way acquisition procedures.

Following the lead agencies' decisions on the Final EIS/EIR, contracts for right-of-way easements acquisition would be negotiated and completed. New easement rights would be required for transmission lines and access roads. The easements for new construction, upgrading, and paralleling or replacing existing lines vary depending on the location and ownership involved. These processes are more fully discussed in Appendix A of Volume 3A of the Draft EIS/EIR.

For a new right-of-way, an easement to build, operate, and maintain the transmission line would be acquired. A typical easement would consist of a 200-foot right-of-way, but may vary in some places where wider easements are required, such as for long spans and special structures. Easements may be acquired by one or more of the COTP Participants or Northwest utilities. The landowner would generally retain title to the land and would be able to use it for activities that are compatible with the transmission line, such as agriculture. The landowner would receive compensation for the easement based on the fair market value of the land.

Between the proposed Olinda Substation and the Tracy Substation, Western has an easement of approximately 125 feet in width for its existing lines. The design for the upgrade section would involve installing a 500 kV line in an easement designated for a 230 kV line. Additional rights would have to be acquired, but no additional right-of-way would be needed in most areas. Minor relocations of structures and the ties to the Olinda and Tracy Substations may require some additional right-of-way in these areas. Easement rights for access roads to the right-of-way would be acquired over certain existing roads and trails.

Where existing transmission lines would be paralleled or replaced, rights-of-way would also need to be acquired. The width would vary, but in general, easement provisions would be similar to those described above. The typical right-of-way width required for each route segment is presented in Table 2.1-1 of Volume 3A, Appendix A of the Draft EIS/EIR. Where the transmission line traverses areas of tall or heavy timber, special limited easements of varying widths may be acquired adjacent to the transmission line ROW to provide for the removal of danger trees.

Construction Practices

During the construction of an extra high voltage (EHV) transmission line, there are several basic phases of work including surveying, clearing, construction of access roads, foundation installation, dispersement of materials, structure erection, conductor stringing, conductor stringing site restoration, and final clean-up. Volume 3A, Appendix A of the Draft EIS/EIR discusses the phases in greater depth.

Operation and Maintenance Practices

The proposed transmission line would be energized and operated at a nominal voltage of 525 kV, plus or minus five percent. Changes in power flow would cause minor fluctuations in the actual operating voltage. System dispatchers in power control centers would direct the day-to-day line scheduling and equipment operation by supervisory control to operate, maintain, and protect the system. Circuit breakers would operate automatically in an emergency to minimize damage to the system.

Outages along the existing Intertie have been caused in the past by severe ice and wind storms, forest fire alerts and associated smoke, equipment failures, lightning, and human error. Sufficient time is needed for system dispatchers to reduce the loading on the existing 500 kV lines to a safe level without causing a disruption in service. Depending on the availability of localized generating resources, this can be done in a relatively short time, estimated to be between one and two hours. However, considerably more time, estimated up to eight hours, could be required to "unload" all three 500 kV lines to a safe level.

Land use activities within the transmission line right-of-way would be permitted within the terms of the easement. Farming and grazing are generally encouraged within the right-of-way if appropriate precautions are observed. Incompatible activities not permitted within the right-of-way would include constructing buildings, drillings wells, or other activities that may compromise the safe operation of the transmission line.

Various techniques would be used within the right-of-way to control or eliminate vegetation that could interfere with reliable service. Techniques include hand and mechanical cutting as well as selective application of herbicides. The management objective, type of vegetation present, adjacent land use and development, and impacts of the control technique would be considered in selecting the most appropriate method for each right-of-way segment or facility. Herbicides will not be used on National Forest System lands unless current policy changes.

A maintenance program would be established to ensure continued reliable service of the transmission system. The proposed transmission line structures, access roads, and rights-of-way would be regularly inspected by foot, vehicle, or air patrol one to three times per year. Emergency repairs would be made if the transmission line were damaged and required immediate attention. Maintenance crews of generally less than ten persons would use tools, trucks, assist trucks, aerial lift trucks, cranes, and other equipment necessary for repairing and maintaining insulators, conductors, structures, and access roads.

Substation, Switching Station, and Series Compensation Station (2.1.2)

The COTP would require construction of one new switching station (southern Oregon area), one new substation (Olinda), and a new series compensation station near Maxwell (approximately midway between the proposed Olinda Substation and the Tracy Substation). In addition to these new facilities, modifications and equipment additions would be required at two existing facilities (Tracy Substation and Tesla Substation).

Each facility would contain equipment that may include power circuit breakers, buswork, a control house, metering equipment, communications equipment, lightning and switching surge protection and relay equipment, and line terminals. In addition, the Olinda Substation and Tracy Substation would be equipped with power transformers that would convert the 500 kV operating voltage of the COTP to the 230 kV operating voltage. The substations and switching stations could also be equipped with series and/or shunt capacitor banks and shunt reactors. This equipment would be used for voltage and power flow control.

Southern Oregon Switching Station. This switching station would require a site that is approximately 500 feet x 1,500 feet. The major equipment items to be installed would be buswork, control and metering equipment, a control building, a minimum of three 500 kV power circuit breakers, series capacitors and shunt reactors. Site E3 (Figure 1.1.2-4) has been identified as the Project preferred site.

Olinda Substation. The Olinda Substation would be a new facility. Four potential sites have been identified (Figure 1.1.2-5). All are near Gas Point Road and the existing Western Area Power Administration 230 kV transmission lines. Site GP4 has been identified as the Project preferred site.

The Olinda Substation would require a site approximately 2,000 feet x 2,000 feet. The major equipment items would consist of series and shunt capacitors, shunt reactors, 500 kV power circuit breakers, power transformers, 230 kV power circuit breakers, buswork, control and metering equipment, and a control building.

The substation designs and transmission line approaches for the Olinda Substation are being refined. Some of the existing transmission line structures will be moved to allow better alignment of the lines into the substation. The structure relocations will be minor and within the area starting just north of Gas Point Road that was analyzed in Appendix C, Volume 3A of the Draft EIS/EIR.

Tracy Substation. The Tracy Substation expansion would require an area of approximately 1,000 feet x 2,000 feet. The facilities would consist of buswork, control relay and metering equipment, a control building, shunt reactors, series and shunt capacitors, 500 kV power circuit breakers, power transformers, and 230 kV circuit breakers. Six 230 kV circuit breakers will be replaced with breakers of higher ratings. To make room for the substation additions and the 500 kV line approach spans, the approach spans of the Hurley-Tracy 230 kV lines need to be relocated starting just north of the Byron Highway. Based on a suggestion by the landowner, these lines would be moved nearer to the Delta-Mendota Canal and would be placed on one set of double-circuit structures. The northernmost location, Site T1, (Figure 1.1.2-5) has been identified as the Project preferred site.

Tesla Substation. The COTP 500 kV line will interconnect with the existing Tesla-Los Banos #2 transmission line just south of the Tesla Substation. As a result, only minor relaying changes and the replacement of two 230 kV power circuit breakers will occur within the Tesla Substation.

Maxwell Series Compensation Station. System studies indicate that an intermediate series compensation station (Maxwell) is required near the midpoint of the Olinda Substation to Tracy Substation transmission line segment.

The compensation station would occupy a site approximately 400 feet x 400 feet. The major equipment items would consist of series capacitors and control equipment, bus work, and line dead-end structures. The site would be graded and fenced, and would include a control building. Site SC3 (Figure 1.1.2-6) has been tentatively identified as the preferred site.

Communication Facilities (2.1.3)

It is anticipated that 10 to 15 new microwave facilities may be required for protective relaying, supervisory control, data acquisition, and power dispatching. In addition, expansion of 10 or more existing sites may be required. The telecommunication system would be used to control the transmission system and provide voice communication circuits to coordinate activities in operating and maintaining the facilities. Figure 2.1-6A of Volume 1 of the Draft EIS/EIR shows the sites currently under investigation as potential locations for the communication systems. A detailed engineering analysis will be made of each of the sites, and a final system will be developed based upon those recommendations. In addition to the sites listed in Figure 2.1-6A of Volume 1 of the Draft EIS/EIR, a radio station owned by BPA is located on Buck Butte, approximately two miles from the Southern Oregon Switching Station site.

The proposed communication facilities would be constructed at existing developed sites where possible. A typical communication site would be fenced and contain an insulated building, a self-supporting tower, a commercial AC power line, and a cleared area for a helicopter pad. At new sites, land and rights would be acquired for facilities and access roads.

Construction at each site would consist of building access roads where necessary, site grading, foundation installation, building and tower erection, fencing, equipment installation and startup, and final cleanup of the site. Communication facilities would operate automatically, with no attending personnel. The building would be locked with entry restricted to appropriate utility personnel. The maximum power of the microwave transmitter at each facility would be approximately five watts. Maintenance of the proposed communication facilities would commonly involve testing, repair, and replacement of electronic equipment within the building.

The proposed communications facilities would be constructed at existing developed sites where possible. However, the need to maintain the reliability of the overall system must be given priority over the use of sites which presently are associated with the existing AC Intertie. If it is determined that sharing a communication site with the existing AC Intertie could contribute to a multiple line outage, a different site would be selected in the interests of the reliability of the three-line system.

Alternative Transmission Line Routes (2.1.4)

Routing alternatives for the COTP were developed through a narrowing process. Starting with a regional study area, corridors two to five miles wide were first identified by considering environmental, economic, and engineering constraints, and public input. Within the generally defined corridors, alternative routes 1,500 feet wide were then delineated. With the input received from the public alternatives were reviewed and refined. The result was a set of route segments that appear to be acceptable from environmental, economic, and engineering perspectives, and which were combined to establish a reasonable range of alternatives for consideration. For ease of evaluation, the alternative routes for the COTP were analyzed in three sections: the Northern Section, the Central/Upgrade Section, and the Southern Section. The Central/Upgrade and Southern Sections lie entirely within California. Several miles of the Northern Section lie within Oregon. A more complete discussion of the routing process and of routes suggested prior to the release of the Draft EIS/EIR is presented in the Phase II Report of Volume 2A of the Draft EIS/EIR. A discussion of routes suggested since the Draft EIS/EIR, but not adopted, is presented in Section 1.2.2 of this document.

Since release of the Draft EIS/EIR, agencies and the public have provided additional route suggestions that were considered by the lead agencies. Most of the routes were contained in the Supplement to the Draft EIS/EIR released for public review in early July 1987. A comparison of the merits of these new route options to the preferred route contained in the Draft EIS/EIR resulted in revisions to the Project preferred route. A description of the process leading to the new preferred route is presented in Section 1.2.2 of this Final EIS/EIR. Table 1.1.2-2 identifies certain routes that were subdivided and renamed as a result of the new route analyses.

The U. S. Forest Service indicated in November 1987 that the area east of the North 3J corridor (east of Little Meadows) has a feasible route location that will minimize resource impacts while meeting geologic concerns. Should a superior location be found near North 3J during final design, the lead agencies will work with the Forest Service to identify, review, and approve that location.

The revised Project preferred route is listed in Table 1.1.2-1 and shown in Figures 2 and 3 following the Abstract in this document.

Project Preferred Route (2.1.4.2)

North D of the four northern alternatives discussed in the Draft EIS/EIR, and South B of the three southern alternatives, represented both the environmentally superior and Project preferred alternatives. Route segments discussed in the Supplement to the Draft EIS/EIR were options within Alternatives North D and South B.

Alternative D in the northern section was chosen as the environmentally preferred alternative primarily because it minimized impacts to timberlands and minimized impacts to earth, water and vegetation resources and critical wildlife species and their habitats. Alternative D was selected as the Project preferred route because this alternative satisfies transmission system reliability considerations provided that a fuels management plan and fire response plan is developed in conjunction with the USDA Forest Service and implemented by the COTP for the area between the existing Intertie and the preferred route as revised. The USDA Forest Service indicated in November 1987 that the area east of the North 3J corridor (east of Little Meadows) has a feasible route location that will minimize resource impacts while meeting geologic concerns. Should a superior location be found near North 3J during final design, the lead agencies will work with the Forest Service to identify, review, and approve that location.

Alternative B in the southern section was identified as the environmentally superior alternative because it minimized impacts to developed and planned land uses to the extent practical. Alternative B was selected as the Project preferred route because environmental impacts are minimized while separation from the existing Intertie is maximized to the extent practical.

Based on environmental, engineering, and economic considerations, the lead agencies have selected the recommended environmentally superior alternative with the exception of one area in the Tulelake basin and one area near Bear Mountain. In the Tulelake basin, the lead agencies found the recommended environmentally superior route (N-10 Alt.4) to have prohibitively high costs compared to slight environmental benefits and is therefore not feasible from an economic perspective. In the Bear Mountain area, the lead agencies found that more extensive access road and construction efforts on North 2C made the comparison with North 2B so close that one is not clearly environmentally superior to the other. In this and other areas, environmental impacts along the preferred route can be reduced through implementation of mitigation measures. These segments are noted on Table 1.1.2-1 at the end of this section. In each of these areas, the environmental impacts can be reduced to acceptable levels through implementation of mitigation measures. The environmental aspects of the complete set of routing alternatives and options are discussed in Volume 1, Sections 3.0 and 4.0 of the Draft EIS/EIR and in the Supplement to the Draft EIS/EIR. Tables 1A, 1B, and 1C in the Summary of this document present much of this information in tabular form. Section 1.2.2 of this document and Section 2.0 of Volume 2A of the Draft EIS/EIR discuss the process for the selection of both the environmentally superior and Project preferred route. Section 1.1.5 of this document describes the mitigation measures to be implemented.

Associated Facilities (2.1.5)

Associated facilities as used in this Final EIS/EIR are defined as potential new facilities involving COTP Participants considering the option of direct connections with Western's system to obtain COTP power. The utilities currently evaluating associated facilities include: City of Alameda, City of Lodi, City of Palo Alto, City of Santa Clara, Modesto Irrigation District, and Turlock Irrigation District. These facilities are in preliminary planning stages and would generally have benefits to the proponents in addition to direct access to COTP power. The Participants have indicated that the need for new facilities would not be a direct result of the COTP due to their option of being able to utilize existing wheeling arrangements guaranteed through the MOU the Participants have executed. Therefore, direct interconnections would not be a direct result of the COTP. If interconnections are proposed, separate environmental documentation would be prepared.

Schedule (2.1.6)

The updated schedule for the design and construction of the COTP is presented in Figure 1.1.2-7.

2. Page 2.2-1

After paragraph 2, bullet 6, add the following:

"If the Los Banos-Gates transmission line would not be constructed or would be deferred, it may then be necessary to modify the transmission system south of Tesla Substation to support the increased power transfer resulting from COTP. These potential modifications include:

- Upgrade of existing 500 kV series capacitors in the Los Banos-Midway 500 kV lines at Los Banos Substation.

- Rerouting the 70 kV circuit currently in place on the towers of the Gates-Panoche 230 kV line. Reinforcement of the 230 kV line would require removing the 70 kV line from the towers and locating it along a new route.

- Remedial action schemes for system disturbances will be installed at various locations.

- Possible installation of 500 kV shunt capacitors at existing substations to be determined pending further studies."

3. Page 2.2-2

   Paragraph 1, Line 3.
   Add: "tower erection" after "tower assembly"

4. Page 2.2-2

   Paragraph 1, Line 8.
   Add: "and access roads." after "tower sites"

5. Page 2.2-2

   Paragraph 2, Line 4.
   Change: "3" to "2" and "5" to "4"

6. Page 2.2-2

   Paragraph 2, Line 5.
   Add: "approximately" after "at"

7. Page 2.3-3

   Replace: Table 2.3-1 with revised Table 1.1.2-3. This table shows the preferred options for the Pacific Northwest Reinforcement Project.

8. Page 2.3-4

   Delete the entire section entitled "Eugene-Medford Project" and replace with the following:

   "Eugene-Medford Project

   The Eugene-Medford Project is a 500 kV transmission line planned by PP&L, to be built from Alvey Substation near Eugene, Oregon, to Meridian Substation near Medford, Oregon, to serve PP&L customer loads in southern Oregon and northern California. This 500 kV line will run 135 miles, replacing 133 miles of an existing 230 kV line, except for 11 miles of new alignment between Dixonville and Ramsey Canyon and short segments of parallel construction in the Medford area.

   PP&L has obtained a site certificate from the Oregon Energy Facility Siting Council, and preconstruction work on the line has begun. The environmental impacts were discussed in the EIS prepared for the project by the Bureau of Land Management, BPA, and the State of Oregon in 1983 (FES83-23). BPA, in a Record of Decision dated October 28, 1985, decided to build the two-mile, 500 kV segment from Alvey Substation to Spencer, both near Eugene.

   As initially proposed, the Eugene-Medford Project and the COTP were independently justified and served different needs. The Eugene-Medford Project focused on supplying southern Oregon and northern California loads. The COTP, Los Banos-Gates Project, and PNW Reinforcement Project would allow two-way transfers of power between the Pacific Northwest and the Southwest.

   In the summer of 1986, BPA and PP&L signed an agreement that provides for the 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 4,800 MW, if such upgrade occurs, including connection to the California-Oregon Transmission Project proposed by California entities. The agreement also grants BPA an option to acquire up to a 50 percent interest in the incremental capacity of PP&L's planned Eugene-Medford 500 kV line.

In developing the preliminary Plan-of-Service for the PNW Reinforcement Project, planners recognized potential economic and environmental advantages of also using the Eugene-Medford Project to support the California-Oregon Transmission Project at 1,600 MW capacity. Because the Eugene-Medford line has already been sited and scheduled for construction, any alternative line would cost more and have greater environmental impact. If BPA exercises its option under the agreement with PP&L, a portion of the Eugene-Medford line's capacity would become a part of the Pacific Northwest Reinforcement Project."

9. Page 2.4-2

Paragraph 1, Line 6.
Change: "absorbed in" to "transmitted to"

Change: "daily peak periods, the construction", to read: "daily peak periods; the construction"

10. Page 2.4-3

Paragraph 1, Line 6.
Add: "impacts" after "archaeological"

11. Pages 2.5-9 and 2.5-10

Delete the entire section entitled "Underground Transmission Alternative to the Proposed Action" and replace with the following:

"Underground Transmission Alternative to the Proposed Action

Technology is not yet available that could provide the required level of reliability for the operation of a 500 kV underground cable for the COTP. Underground installations of 500 kV exist in very few areas in the world. With the exception of submarine applications, all of these facilities are very short runs. Cross country underground 500 kV projects are not yet feasible with the present state of technology for 500 kV underground transmission. Experience throughout the world indicates that, with current technologies, manufacture and installation of underground 500 kV cable, has a much worse performance record than underground installations of lower voltages. This is attributable to the much higher electrical and mechanical stresses associated with high voltage cables. Outages for underground lines may extend to several weeks or longer, while the time required for repairs and replacement on an overhead line is of a much shorter duration.

COTP contacted the three existing users of 500 kV underground systems. One system, an experimental installation of 1,500 feet, was determined not to be a proven technology. The second system is planned to be paralleled by an overhead system because of reliability problems and concerns for failure. The third system is a submarine installation that is performing satisfactorily, but was installed at a cost considerably higher than originally anticipated.

Certain environmental impacts would be associated with the construction of major underground transmission lines that are different from overhead transmission lines. Due to the required construction of one or more trenches for the entire line length, more soil would be disturbed than in the construction of overhead lines. The installation of shunt reactor stations would be required at regular intervals to compensate for the losses associated with underground cable. These areas must be cleared of vegetation and occupy several acres of land to accommodate pumps, compressors, oil storage tanks, heat exchangers, and other equipment. Access roads required for construction and maintenance would be more numerous than for an overhead line. Adverse effects in wetlands and areas of dense vegetation could result from changes in thermal and/or moisture balance in the soil caused by cable heat dissipation. Additionally, the right-of-way must be kept permanently free of trees and large shrubs to prevent the growth of roots into the cable system.

Prohibitive cost and environmental and maintenance considerations eliminated underground transmission as a design alternative to the COTP as proposed."

12. Page 2.5-16

Paragraph 3, Line 11.
Add: ", is" after "hence"

FIGURE 1.1.2-1

CALIFORNIA-OREGON TRANSMISSION PROJECT

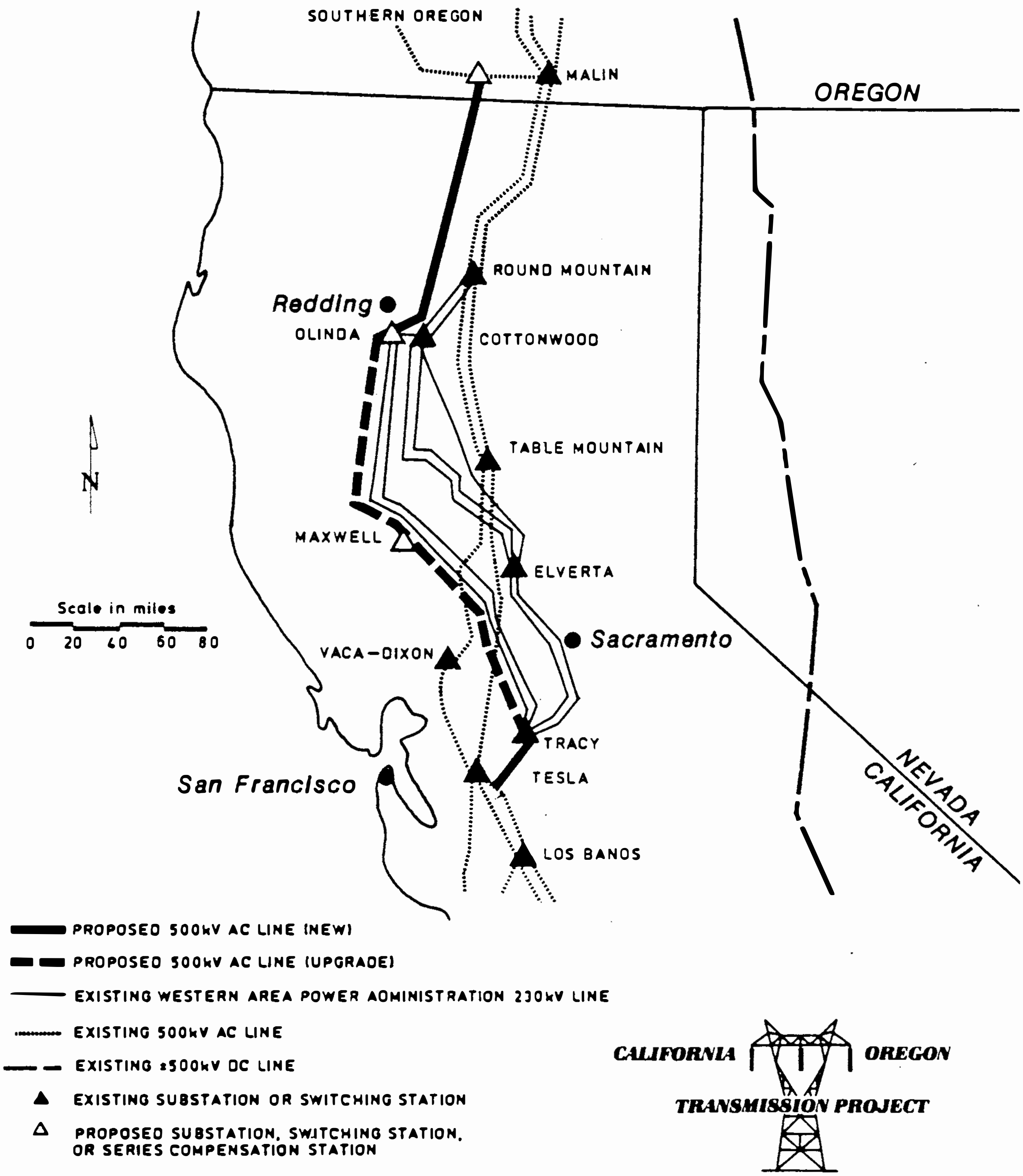
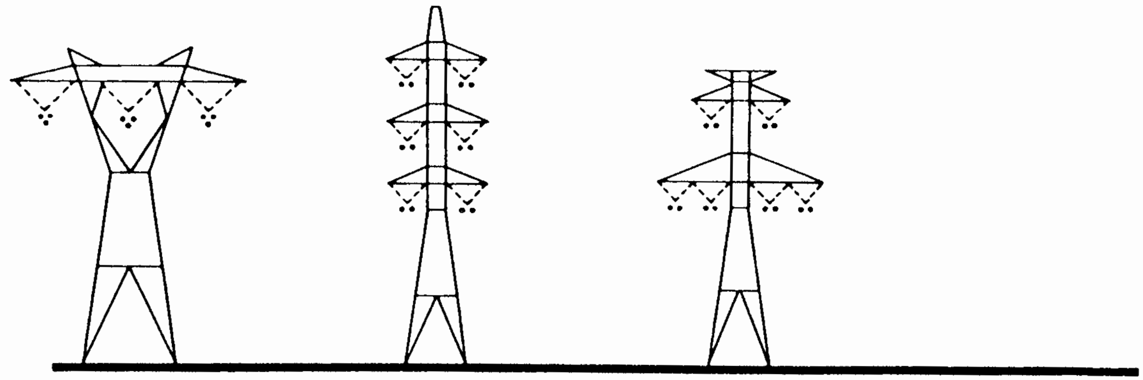


FIGURE 1.1.2-2

TYPICAL DIMENSIONS OF TRANSMISSION STRUCTURES

LATTICE TRANSMISSION STRUCTURES

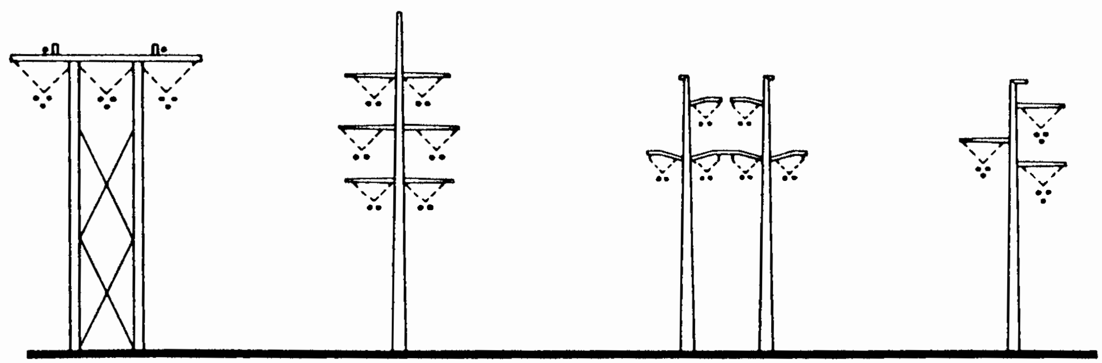
Not to Scale



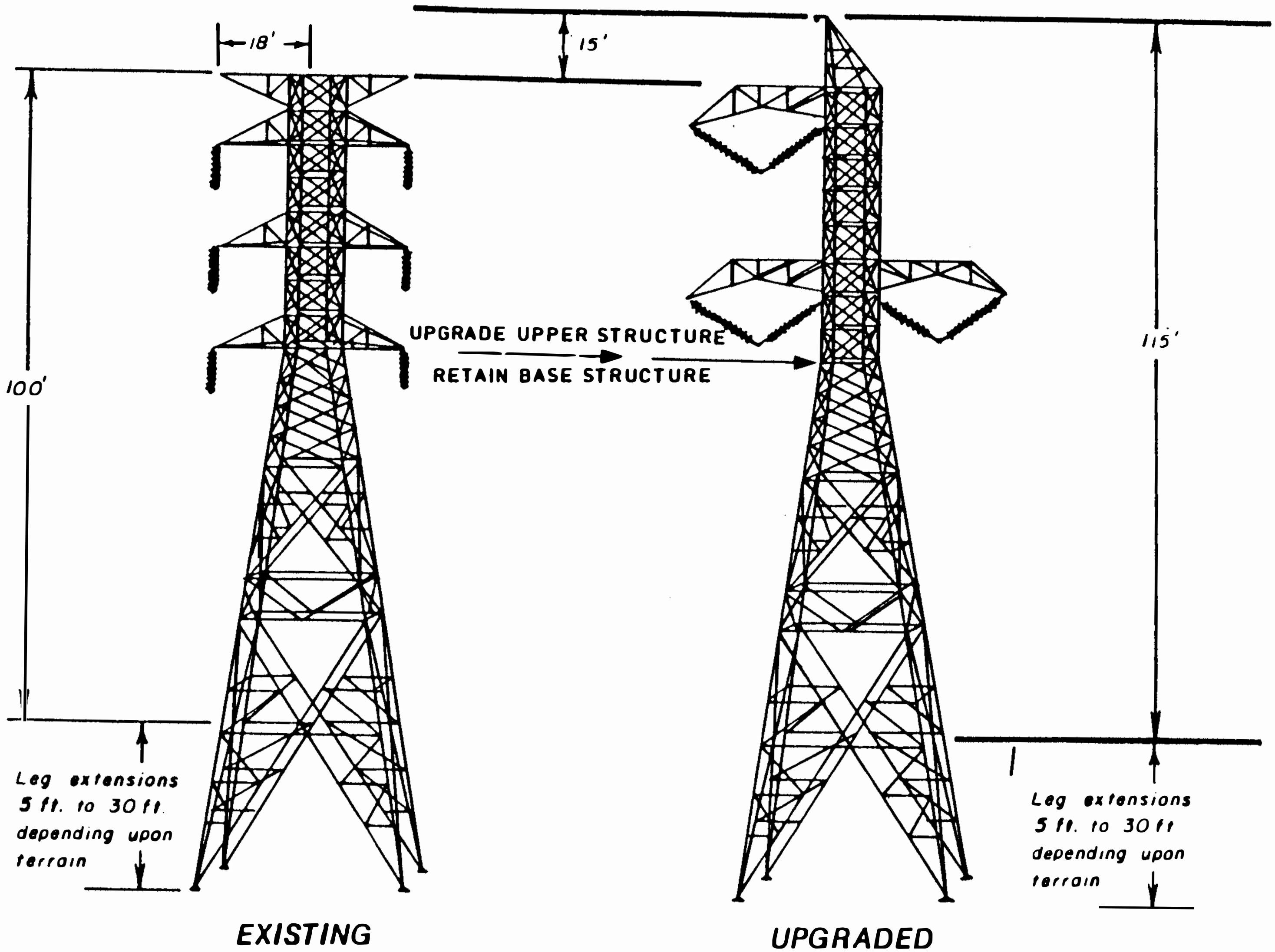
Structure Type	Single Circuit Lattice Tower	Double Circuit Lattice Tower	Double Circuit Lattice Tower
Right-of-Way Width	200 feet	200 feet	200 feet
Area of Base of Structure	1,225 ft^2	1,225 ft^2	1,500 ft^2
Typical Structure Height Ranges	95-225 feet	150-210 feet	130-200 feet
Approximate No. of Structures / Mile	4.8	4.8	4.8

TUBULAR TRANSMISSION STRUCTURES

Not to Scale



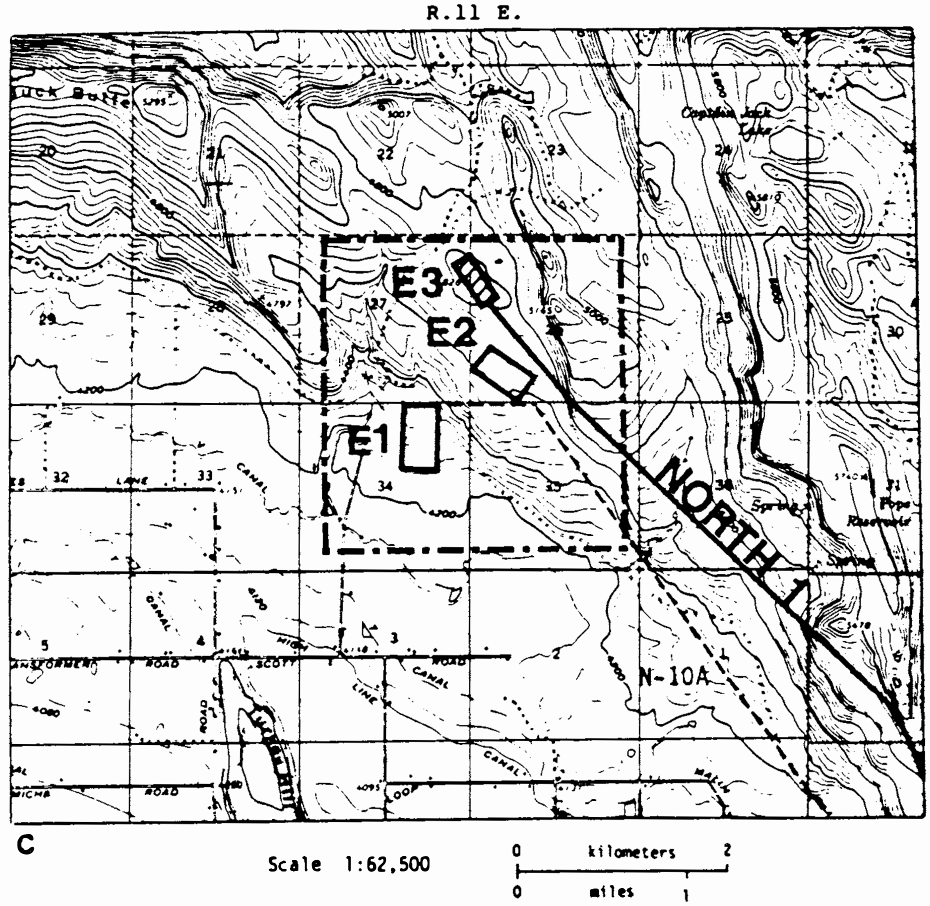
Structure Type	Single Circuit H-Frame Tubular	Double Circuit Tubular	Double Circuit H-Frame Tubular	Single Circuit Tubular
Right-of-Way Width	200 feet	200 feet	200 feet	200 feet
Area of Base of Structure	250 ft^2	100 ft^2	400 ft^2	100 ft^2
Typical Structure Height Ranges	170-190 feet	150-210 feet	130-200 feet	95-225 feet
Approximate No. of Structures / Mile	2.9-4.0	4.8	4.8	4.8



	EXISTING	UPGRADED
STRUCTURE TYPE	Double circuit 230 kV lattice	Single circuit 500 kV lattice upgrade
RIGHT-OF-WAY WIDTH	125 feet	125 feet
AREA OF BASE OF STRUCTURE	900 square feet	900 square feet
TYPICAL STRUCTURE HEIGHT	125 feet	140 feet after upgrade
APPROXIMATE NUMBER OF STRUCTURES PER MILE	4.4	4.4

FIGURE 1.1.2-3

Comparison of Western Area Power Administration's 230-kV Double Circuit and Upgraded 500-kV Towers



CALIFORNIA OREGON TRANSMISSION PROJECT

FIGURE 1.1.2-4

STUDY AREA FOR SOUTHERN OREGON ALTERNATIVE SWITCHING STATION SITES W1 AND W2 EAST OF PINEHURST, C1 AND C3 WEST OF KENO, AND E1 AND E2 NORTH OF MALIN

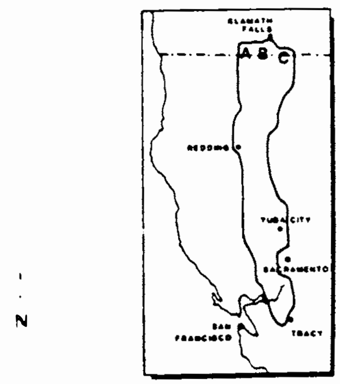
Area Under Consideration

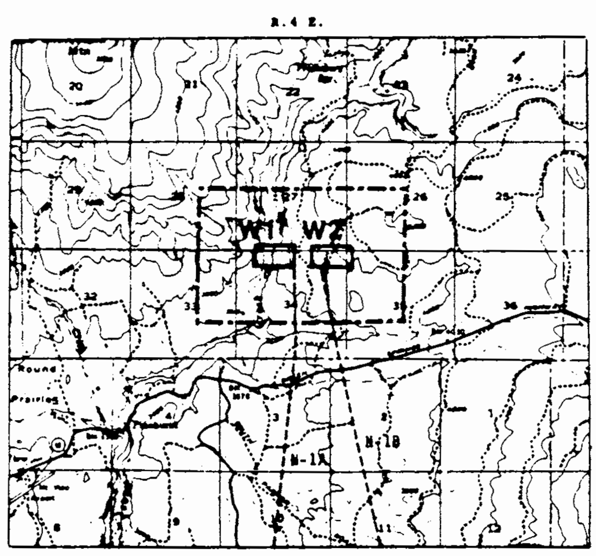
Study Area Boundary

Proposed Route Segment

Preferred Switching Station Site

Alternative Switching Station Site





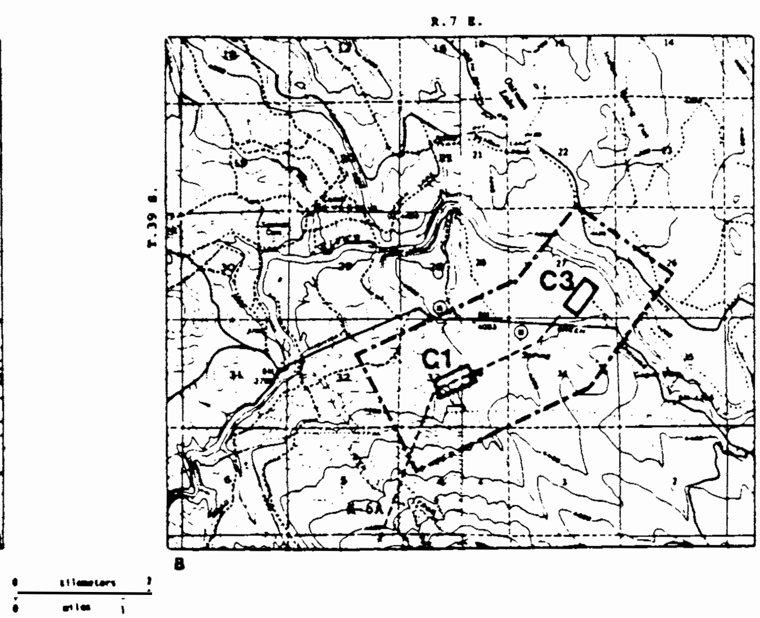


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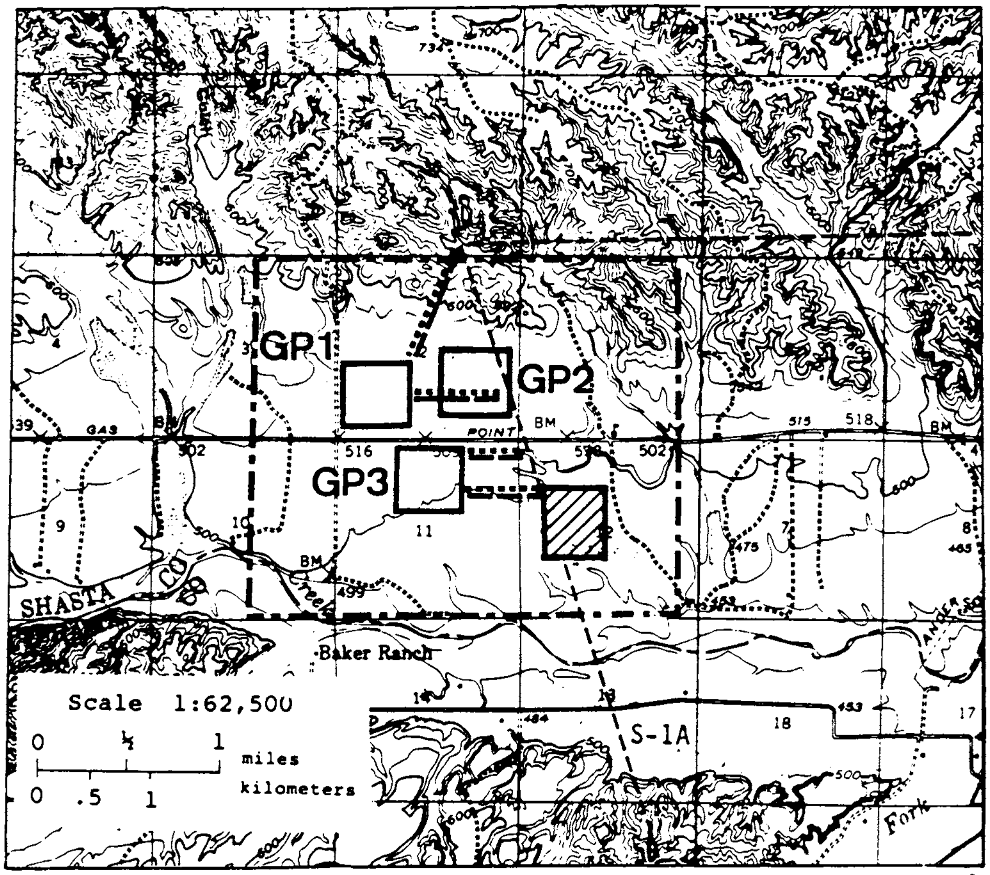
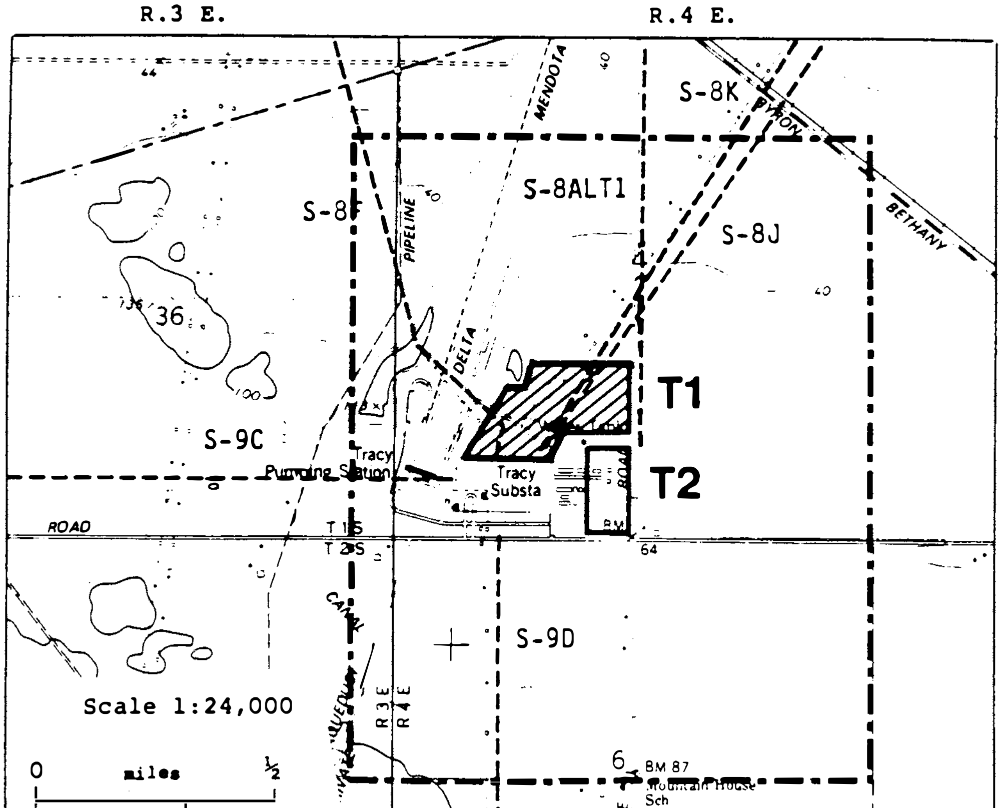
FIGURE 1.1.2-5

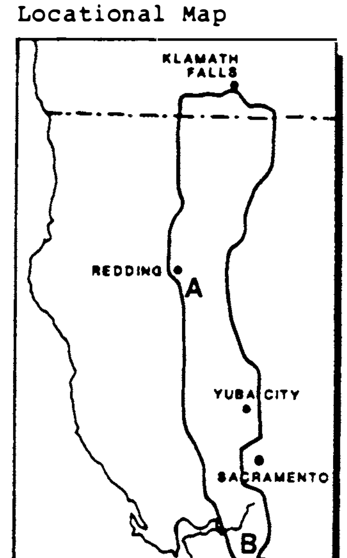
STUDY AREA FOR ALTERNATIVE SUBSTATION SITES GP1, GP2, GP3, AND GP4 (OLINDA) AND T1 AND T2 EAST OF TRACY SUBSTATION



- Area Under Consideration
- Study Area Boundary
- Proposed Route Segment
- Single Circuit 500 kV Line
- Double Circuit 230 kV Line
- Preferred Substation Site
- Alternative Substation Site



Locational Map



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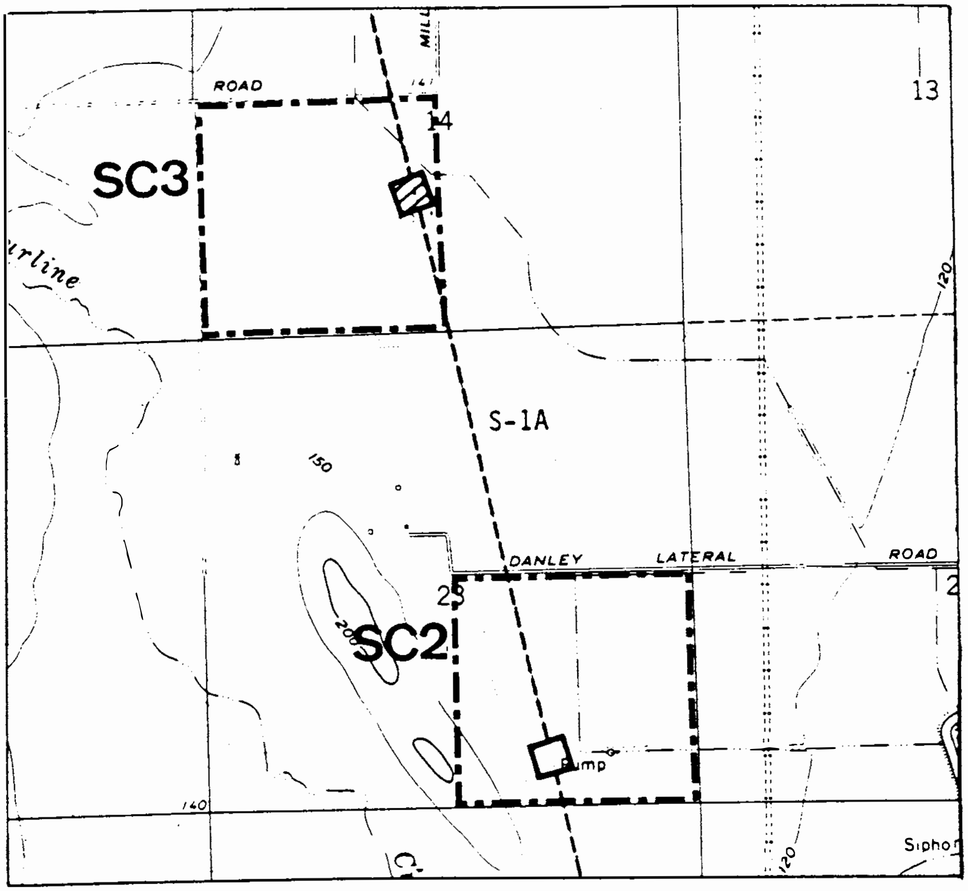
R 4 W

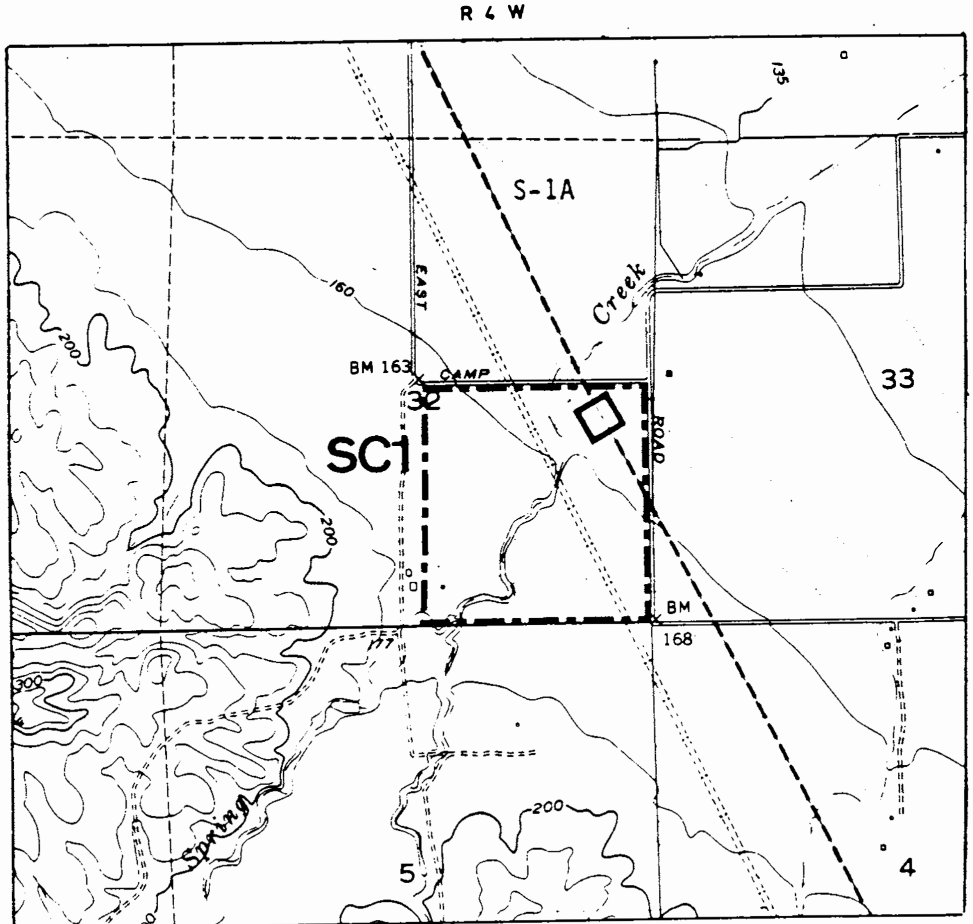
T 16 N



A

R 4 W

T 15 N



B

FIGURE 1.1.2-6

STUDY AREA FOR ALTERNATIVE SERIES COMPENSATION STATION MAXWELL SITES SC1 SOUTHWEST OF WILLIAMS, AND SC2 AND SC3 SOUTHWEST OF MAXWELL

Area Under Consideration

Study Area Boundary

Proposed Route Segment

Preferred Series Compensation Station Site

Alternative Series Compensation Station Site

Scale 1:24,000

N

0 miles ½

0 .5 kilometers

Locational Map

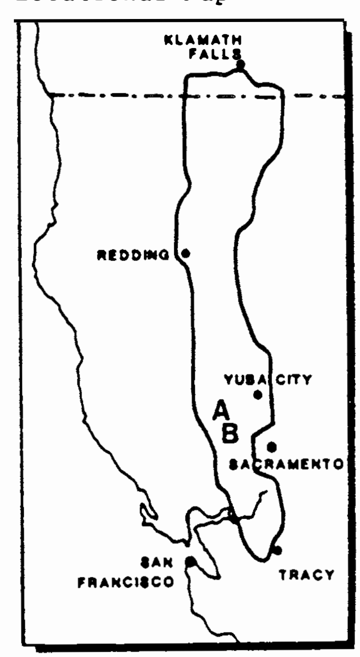


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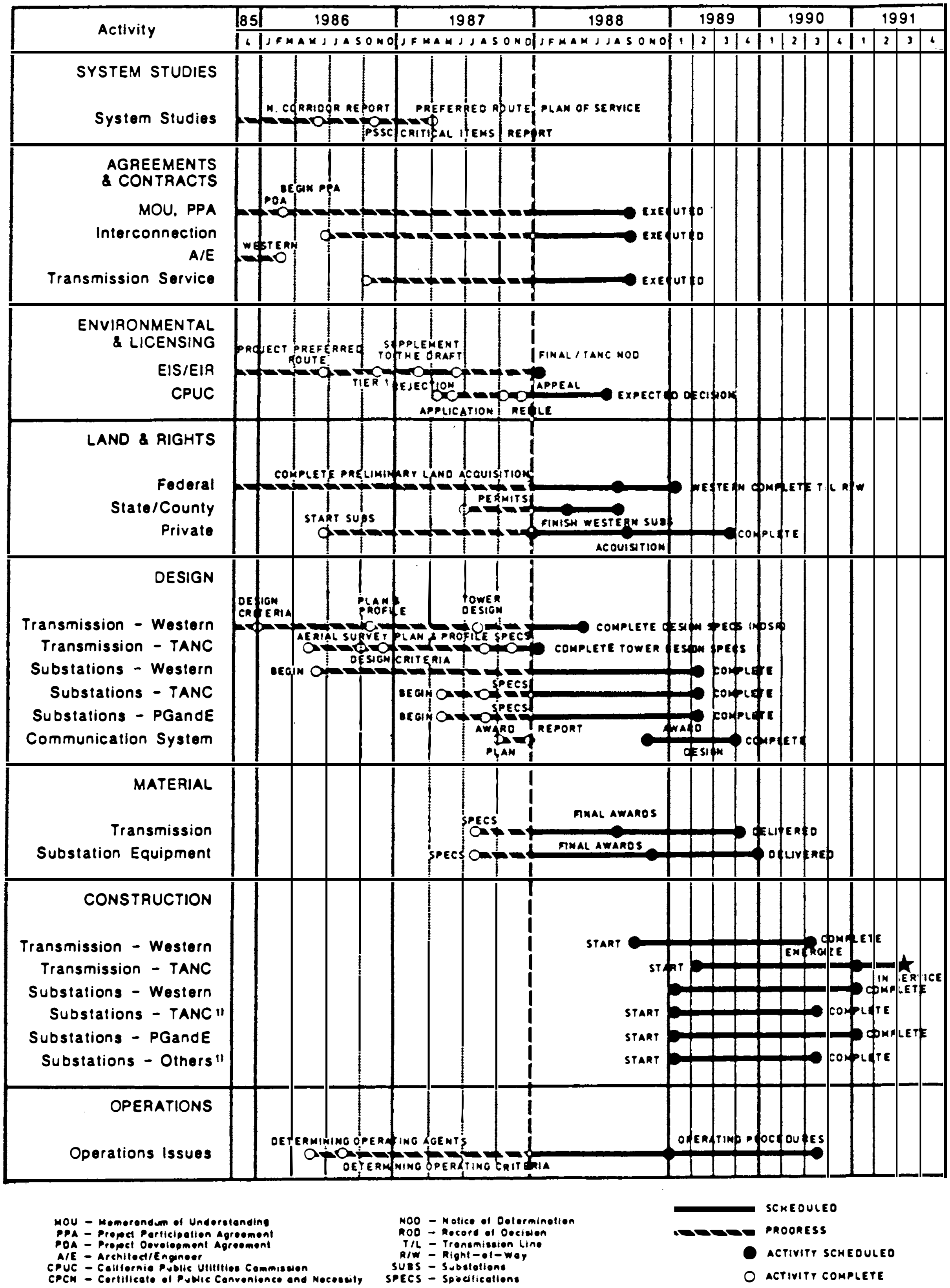
FIGURE 1.1.2-7

CALIFORNIA-OREGON TRANSMISSION PROJECT

Project Summary Schedule

PROGRESS THROUGH DECEMBER 1987

JANUARY 1



MOU – Memorandum of Understanding
PPA – Project Participation Agreement
PDA – Project Development Agreement
A/E – Architect/Engineer
CPUC – California Public Utilities Commission
CPCN – Certificate of Public Convenience and Necessity
NOD – Notice of Determination
ROD – Record of Decision
T/L – Transmission Line
R/W – Right-of-Way
SUBS – Substations
SPECS – Specifications

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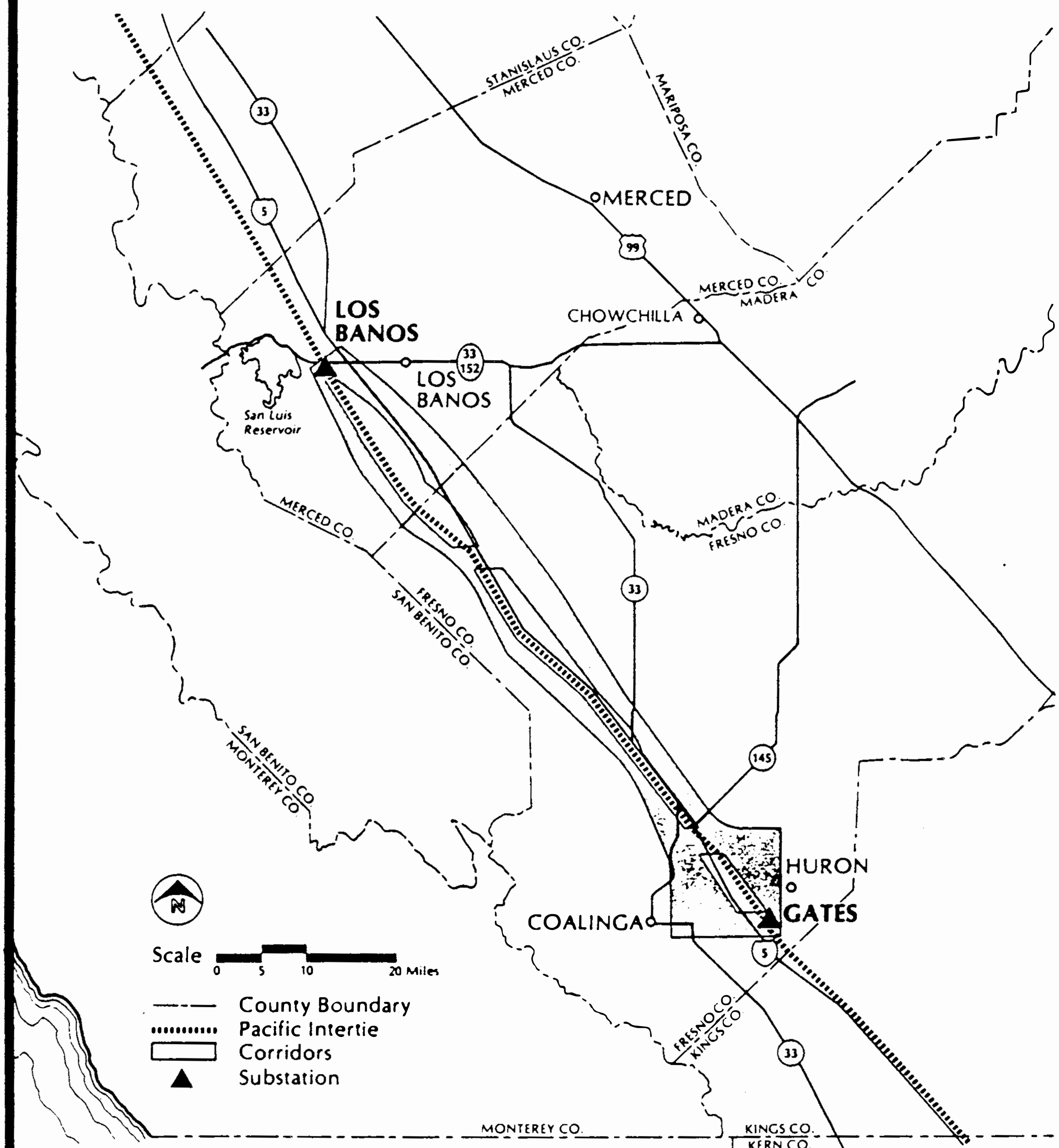
FIGURE 1.1.2-8

LOS BANOS-GATES TRANSMISSION PROJECT



Los Banos-Gates Transmission Project

TABLE 1.1.2-1

ROUTE SEGMENTS COMPRISING
NORTHERN, CENTRAL, AND SOUTHERN
COTP PREFERRED ROUTES,
ALTERNATIVES, AND OPTIONS*

Preferred: North D	Preferred: Grizzly Peak-Redding	Preferred: Central Section	Preferred: South B
North 1	N-8 Alt.2(A)	S-1A	S-8B
N-10G **	N-9A		S-8C
N-10J **	N-9C		S-8 Alt.1
N-10K	N-9D		S-8E1(A)
N-10L	N-9G		South 1
N-10M1	N-9J		S-8 Alt.3
N-10M2(A1)	N-9N		S-8K
N-10M2(A)	N-9O		S-9D
North 2B ***	N-9Q		S-9G
N-10 Alt.5(B)	N-13A		South 2
N-10 Alt.5(C)			
N-10 Alt.5(D)			
N-7 Alt.1(A)			
N-7 Alt.1(B)			
North 3J			
N-8A(3)			
N-8C			
North 4			

ALTERNATIVES AND OPTIONS TO THE PREFERRED ROUTE

Options				Alternatives
N-10A	North 3K	N-9B	S-8J2	North A
N-10E	N-7 Alt.1(C)	N-9H	S-9F	North B
N-10 Alt.2	N-7H2	N-9K	S-9G(1)	North C
N-10 Alt.3	N-7H2(A)	N-9M	S-9H	South A
N-10 Alt.4	N-7H2(B)	N-9P		South C
N-10 Alt.5(A1)	N-8A(1)	N-9S		
N-10 Alt.5(A)	N-8A(2)	S-8E1(B)		
North 2A	N-8A	S-8E2		
N-10M2(B)	N-8 Alt.1	S-8H		
North 2C	N-8 Alt.2	S-8J		
North 3A(1)	N-8 Alt.3	S-8J1		

* The top half of this table lists those route segments that comprise the current preferred route. Additional route options and alternatives, which are partly listed here, are described in greater detail in the Draft EIS/EIR and the Supplement to the Draft EIS/EIR. See the Affected Environment Map in Section 1.1.3 of this document for the locations of these route segments.

** The lead agencies have found N-10 Alt.4, the recommended environmentally superior option, to have prohibitively high costs compared to slight environmental benefits and conclude that it is not feasible from an economic perspective. N-10G/N-10J has been identified as the preferred route. This is further discussed in Section 1.2.2 of this document.

*** The lead agencies found that more extensive access road and construction efforts on North 2C made the comparison with North 2B so close that one is not clearly environmentally superior to the other. This is further discussed in Section 1.2.2 of this document.

TABLE 1.1.2-2

ROUTES SUBDIVIDED AND RENAMED
AS A RESULT OF NEW ROUTE ANALYSES
IN THE SUPPLEMENT TO THE DRAFT EIS/EIR

Route Name in Draft EIS/EIR	Revised Name in Final EIS/EIR
N-7H2	N-7H2(A), N-7H2(B)
N-7 Alt.1	N-7 Alt.1(A), N-7 Alt.1(B), N-7 Alt.1(C)
N-8A	N-8A, N-8A(1), N-8A(2), N-8A(3)
N-8 Alt.2	N-8 Alt.2, N-8 Alt.2(A)
N-10M2	N-10M2(A1), N-10M2(A), N-10M2(B)
N-10 Alt.5	N-10 Alt.5(A1), N-10 Alt.5(A), N-10 Alt.5(B), N-10 Alt.5(C), N-10 Alt.5(D)
S-8E	S-8E1, S-8E1(A), S-8E2
S-8J	S-8J, S-8J(1), S-8J(2)
S-9G	S-9G, S-9G(1)

TABLE 1.1.2-3 PROPOSED FACILITIES-AC INTERTIE REINFORCEMENT PROJECT

STATIONS/OPTIONS*		OWNERSHIP	POWER CIRCUIT BREAKER - NO.	LINE LOOP	YARD EXPANSION	TOWERS	REPLACE SERIES CAPACITOR BANK	ADD NEW SERIES CAPACITOR BANK	ADD NEW SHUNT CAPACITOR BANK	COST** ($ X 1,000,000)
ASHE		BPA (p)					(Reconnect Existing Shunt Reactor Bank.)			0.1
SLATT		BPA (p)	1	o	o	o				1.5
BUCKLEY	A	BPA (p)	2	o		o				4.1
	B		11	o		o				12.3
BAKEOVEN	A	BPA (p)	(No additions, remove all capacitor banks in future.)							2.0
	B				o	o	o	o		11.8
GRIZZLY	A	BPA/PGE (p)	5 - 6	o	o	o				5.7
	B		5 - 6	o	o	o		o		10.2
	C		5 - 6	o	o	o			o	8.5
GRIZZLY TO MALIN SERIES COMPENSATION 1/										
SAND SPRING		BPA/PGE (p)		o	o		o	o	o	1 - 25
FORT ROCK		BPA/PGE (p)		o	o		o	o		1 - 25
SYCAN/SUMMER LAKE		BPA/PGE/PP&L (p)		o	o	o	o	o		1 - 25
GRIZZLY-MALIN LOOP-IN	A	BPA (p)		o	n/a	o				2.0
	B	(p)		o	n/a	o				2.5
	C	(p)		o	n/a					2.5
	D	(No Loop-in.)								-
MALIN	A	BPA/PGE/PP&L/Western (p)			o	o			o	6.1
	B				o	o	o		o	12.3
	C				o	o	o		o	12.0
MARION/ MARCOLA/ ALVEY	A	BPA		o	o	o		o		4.0
	B			o	o	o		o		4.0
	C	(p)		o	o	o		o		4.0
DIXONVILLE	A	PP&L (p)		o	o	o		o		2.9
	B			o	o	o		o		6.0
MERIDIAN	A	PP&L (p)		o	o	o		o		3.1
	B			o	o	o		o		6.6
	C			o	o	o		o		3.5
	D	(No series capacitor installed.)								-

* The letters (A,B,C,D) refer to options within the stations. Only one would be developed for each station.
** The costs are based on preliminary estimates done in 1985. Costs for other related facilities are not included in this report.
n/a Not applicable.
(p) Indicates preferred option.
1/ See additional (last) paragraph in Section 2.6 for clarification.

Affected Environment

1.1.3 CHANGES TO THE DRAFT EIS/EIR SECTION 3.0 - AFFECTED ENVIRONMENT

1. Pages 3.1-4, 3.1-3, 3.1-6, 3.1-7, and 3.1-8

   Figures 3.0-3, 3.0-2, 3.0-5, 3.0-6, and 3.0-7.
   Replace: the above referenced figures with Figures 1.1.3-1, 1.1.3-2, 1.1.3-3, 1.1.3-4, and 1.1.3-5.

2. Figures 1.1.3-2 and 1.1.3-3

   NOTE: The U. S. Forest Service has indicated in November 1987 that the area east of the North 3J corridor (east of Little Meadows) has a feasible route location that will minimize resource impacts while meeting geologic concerns. Should a superior location be found near North 3J during final design, the lead agencies will work with the Forest Service to identify, review, and approve that location.

3. Page 3.1-5

   Figure 3.0-4, mapped area along Pit River.
   Change: area mapped as "other sensitive raptor use" to "bald eagle use area".

4. Page 3.1-9

   Paragraph 5, Line 3.
   Add: "Class 1 air quality standards are in effect in Lava Beds National Monument." after "standards."

5. Page 3.1-12

   Table 3.1-3, Line 1, Column 3.
   Change: "11.79" to "18.90"

6. Page 3.1-21

   Paragraph 3, Lines 7 and 8.
   Change: "coal which was once mined but is now of little importance" to "coal resources that have been essentially worked out and were last mined in 1906."

7. Page 3.1-29

   Paragraph 2, Lines 7 and 8.
   Add: "." after "oak"
   Delete: "(See Forestry Data section in Section 3.6 of the Phase III Report to Volume 2A of the Draft EIS/EIR for a species listing)."

8. Page 3.1-31

   Paragraph 3, Lines 8 and 9.
   Add: "the Big Break Shoreline Regional Park on Jersey Island." after "...in the Sacramento-San Joaquin Delta,". Delete: "on the north shore of Bethel Island within 1-2 miles of an alternative route."

9. Page 3.1-32

   Paragraph 2, Line 17.
   Add: "Spelunking (cave exploration) is a popular activity in the Burnt Lava Flow Virgin Area." after "routes".

10. Page 3.1-32

    Paragraph 5, Lines 4 and 5.
    Change: "However, no alternative routes cross hunting clubs." to "Alternative routes cross hunting clubs on Jersey Island, Veale Tract, and Hotchkiss Tract."

11. Page 3.1-34

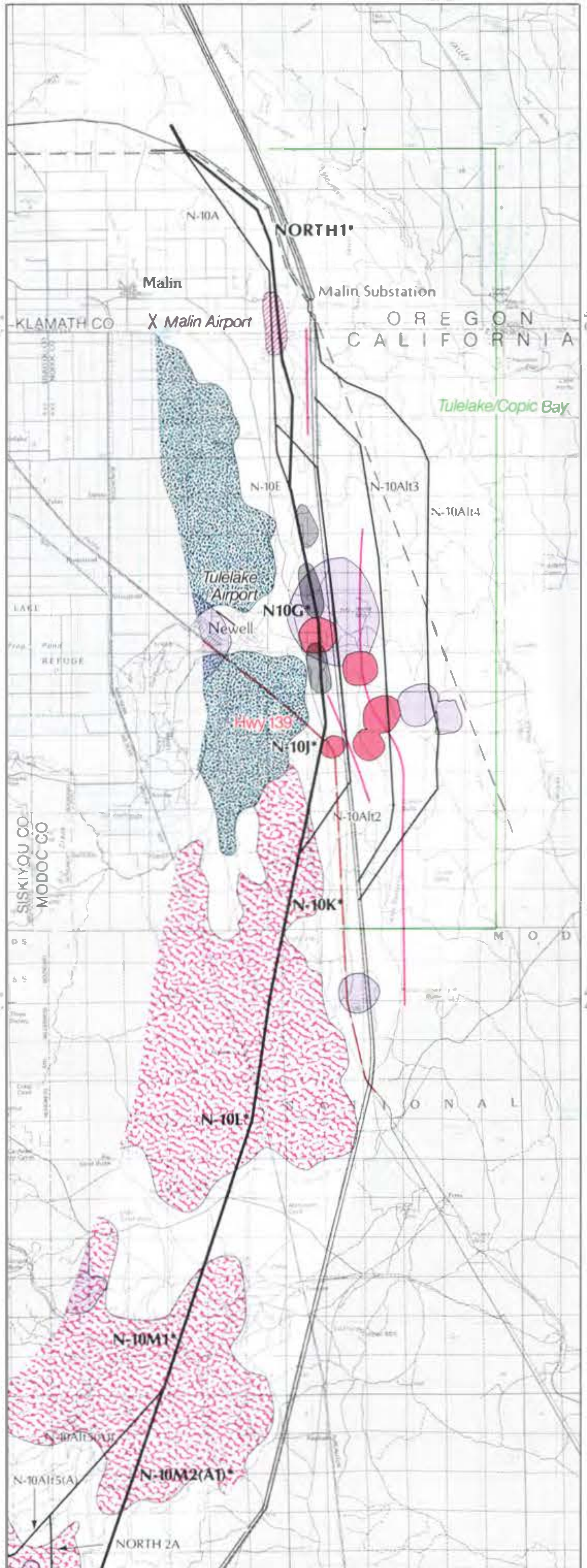
    Paragraph 2, Line 1.
    Add: "a rural development southwest of Pinehurst," after "include".

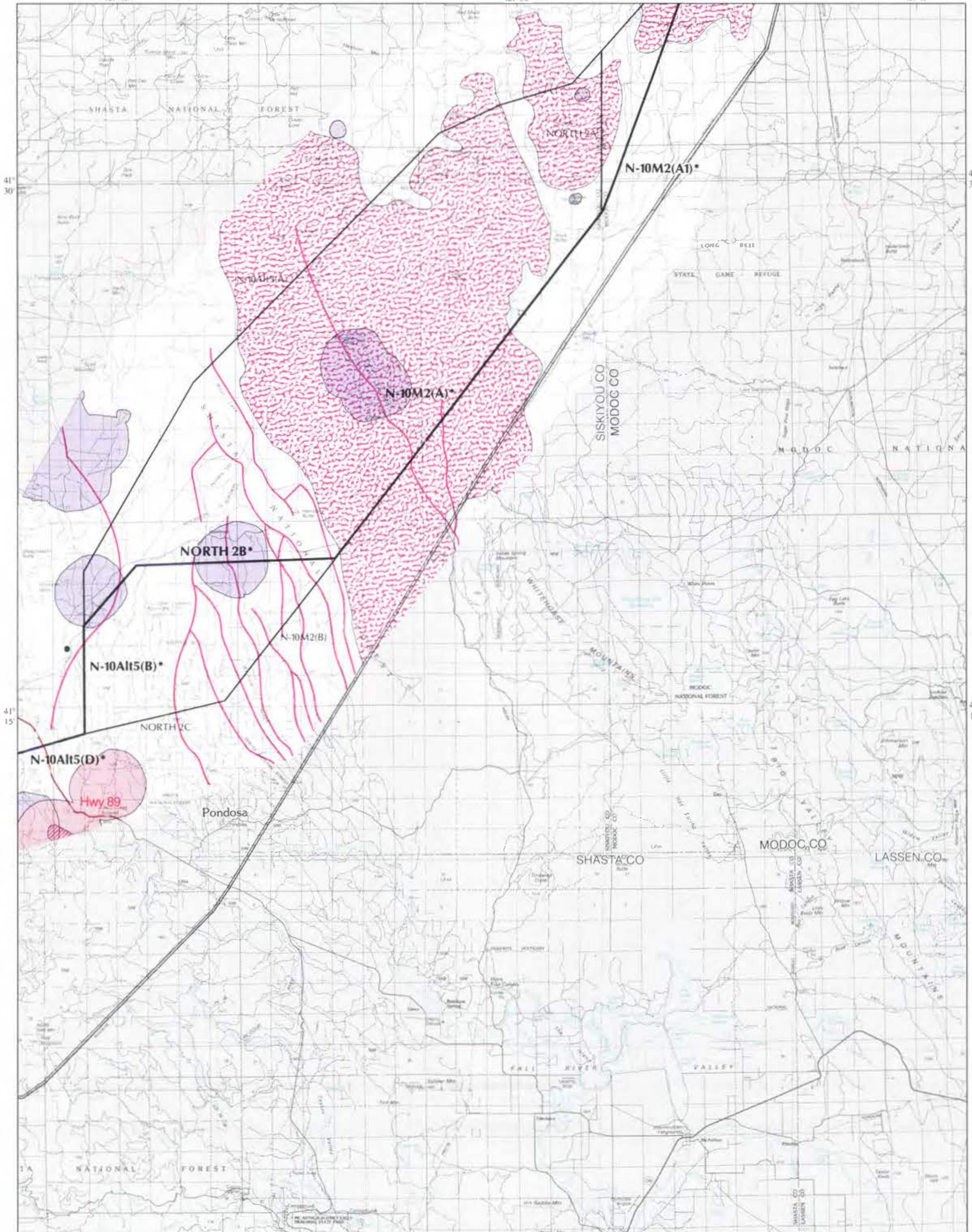
12. Page 3.1-52

    Table 3, 1-7, Column for E-6, Row on Land Status.
    Change: "USFS multiple use lands" to "BLM lands"

CALIFORNIA OREGON TRANSMISSION PROJECT

Affected Environment





Land Use

- **Newell** Existing community
- *Delta* Major area of agricultural (farming) activity

Recreation

- Recreation site (within one mile of route segment)
- Major recreation river crossed by route segment
- Designated scenic highway, road, or trail crossed by route segment

Biological Resources

- Swainson's hawk use area
- Sandhill crane use area
- Bald eagle use area
- USFS designated spotted owl management territory
- Other sensitive raptor use area (prairie falcon, golden eagle, goshawk)
- Area of high waterfowl collision potential

Earth and Water Resources

- Endangered aquatic species
- Area characterized by slopes greater than 30%
- Fault traces
- Recent lava flows
- Soils with high susceptability to wind erosion
- Soils high in organic content
- Montgomery Creek formation
- Montezuma Hills formation
- Organic soils

Routes

- **5-9H*** Project preferred alternative
- **N-1L** Alternatives
- N-6Alt1 Options

Existing Transmission Lines

- 115KV
- 230KV
- 500KV

Scale 1:250,000

0 2 kilometers 8 10

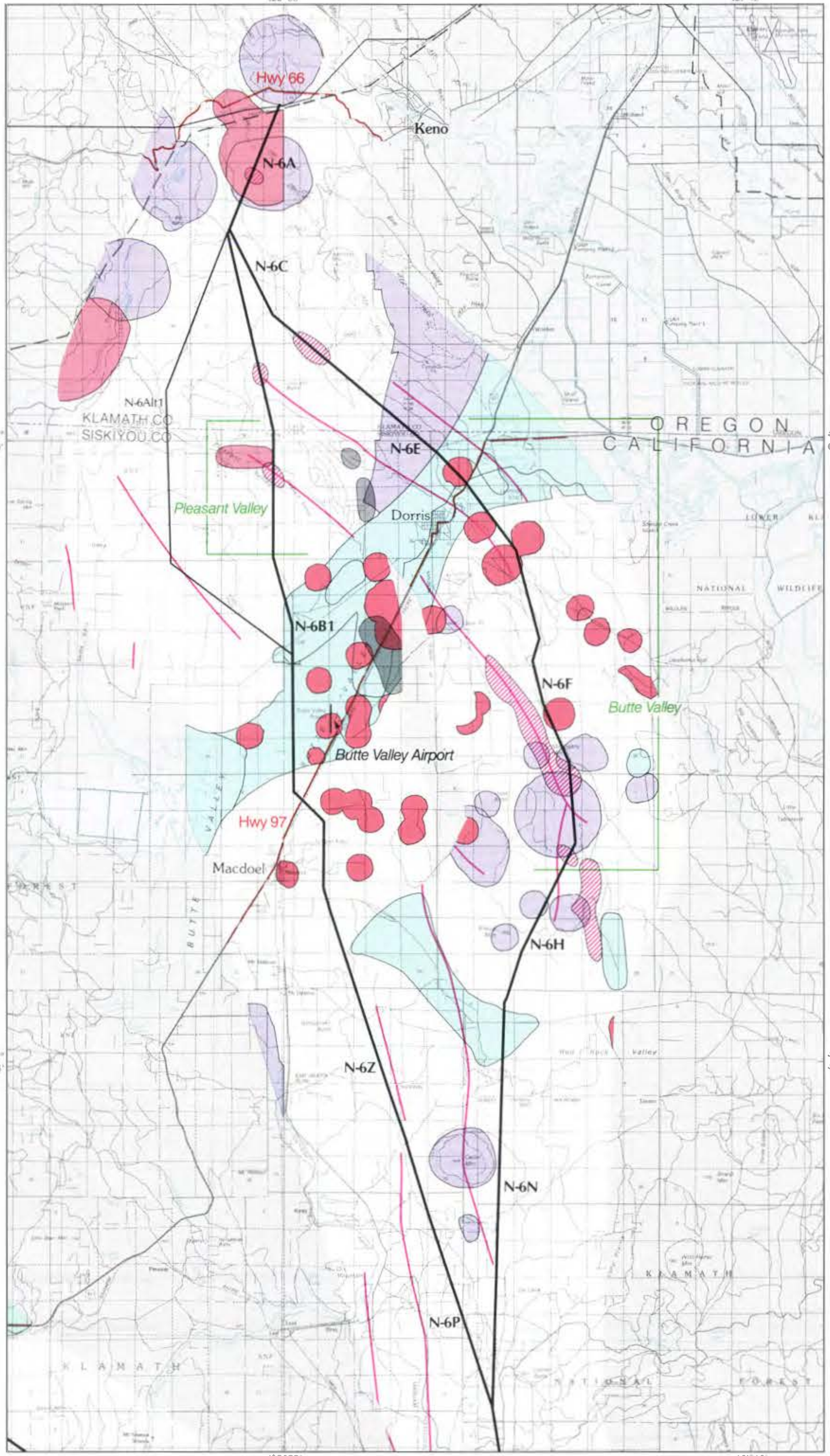
0 1 2 miles 4 5 6

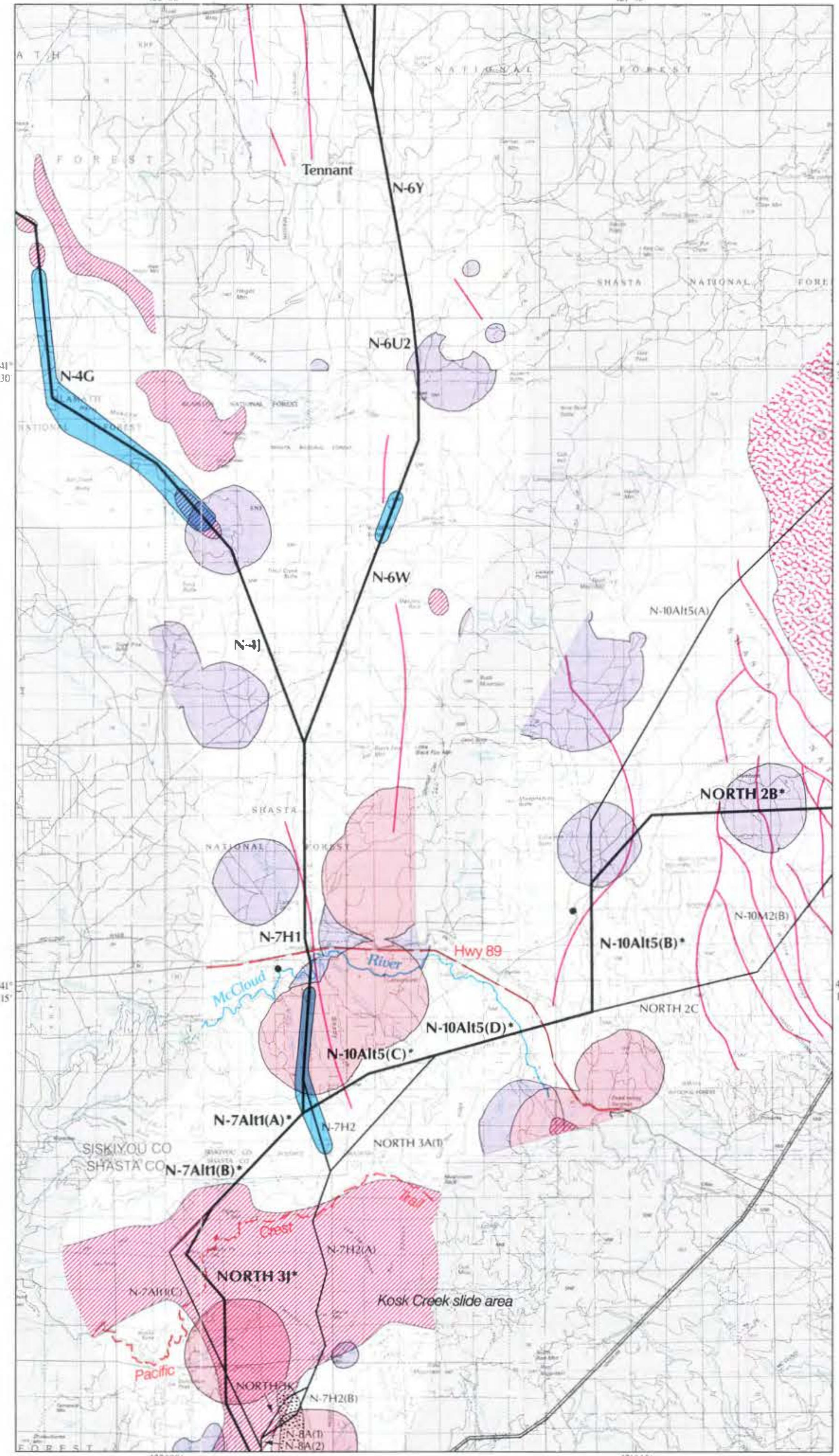
Location Map

envirosphere company
A Division of EBASCO SERVICES INCORPORATED

WESTON

Figure 1.1.3-1





CALIFORNIA OREGON TRANSMISSION PROJECT

Affected Environment

Land Use

Newell Existing community

Delta Major area of agricultural (farming) activity

Recreation

Recreation site (within one mile of route segment)

Major recreation river crossed by route segment

Designated scenic highway, road, or trail crossed by route segment

Biological Resources

Swainson's hawk use area

Sandhill crane use area

Bald eagle use area

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Soils high in organic content

Montgomery Creek formation

Montezuma Hills formation

Organic soils

Routes

S-9H* Project preferred alternative

N-1L Alternatives

N-6Alt1 Options

Existing Transmission Lines

115KV

230KV

500KV

Scale 1:250,000

0 2 kilometers 8 10

0 1 2 miles 4 5 6

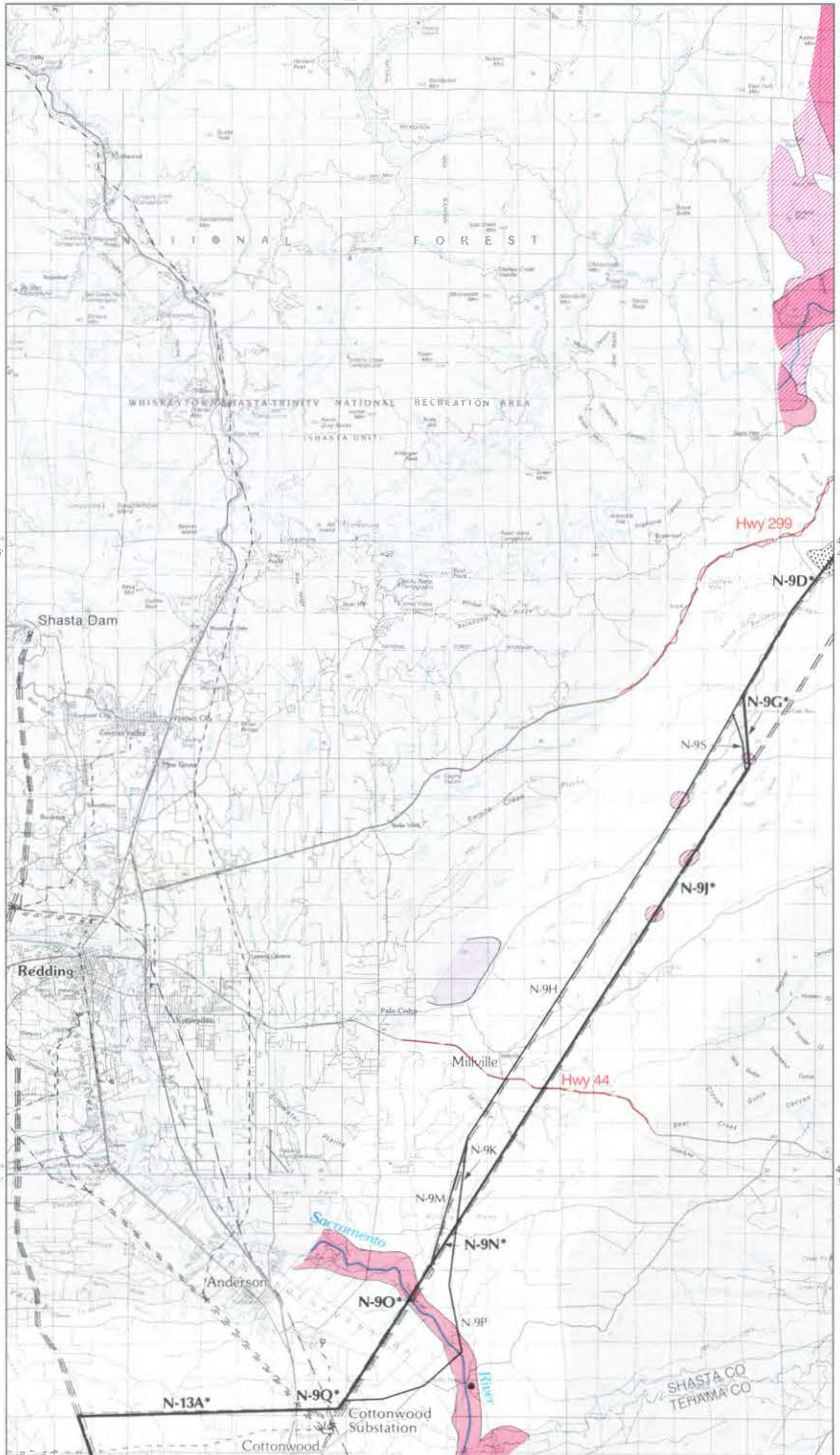
N

Location Map

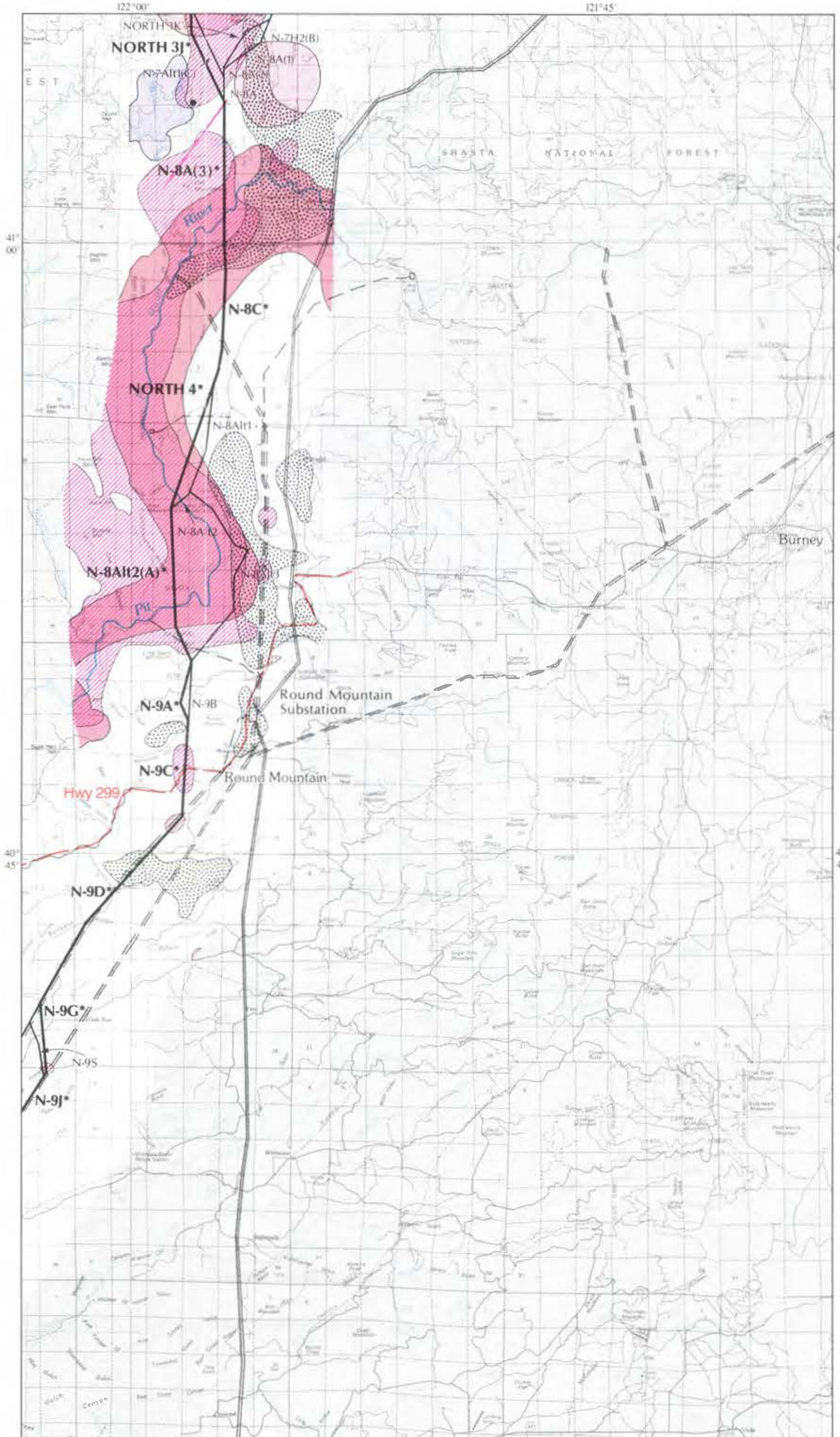
envirosphere company

WESTON

Figure 1.1.3-2



A



B

CALIFORNIA OREGON TRANSMISSION PROJECT

Affected Environment

Land Use

- Newell — Existing community
- Delta — Major area of agricultural (farming) activity

Recreation

- Recreation site (within one mile of route segment)
- Major recreation river crossed by route segment
- Designated scenic highway, road, or trail crossed by route segment

Biological Resources

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Routes

- S-9H* — Project preferred alternative
- N-1L — Alternatives
- N-6Alt1 — Options

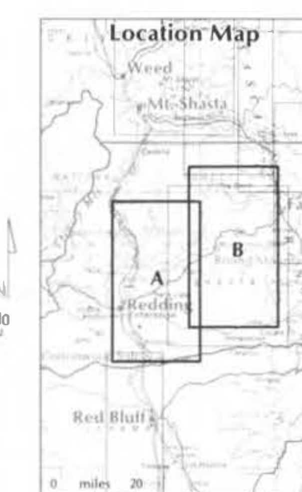
Existing Transmission Lines

- 115KV
- 230KV
- 500KV

Scale 1:250,000

kilometers 0 2 4 6 8 10

miles 0 1 2 3 4 5 6



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WESTON

Figure 1.1.3-3


N-13A*
Cottonwood Substation
Cottonwood
SHASTA CO
TEHAMA CO
Gas Point Rd
Red Bluff
S-1A*
(Upgrade)
Central Valley
Corning
A
TEHAMA CO
GLENN CO
Orland
Willows
GLENN CO
COLUSA CO
Maxwell
B
GLENN CO
COLUSA CO
Maxwell
Williams
COLUSA CO
YOLO CO
C
CALIFORNIA OREGON TRANSMISSION PROJECT
Affected Environment
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Newell Existing community
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Existing Transmission Lines
115KV
230KV
500KV
Scale 1:250,000
kilometers
miles
Location Map
Red Bluff
Chico
Willows
Colusa
Yuba City
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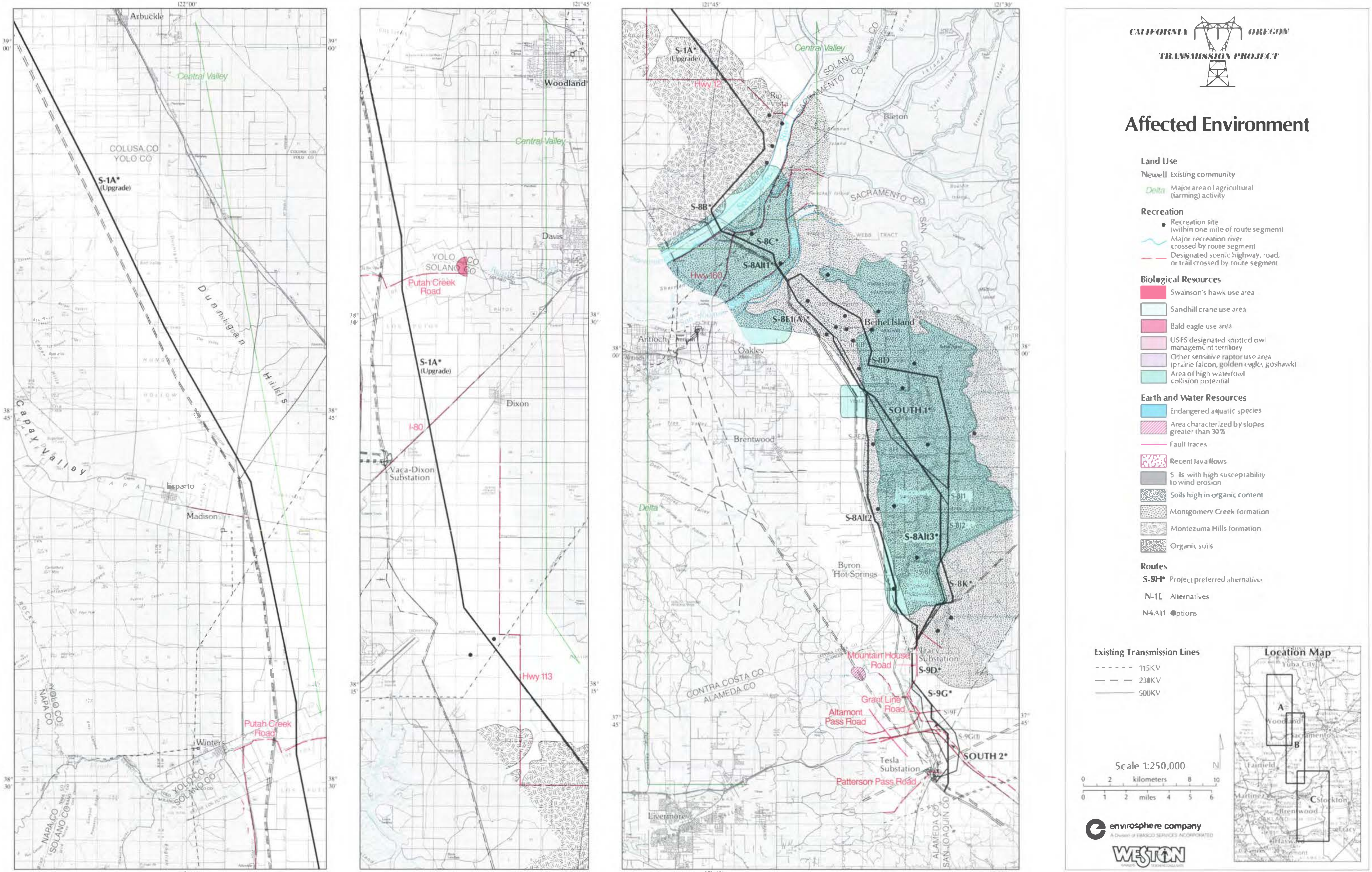
WESTON

Figure 1.1.3-4


CALIFORNIA OREGON
TRANSMISSION PROJECT
Affected Environment
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S-9H* Project preferred alternative
N-1L Alternatives
N-4Alt1 Options
Existing Transmission Lines
115KV
230KV
500KV
Location Map
Scale 1:250,000
kilometers
miles
envirosphere company
WESTON
Arbuckle
Central Valley
COLUSA CO
YOLO CO
S-1A* (Upgrade)
Dunnigan Hills
Capay Valley
Esparto
Madison
Winters
Putah Creek Road
YOLO CO
SOLANO CO
NAPA CO
Woodland
Davis
Putah Creek Road
Dixon
I-80
Vaca-Dixon Substation
Hwy 113
Hwy 12
Rio Vista
SACRAMENTO CO
Isleton
S-8B*
S-8C*
S-8Alt1*
Hwy 160
S-8E1(A)*
Bethel Island
Antioch
Oakley
S-8D
SOUTH 1*
Brentwood
S-8Alt2
S-8Alt3*
Byron Hot Springs
S-8K*
Delta
CONTRA COSTA CO
ALAMEDA CO
SAN JOAQUIN CO
Mountain House Road
Tracy Substation
S-9D*
S-9G*
Grant Line Road
Altamont Pass Road
Tesla Substation
SOUTH 2*
Patterson Pass Road
Livermore
A
B
C

Figure 1.1.3-5

Environmental Consequences

1.1.4 CHANGES TO THE DRAFT EIS/EIR VOLUME 1 SECTION 4.0 - ENVIRONMENTAL CONSEQUENCES

The text of Section 4.0 from the Draft EIS/EIR is reproduced here in its entirety. Text deletions are noted by slashes while additions are noted by underscoring. The numbers in parentheses following the subheadings indicate the corresponding section in the Draft EIS/EIR. This section also includes the updated tables that were presented in the Draft EIS/EIR as well as several new tables.

Environmental Consequences (4.0)

California-Oregon Transmission Project (4.1)

This section presents the findings of impact analyses for each resource area for the four alternatives in the north (A-D), the Grizzly Peak to Redding route (common for alternatives A-D), the Central Section Upgrade route, and the three alternatives in the south (A-C). A detailed discussion of the impacts expected from the individual segments comprising the alternative is presented in Volume 2A of the Draft EIS/EIR. The environmental impacts of the upgrade are not expected to be significant due to the planned reconstruction of ~~the~~ towers along the Central Section Upgrade route, and use of existing foundations and access roads. This section also includes summaries of the northern and southern alternatives for each resource area, and discussions of the options within alternatives.

Resource specialists considered the option of using a double-circuit 500 kV tubular tower instead of a single-circuit 500 kV tower along the Project preferred route between the Tracy and Tesla Substations. Except for potential incremental impacts to visual resources, which were not considered significant, it was determined that no additional environmental impacts would result from using this option.

An alternative tower type is being considered for the COTP between the southern Sacramento River crossing and the Tracy Substation. This alternative would employ a tubular steel "H-frame" design (Figure 1.1.2-2), which could facilitate foundation construction on marshy Delta soils. To reduce overall costs in this area, the number of towers would be reduced to approximately 3.2 per mile. To maintain required clearances between the conductors and the ground, the towers would range from 170 to 190 feet in height. In comparison, the steel structures proposed for the southern Delta in the Draft EIS/EIR would average 4.8 per mile and would be approximately 125 feet high. Potential impacts of this new tower type are discussed in the following sections on vegetation, wildlife, land use, socioeconomic, and visual impacts.

Project features considered by the resource specialists in this analysis of alternatives are presented in Tables ~~4.1-1 to 4.1-8~~ 1.1.4-1 to 1.1.4-8. Table 1A presented in the Summary at the beginning of ~~Volume 1~~ this document presents impacts for the Central Section Upgrade route and highlights impacts for the alternative routes.

Climate and Air Quality (4.1.1)

Since construction and operation activities would be similar for alternative routes within a given study area, this discussion applies to all potential alternatives. Impacts to air quality were considered significant if any national or state ambient air quality standards would be exceeded or if current violations are further worsened.

Northern Section Alternative Routes A, B, C, and D (4.1.1.1)

Climate

The proposed project will not have a significant effect on the climate of this study area.

Air Quality

Construction of the transmission line in this study area would require extensive clearing and grading of existing forest and rangelands. Air pollutants that would be emitted from these activities include nitrogen oxides (NO_x), sulfur oxides (SO_x), hydrocarbons (HC), carbon monoxide (CO), and total suspended particulates (TSP). Emissions of NO_x, SO_x, HC and CO would be attributable to construction machinery exhaust and the burning of cleared vegetation (open burning). TSP emissions would arise from vehicle exhaust, open burning, and fugitive dust generated from vehicular traffic associated with clearing and grading operations. These emissions may cause some minor, localized impacts; however, they will be short-term in nature and would not significantly alter the air quality of the Northern Section study area.

Emissions of NO_x, SO_2, HC, CO, and TSP from construction equipment exhausts are presented in Table 1.1.4-13 for each construction phase. These estimates are based on preliminary construction activity information and U.S. EPA emission factors for heavy duty construction equipment. It should be noted that the construction activities will occur in staggered phases, therefore, these emission sources will be distributed along the entire length of the route and should not significantly affect ambient air quality.

Fugitive dust will be generated by vehicle traffic along dirt roads and by clearing and grading operations during transmission line construction. Based on preliminary construction activity information and U.S. EPA emission factors, approximately 1,128 pounds per day of fugitive dust will be generated from construction activities along the route. Again, these emissions will be spread out over the entire route, and, therefore, should not cause significant air quality impacts.

Northern Section Grizzly to Redding (4.1.1.2)

Air quality and climate impacts for this study area and its alternative routes would be similar to those of Northern Section Alternative Routes A, B, C, and D since construction activities and subsequent emissions would be similar. As discussed above, the construction and operation of the Project would not have a significant effect on the existing climate or air quality.

Central Section Upgrade Route (4.1.1.3)

Climate

The proposed project will not have a significant effect on the climate of this study area.

Air Quality

Since this route section is an upgrade of an existing transmission line, construction activities will not include extensive clearing and grading of the surrounding land. Therefore, fugitive dust emissions will arise primarily from construction equipment traveling on unpaved access roads. These emissions will cause some localized short-term impacts, but would not have a significant effect on ambient air quality. NO_x, SO_x, HC, CO, and TSP emissions associated with the operation of equipment necessary for tower construction and erection and line stringing would not contribute significantly to the existing air quality of the Central Study Section.

Southern Section Alternative Routes A, B, and C (4.1.1.4)

Climate

The proposed project will not have a significant effect on the climate of this study area.

Air Quality

Construction of the transmission line in this study area would require the clearing and grading of portions of farm and rangelands for access roads and transmission tower pads. Air pollutants that would be emitted from these activities include NO_x, SO_x, HC, CO, and TSP. Emissions of NO_x, SO_x, HC, and CO would be attributable to construction machinery exhaust and open burning. TSP emissions would arise from vehicle exhaust, open burning, and fugitive dust generated from vehicular traffic associated with clearing and grading operations. These emissions may cause some minor, localized impacts; however, they will be short-term in nature and would not significantly alter the air quality of the Southern Section study area.

Earth Resources/Geologic Hazards (4.1.2)

The Universal Soil Loss Equation (USLE) was used to assess the significant of COTP impacts to the productivity of the project area soils. The USLE was developed in 1965 by W. H. Wischmeier and D. D. Smith to estimate rainfall erosion losses from cropland east of the Rocky Mountains. Since that time it has been successfully used to estimate erosion losses on all types of soils (crop, forest and urban land) in all 50 states and several foreign countries. The modifications which have made the USLE better than other methods (including erosion hazard potential ratings) at predicting the erosion loss of COTP soils (which, because of their granitic origin, antecedent moisture characteristics and mass wasting potential, are often atypical of other soils) are explained below.

In order to use the USLE, soil loss estimates (in tons/acre/year) were compared to soil loss tolerances (the rate at which soils were formed). If soil loss estimates were greater than soil loss tolerances it was assumed that the rate of soil loss cannot be sustained for any length of time (years) without real and permanent damage being done to the productivity of project topsoil.

It should be noted that the USLE was never designed and has not been used in this analysis to develop sediment production figures for different project alternatives. "The USLE is an erosion model designed to compute long time average soil losses from sheet and rill erosion under specified conditions. It is also useful for construction sites and other non-agricultural conditions, but it does not predict deposition and does not compute yields from gully, streambank, and streambed erosion" (USDA 1978). The soil loss estimates represent only soil displacement and are not used to quantify the production of streamborne sediment.

Geologic hazards were considered significant if a geologic event has a high chance of occurrence and would be severe enough to adversely affect the transmission line, e.g., if a route crosses or is located within 60 feet of an active fault-trace centerline with a history of recurring earthquakes which measure 4.0 or greater on the Richter Scale. Impacts to mineral resources were considered significant if the potential exists for a route segment to interfere with present mineral extraction activities or future mineral exploration, extraction, or use activities. Soil erosion impacts were considered significant if the estimated soil loss for a route segment exceeds the T-factor (soil loss tolerance exposed in tons/acre/year) specified for soils of the route segment.

Northern Section: Alternative Routes A, B, C, and D (4.1.2.1)

Estimates indicate that soil loss ~~from the steep slopes of Alternative A may exceed soil loss tolerances on 99 percent of the total area to be cleared, by an average of 3.8 tons/acre/year. This means that~~ will not exceed soil loss tolerances for all routes and alternatives to be located in Oregon. Therefore, the potential does not exist for significant soil impacts to occur in this area. Overall, estimates indicate Alternative A has the highest potential for soil erosion of the four northern alternatives. Because of its location relative to the geological hazards of the area, Alternative A also has the potential to induce and/or be affected by landslip, earthquakes (from Tenant area fault traces), periodic volcanic eruptions in the Mount Shasta area, and mass wasting in Kosk Creek drainage. However, the placement of towers on stable soil/rock would reduce landslip, liquefaction and slope failure, and the distance and topography between Alternative A and Mount Shasta would reduce potential volcanic hazards to an insignificant level.

Alternative A crosses the Devil's Canyon and Kosk members of the fossil-bearing late Triassic Modin Formation. Because Triassic fossils are uncommon in California and meet the uniqueness criteria, physical disruption of these fossils is considered significant. Field investigations to identify final tower and road locations, excavation of fossil finds by a qualified paleontologist, and reporting of the find to the appropriate agencies will mitigate impacts to less-than-significant levels.

Estimates indicate that soil loss from Alternative B may exceed soil loss tolerances on 44 percent of the area to be cleared, by an average of 1.9 tons/acre/year. This means that Alternative B has the second highest potential for soil erosion of the four northern alternatives. Alternative B also crosses the Poman and Truax soils which are susceptible to significant wind erosion when vegetation is removed. The location of Alternative B relative to the geologic hazards of the area also indicates that it could sustain damage from periodic volcanic eruptions i the Mount Shasta area, from earthquakes (Tenant area fault traces) and mass wasting in Kosk Creek drainage. Impacts from these hazards would be minimized through distance, intervening topography, and the placement of towers on soil/rock which is not subject to liquefaction. Long-term impacts to soils would be reduced to insignificance through he installation and maintenance of drainage controls and retention of vegetation. Short-term impacts to soils would be reduced to insignificant levels through the retention of rough, cloddy ground/ and water sprinkling to suppress fugitive dust.

Alternative B crosses the Devil's Canyon and Kosk members of the fossil-bearing late Triassic Modin Formation. Because Triassic fossils are uncommon in California and meet the uniqueness criteria, physical disruption of these fossils is considered significant. Field investigations to identify final tower and road locations, excavation of fossil finds by a qualified paleontologist, and reporting of the find to the appropriate agencies will mitigate impacts to less-than-significant levels.

Estimates indicate that soil loss from Alternative C may exceed soil loss tolerances on 64 percent of the total area to be cleared by an average of 2.1 tons/acre/year. This means that Alternative C has the third highest potential for water-induced soil erosion of the four northern alternatives. Alternative C also crosses the Poman and Truax soils. These are susceptible to significant wind erosion when vegetation is removed. Alternative C may sustain damage from volcanic activity in the Mount Shasta area, or from earthquakes in the Tenant area fault traces and mass wasting in the Kosk Creek drainage. Impacts from volcanic activity, earthquakes and mass wasting would be reduced to an insignificant level through distance, intervening topography, and the placement of towers on soil/rock which is not subject to liquefaction. Impacts to soils would be reduced to insignificance through the installation and maintenance of drainage controls, retention of vegetation and rough, cloddy ground, and water sprinkling to suppress fugitive dust.

Alternative C crosses the Devil's Canyon and Kosk members of the fossil-bearing late Triassic Modin Formation. Because Triassic fossils are uncommon in California and meet the uniqueness criteria, physical disruption of these fossils is considered significant. Field investigations to identify final tower and road locations, excavation of fossil finds by a paleontologist, and reporting of the find to the appropriate agencies, would mitigate impacts to less than significant levels.

Estimates indicate that soil loss from Alternative D may exceed soil loss tolerances on ~~80~~ <u>40</u> percent of the total area to be cleared, by an average of ~~1.0~~ <u>2.0</u> tons/acre/year. This means that the soil erosion potential of Alternative D is the lowest of the northern alternatives. Geologic hazards include the instability of lava tubes for tower foundations, differential settlement of tower foundations due to low soil bearing capacities in the Copic Bay area, earthquake damage which might be sustained as the result of seismic activity in the Giant Crater Lava Flow area, and damage from periodic volcanic eruptions in the Medicine Mountain area. <u>The lava tubes of the Giant Crater Lava Flow area are subject to collapse and could adversely affect tower stability, representing a significant hazard. However, final route adjustments based on geotechnical investigations would mitigate this hazard to less-than-significant.</u> In addition, Alternative D passes through and may cause significant impacts to the 38,500 acre Glass Mountain Known Geothermal Resource Area (KGRA) which is ranked 4th of 17 KGRAs in California and 16th of 55 KGRAs nationally in importance for future energy production. Impacts from these hazards would be reduced to an insignificant level through distance, intervening topography, the placement of tower foundations on high integrity soil/rock, the importation of fill, the removal, compaction and replacement of existing soil, and where necessary, the use of pilings or subsurface anchors or supports. Impacts to the Glass Mountain KGRA would be reduced to an insignificant level through negotiated access and restricted use of this resource by COTP.

Alternative D crosses the Pliocene Alturas Formation, an extensive diatomaceous lake deposit. The deposit is known to contain fossils of large vertebrates that are unique and of scientific interest. Field investigations to identify final tower and road locations, excavation of fossil finds by a qualified paleontologist, and reporting of the find to the appropriate agencies would mitigate impacts to less-than-significant levels.

Northern Section: Grizzly Peak to Redding Route (4.1.2.2)

This section, common to all northern section alternatives, crosses steep slopes, areas of high rainfall, and soils possessing high erosion and landsliding potential. Estimates indicate that soil loss on ~~82~~ <u>84</u> percent of the total area to be cleared will exceed soil loss tolerances by an average of ~~13~~ <u>15</u> tons/acre/year. This constitutes a significant impact to soils. Landslides in the Montgomery Creek Formation may have a significant impact on transmission towers. Impacts from landslides and to soils can be mitigated to a level which is less than significant through proper design and spacing of drainage controls, the use of straw or hay mulch, ~~temporary and permanent~~ revegetation programs, the avoidance of <u>extreme</u> wet weather construction, and the anchoring of towers to bedrock.

The Grizzly Peak to Redding route passes near a copper-zinc district and an area which once supported coal mining operations. Although neither of these resources are currently considered important, and it is not believed that they will become important in the future, impacts would be minimized through negotiated access and removal of the minimum amount of overburden which may contain copper to prepare the COTP right-of-way during project construction.

The U. S. Forest Service indicated in November 1987 that the area east of the North 3J corridor (east of Little Meadows) has a feasible route location that will minimize resource impacts while meeting geologic concerns. Should a superior location be found near North 3J during final design, the lead agencies will work with the Forest Service to identify, review, and approve that location.

Central Section Upgrade Route (4.1.2.3)

Seismicity is the only hazard which could affect the transmission line in this section. However, the transmission line would not be located adjacent to any active faults in this area. Therefore, COTP facilities are not expected to be significantly affected by seismic activity.

Land in this section is level to gently sloping, and no new access roads would likely be built in this section. The potential for significant adverse impacts on soils is minimal. ~~Impacts will only be short-term.~~ If proper construction methods are used to avoid the compaction of wet agricultural soil, impacts will only be short-term and related to the construction phase. Consequently, significant soil impacts will not result in the Central/Upgrade Section.

The crossing of Cottonwood Creek could involve site disturbance during construction. Since the Pliocene Tehama Formation is well exposed in outcroppings along the Creek, a significant impact on fossil resources could result. However, site investigations to identify avoidance areas will reduce impacts to less than significant.

Southern Section: Alternative Routes A, B, and C (4.1.2.4)

Of the three southern alternatives, Alternative A traverses the least amount of organic soil (3.8 miles) but the largest amount of soil subject to liquefaction (21.5 miles). Organic soils, subject naturally to wind erosion, may become more vulnerable to wind-induced impacts during construction. Organic soils as well as soils susceptible to liquefaction (primarily the sands which underlie the Sacramento-San Joaquin River Delta) may also experience subsidence and result in the differential settlement of transmission towers. Impacts from these hazards can be reduced to an insignificant level through the importation of fill, and/or the removal, compaction and replacement of existing soils and/or the use of pilings or subsurface anchors or supports.

Alternative A passes near active natural gas wells on Sherman Island, sand, coal and potentially important mercury near Oakley and Antioch, and active sand and gravel quarries near Byron. Of these minerals, only natural gas on Sherman Island, mercury near Antioch, and sand and gravel near Byron would be affected by the COTP. Although these impacts are not expected to be significant, negotiated access, the removal of the minimum amount of overburden which may contain mercury, sand, or gravel necessary to prepare the COTP right-of-way and the venting of the minimum amount of natural gas necessary to ensure COTP health and safety would help to minimize impacts during project construction and operation.

Of the three southern alternatives, Alternative B crosses the second highest amount of organic soil (12.4 miles) and the second highest amount of soil susceptible to liquefaction (18.9 miles). Organic soils, subject naturally to wind erosion, may become more vulnerable to wind-induced impacts during construction activities. Organic soils as well as soils susceptible to liquefaction (primarily sands which underlie the Sacramento-San Joaquin River Delta) may also experience subsidence and result in differential settlement of transmission towers. Impacts from these hazards can be reduced to an insignificant level through the importation of fill, and/or the removal, compaction and replacement of existing soils and/or the use of pilings or subsurface anchors or supports.

Alternative B passes near active natural gas wells on Sherman Island, and sand, coal and potentially important mercury near Oakley and Antioch. Of these minerals only the natural gas on Sherman Island and mercury deposits near Antioch could be affected by the COTP. Although these impacts are not expected to be significant, negotiated access and compensation for the relocation or closure of any existing facilities will help to minimize impacts during project construction and operation.

Of the three southern alternatives, Alternative C crosses the most amount of organic soil (23.4 miles) but the smallest amount of soil subject to liquefaction (7.9 miles). Organic soils, subject naturally to wind erosion, may become more vulnerable to wind-induced impacts during construction. Organic soils as well as soils subject to liquefaction (primarily the sands which underlie the Sacramento-San Joaquin River Delta) may also experience subsidence and result in the differential settlement of transmission towers. Impacts from these hazards can be reduced to an insignificant level through the importation of fill, and/or the removal, compaction and replacement of existing soils and/or the use of pilings or subsurface anchors or supports.

Alternative C passes near active natural gas wells on Sherman Island. Potential impact to this resource, though not significant, would be reduced through negotiated access, their limited extraction by COTP, and by receipt of compensation for the relocation or closure of any existing facilities.

Water Resources and Fisheries (4.1.3)

Water supply resource impacts were considered significant if streams would be blocked, if aquifer recharge capability was affected, or if currently operating groundwater wells were disrupted. Fisheries impacts were considered significant if permanent barriers to migration were created, or if a change in water temperature or quality would result in a reduction of habitat or population of important game or special-status aquatic species. The California Regional Water Quality Control Board, Central Valley Region, has identified beneficial uses within the Pit River drainage including stock watering, hydroelectric power, water contact recreation, canoeing and rafting, non-water contact recreation, warm/cold fresh water habitat, spawning habitat for both warm and cold water species, navigation, municipal and domestic water supply, and irrigation. Beneficial uses will not be affected by the COTP. Impacts to water quality of streams or springs were considered significant if new access roads or transmission line rights-of-way crossed them on slopes in excess of 30 percent, or if a route paralleled, within 1,500 feet, one or more miles of stream.

Forest Service Best Management Practices (BMPs) for water quality have been adopted as mitigation for the COTP. The BMPs were submitted to the State Water Resources Control Board, in accordance with the Clean Water Act, for water quality management on National Forest System lands. Lead Agency staff has conferred with the North Coast and Central Regional Water Quality Control Boards. Because the mitigation measures for the COTP require implementation of the BMPs, staff from each of the Regional Boards have stated that there will be minimal impacts to water quality or beneficial uses of the waters of the State of California.

Northern Section: Alternative Routes A, B, C, and D (4.1.3.1)

Alternative A crosses approximately 33 water bodies and closely parallels ~~8~~ eight miles of stream. In addition, 11 of the water bodies are crossed in areas where the slope is 30 percent or greater. One stream crossing is in part of the McCloud River drainage which contains the federal candidate endangered redband trout (Salmo sp.). This alternative parallels a drainage containing the federal candidate endangered Jenny Creek sucker (Catostomus rimiculus). Impacts on federal candidate endangered species from construction activity and increased sedimentation are potentially significant along this alternative because of the large number of streams crossed in the coastal mountains, and the presence of candidate endangered species. Significant impacts can be mitigated by locating access roads away from sensitive areas. Impacts to water quality and supply would be mitigated by the proper location and construction of access roads and stream crossings.

Alternative B crosses approximately ~~19~~ 18 bodies of water and closely parallels ~~7~~ six miles of stream. In addition, ~~6~~ four of the water bodies are crossed in areas where the slope is 30 percent or greater. Three streams are crossed which contain populations of the federal candidate endangered redband trout. Impacts on endangered species from construction activity and increased sedimentation are potentially significant along this Alternative. These impacts can be mitigated by locating access roads away from sensitive areas. Proper construction and location of access roads and crossings would mitigate impacts on water supply and quality to an insignificant level.

Alternative C crosses approximately ~~28~~ 23 bodies of water and closely parallels ~~11~~ 10 miles of stream. In addition, ~~5~~ five of the water bodies are crossed in areas where the slope is 30 percent or greater. Two streams are crossed which contain populations of the federal candidate endangered redband trout. Impacts to endangered species from construction activity and increased sedimentation are potentially significant along this Alternative. These impacts can be mitigated by locating access roads away from sensitive areas. Significant impacts to water quality and supply would be mitigated by the proper location and construction of access roads and stream crossings.

Alternative D crosses approximately 26 bodies of water and does not closely parallel any streams. ~~Five~~ Three of the water bodies are crossed where the slope is 30 percent or greater. There is one stream crossed which contains the federal candidate endangered redband trout. Impacts on endangered species from construction activity and increased sedimentation are potentially significant along the N-10M Alt.5 portion of this Alternative. These impacts can be mitigated by locating access roads away from sensitive areas (See the Draft EIS/EIR, Volume 2A, Section 4.3). Significant impacts to water quality and supply can be mitigated by proper construction and location of access roads and stream crossings. Much of the northern section of this Alternative has low annual precipitation and thus has few perennial streams. Significant impacts on water resources are not expected with this Alternative.

Northern Section: Grizzly Peak to Redding Route (4.1.3.2)

This route crosses approximately ~~54~~ 70 bodies of water ~~but does not closely parallel any streams.~~ and closely parallels one stream. In addition ~~24~~ 10 of the water bodies are crossed in areas where the slope is 30 percent or greater. One stream is crossed which contains populations of the federal candidate endangered redband trout.

Impacts on endangered species from construction activity and increased sedimentation are potentially significant along this Alternative. These impacts can be mitigated by locating access roads away from sensitive areas. Proper construction and location of access roads and crossings would mitigate any impacts to water supply and quality.

Central Section Upgrade Route (4.1.3.3)

In the Central/Upgrade Section existing access roads and transmission towers would be used as much as possible. Construction would be limited to the replacement of selected structures and conductors. Thus there will be no significant impacts to water quality in this section.

These will be no impacts to water supply in the Central/Upgrade Section. No new access roads are proposed to be built and no known groundwater wells or aquifer recharge areas have been identified within proposed rights-of-way for this section.

Existing towers and access roads would likely be used in this section and no new stream crossings would be constructed. In addition, there are no special-status aquatic species that would be affected by upgrading the existing transmission line. Consequently, no significant impacts to fisheries in the Central Section are anticipated.

Southern Section: Alternative Routes A, B, and C (4.1.3.4)

Alternative A crosses approximately 16 bodies of water and closely parallels ~~3~~ three miles of waterways. There are no steep (greater than 30 percent) slopes along this Alternative and no endangered aquatic species. Proper construction and location of access roads and crossings would mitigate any impacts to water supply and quality.

Alternative B crosses approximately ~~14~~ 22 bodies of water and closely parallels ~~4~~ four miles of waterways. These are no steep slopes along this Alternative and no endangered aquatic species. Proper construction and location of access roads and crossings would mitigate any impacts to water supply and quality.

Alternative C crosses approximately 15 bodies of water and closely parallels Clifton Court Forebay for about two miles. There are no steep slopes along this Alternative and no endangered aquatic species. Proper construction and location of access roads and crossings would mitigate any impacts to water supply and quality.

Vegetation (4.1.4)

The following sections discuss vegetation resources potentially affected by the several routing alternatives. Details on these resources and the impact analyses are provided in Section 3.4 of Volume 2A of the Draft EIS/EIR. Significant impacts, applicable mitigation measures that have been adopted by the Project, and mitigation effectiveness are summarized in ~~4.1.4-1.~~ Table 2A of the Summary in this document. All potentially significant impacts can be mitigated by avoiding the important vegetation resources during siting after detailed field surveys of the selected routing alternative.

Vegetation impacts were considered significant if route segments or access roads traversed unique or sensitive plant communities (as recognized by land management agencies and environmental organizations), or if they traversed wetlands. In addition, potential impacts on special-status plant species were considered significant until field surveys can be conducted.

Northern Section: Alternative Routes A, B, C, and D (4.1.4.1)

Alternative A would result in permanent clearing of at least ~~1,423~~ 1,425 acres of forestlands and ~~34~~ 33 acres of rangeland habitats. Wetlands or floodplains may occur on segments N-1E and N-7H1 but these are of such narrow extent that they likely can be spanned by conductors between transmission structures (average span length is about 1,200 feet). Vernal pool habitats may occur on segment N-1E. Special-status plant species may occur on all route segments of this alternative. Detailed field surveys would permit these vegetation resources to be avoided during final transmission line siting.

Alternative B would result in permanent clearing of 1,093 acres of forestlands and nearly 2 acres of rangeland. Vernal pools also may occur on N-6B1 through Butte valley. Special-status plant species may occur on all segments of this routing alternative. Significant impacts to these vegetation resources can be avoided during final siting if this alternative is selected.

Alternative C would require permanent clearing of ~~1,337~~ 1,336 acres of forest vegetation and 38 acres of rangeland. Wetlands may be affected by the N-6N route segment through Butte Valley. Vernal pools may occur along route segment N-6H. Special-status plant species may be present along all route segments in this alternative except N-6C. Significant impacts to these resources can be avoided during final siting if this alternative is selected.

Alternative D, the environmentally superior route in the Northern Section, would require permanent clearing of ~~1,144~~ 1,031 acres of forest vegetation and ~~74~~ 93 acres of rangeland and lesser amounts of woodlands and shrub types. Segment N-10 Alt.5 crosses wetlands (montane meadows) at several locations near the McCloud River; these wetlands are sufficiently narrow to be avoided by placement of structures and access roads. N-10 Alt.5 also passes near small, scattered stands of old-growth conifer forest on both the Doublehead Ranger District of the ~~MOdoc~~ Modoc National Forest and the McCloud Ranger District of the Shasta-Trinity National Forest. These stands are being retained to support wildlife species diversity on these forests. Vernal pools may occur on route segments ~~N-10A,~~ N-10G, N-10J, N-10K, N-10L, and N-10 Alt.5. Special-status plant species may occur on these and all other route segments of this alternative. Populations of these plant species and the other unique and sensitive plant communities are of such limited extent that they will be avoidable during the final siting, which will include detailed field surveys of the selected route.

Northern Section: Grizzly Peak to Redding Route (4.1.4.2)

Potential habitat for special-status plant species has been identified on all route segments in this corridor except N-7N and N-7"O".

Potential habitat for special-status plant species has been identified on route segments N-8A, N-8B, N-8D, N-8F, N-8G, and N-8 Alt.1, 2, and 3. Route segment N-8G crosses a stand of McNab cypress along Montgomery Creek. This is considered a special plant community by the California Natural Diversity Data Base (CNDDB).

Wetlands or floodplains may occur on route segments N-9J and N-9O. Potential habitat for special-status plant species has been identified on all route segments of this corridor. Several route segments cross unique or sensitive plant communities. Vernal pools may occur along route segments N-9J and N-9O. Route segment N-9O traverses riparian vegetation along the Sacramento River north of Balls Ferry. Previous agricultural clearing in this vicinity would provide an opportunity to situate the transmission line across the river without removing riparian trees. Site-specific mitigation planning would be needed. This alternative would require the removal of ~~1,314~~ 1,162 acres of forest vegetation and nearly ~~8~~ eight acres of rangeland.

Central Section Upgrade Route (4.1.4.3)

The upgrade corridor Route (S-1A) crosses wetlands or floodplains in several locations. The potential for adverse impact to wetlands depends on whether existing structures would be used or whether new structures would be built at these locations. Potential habitat for special-status plants may occur along most of this corridor. The corridor crosses the Nature Conservancy's Jepson Prairie Preserve, an area that supports both vernal pool habitats and a rare native bunchgrass community. Vernal pools also occur elsewhere in the corridor. The potential for adverse impacts depends on whether new structures would be built and the extent of construction disturbance to these resources. Proper planning of construction activities should adequately avoid adverse impacts through the Jepson Prairie Preserve (Leitner 1985).

Southern Section: **Alternative Routes A**, B, and C (4.1.4.4)

Approximately ~~70~~ 104 structures would be located in floodplains, although many of these would be in diked agricultural areas along **Alternative A.** Twenty-eight special-status plants and two significant natural plant communities have the potential to occur in these areas. Any ground disturbance in areas occupied by special-status plants or in vernal pool or iodine bush communities would cause adverse impacts. However, most of these areas could be avoided by surveying and adjusting the centerline within the route segment as necessary to avoid impacts to these areas.

About ~~80~~ 92 new towers would be located in floodplains although many of these would be in diked agricultural lands along Alternative B, the environmentally superior route. Route segment S-8E crosses two extensive wetlands, Taylor Slough and a marshland near Dutch Slough, but both are narrow enough to be spanned if transmission structures are sited properly. Twenty-eight special-status plants and two significant natural plant communities have the potential to occur. Loss of these plants or disturbance of habitat in these areas would be significant. However, most of these areas could be avoided by surveying for them and adjusting the centerline within the route segment as necessary to avoid impacts to these areas.

Approximately 108 new tower sites would be located in floodplains, although many of these would be in diked agricultural areas along Alternative C. Twenty-three special-status plants and two significant natural communities could occur. Any ground disturbance in areas occupied by special-status plants or unique and sensitive plant communities would be significant. However, most of these areas could be avoided by surveying for them and adjusting the centerline within the route segment as necessary to avoid impacts to these areas.

Use of the H-frame tubular structure between the Sacramento River and Tracy would result in the removal of fewer acres of vegetation. The new structure would remove 0.02 acres per mile, compared to 0.13 acres per mile for the lattice structures. This difference is not considered significant.

Wildlife (4.1.5)

Siting the transmission line in an area with high collision potential for birds was considered a potentially significant impact, although it was recognized that site-specific mitigation measures could reduce impacts to less-than-significant levels. If new road access to previously remote game ranges was substantially increased, a significant adverse impact could result. If combined densities of existing and new roads were above established thresholds, then impacts were considered significant on wildlife resources. Impacts to important raptor nesting areas were considered significant if right-of-way clearing would occur near nesting areas. Potential impacts to special-status bird species were also considered significant if the impacts could result in abandonment of their area, result in reproductive failure, or would increase the potential for collisions.

Northern Section: Alternative Routes A, B, **C**, and D (4.1.5.1)

The major impacts along Alternative A would be the possibility of line collisions by the bald eagle and other sensitive raptors. As Olendorff and Lehman (1986) have noted, "collision with power lines could (be) significant in important habitats where endangered species congregate". The line crosses a regular flight path for nesting and wintering bald eagles near Iron Gate Reservoir (Detrich 1985). The area also receives heavy use by other sensitive cliff-nesting raptors, ospreys, and great blue herons (Johnstone 1985). Although the proposed alignment takes advantage of natural topographic features to minimize impacts, the presence of unmarked shield wires would create potential for collisions in this area. Although this would be expected to result in infrequent bald eagle mortality, it would nevertheless be a significant impact. Marking the shield wires in a two mile segment at the Klamath River crossing, and careful use of topographic screening would reduce this impact to less-than significant levels.

Alternative A also passes near a bald eagle nest territory and greater sandhill crane nesting area at Grass Lake (Woodbridge 1985, Johnstone 1986). Collision potential with an unmarked shield wire here is sufficiently high to be a significant impact unless mitigation (marking of the shield wire) is employed.

Disturbance of nesting bald eagles would not occur during construction activities on Alternative A. One new nest found in Jenny Creek during project field work is 2 miles from the Alternative route. The eagle nest at Grass Lake is 1 mile from the route. Both nest areas are isolated from the line due to topographic features.

Alternative A would pass through a spotted owl management area territory (MC-4) on U. S. Forest Service land near the McCloud River (Toner per. comm.). Because this area contains considerably less than the minimum of 1,000 acres of old growth habitat recommended by the USFS for each owl territory, the removal of additional old-growth vegetation within the right-of-way could be significant. Mitigation to less-than-significant impact levels could be accomplished by careful selection of a route within the corridor to avoid USFS land with old-growth forest habitat.

Alternative A would cross ~~31~~ 38 miles of important big game habitat and would cause significant impacts to 19 miles of important habitat for deer, elk, and antelope. These impacts would result from the effects of access road construction and subsequent disturbance of these animals by road users. Road closures would mitigate impacts to less-than-significant levels in most areas. Details on the methods used to determine impacts and specific areas affected are given in Volume 2A of the Draft EIS/EIR.

A number of other impacts would occur that are common to all northern alternatives. These impacts are described in more detail in Volume 2A of the Draft EIS/EIR. These include disturbance from construction activities, effects of right-of-way clearing and subsequent management, increase in perch and nest sites, and effects of electrical fields. These impacts will not be repeated in impact discussions for Alternatives B-D (North).

Alternative B passes within a mile of a bald eagle winter roost near Coleman Lake and the Klamath River. A bald eagle nest also occurs within 0.3 miles of the route in this area. Studies of bald eagle movement patterns and susceptibility to disturbance would be necessary prior to locating a route alignment in this area. Careful siting of the line within the corridor and placement of marker balls or shifting of the corridor could be required to reduce potential for collisions with shield wires near these areas. Construction would have to occur during the non-nesting period (late August - January) near the nest area to prevent significant impacts due to disturbance (USFS 1977).

Alternative B crosses Butte Valley, which is a major foraging area for three special-status birds: bald eagle, greater sandhill crane, and Swainson's hawk (Woodbridge 1985, 1986). Large numbers of eagles forage in Butte Valley during winter. A large proportion of the western population of greater sandhill cranes stop over and spend the fall months in Butte Valley before migrating to California's Central Valley. Breeding cranes also occur at nearby Meiss Lake. Butte Valley supports the largest and densest population of Swainson's hawks in California. These hawks breed and forage extensively in and adjacent to agricultural areas traversed by the route.

As a result of the major concentrations of these three species in Butte Valley, there is potential for collision mortality with shield wires and conductors. Collisions are most likely to occur from late fall to early spring when dense fog on the valley floor greatly reduces visibility. Collisions are a strong possibility with cranes; authorities consider collisions with transmission and distribution lines to be the major source of adult crane mortality (Littlefield 1986, Schlorff 1986). Collisions of up to 20 cranes with transmission lines during foggy weather have caused power outages in the Central Valley (Schlorff 1986). Some bald eagle collisions could occur in foggy weather in Butte Valley. Because of frequent low visibility conditions due to frequent fog in this area, marking wires of other mitigation would not be effective in reducing impacts to less-than-significant levels. Detailed field studies of numbers and movement patterns of bald eagles and cranes would be required prior to route location in this area.

Although Swainson's hawks are present during summer, which is generally free of fog, their concentrated use of agricultural fields for foraging and frequent foraging and courtship flights in the area suggests a low potential for collision. This is not considered significant.

Alternative B would have the same significant adverse impacts to the MC-4 spotted owl territory as described in Alternative A (North). Disturbance of nesting Swainson's hawks during construction would also cause significant impacts. This could be avoided by restricting construction ~~near nests~~ to the non-nesting period. As a result of road construction and resulting human use, Alternative B would cross ~~16~~ 23 miles of important big game range; significant impacts due to road construction would occur only along 3 miles. This could be mitigated in most areas by adoption of road closures.

Alternative C passes within 1.5 miles of a major bald eagle roost area at Bear Valley (Keister 1981). Although the area immediately adjacent to the line is not heavily used by eagles and the area does not experience foggy conditions as frequently as Butte Valley, there is moderate potential for collisions by bald eagles with unmarked shield wires. This is due to the number of eagles present and the frequence of movement over the line to Butte Valley foraging areas. Detailed field studies of eagle flight patterns would also probably be required here prior to route alignment. Moderate collision potential by bald eagles also exists with unmarked shield wires at a topographic low area in Red Rock Valley. Collision potential at both of these areas is considered significant. Careful location and design, and marking of shield wires would possibly mitigate impacts in these areas to less-than-significant levels.

Alternative C crosses ~~29~~ 36 miles of important big game ranges as a result of road construction and resulting human use, and would cause significant adverse impacts to 10 miles of important deer and antelope ranges. Road closures would mitigate these impacts to less-than-significant levels in most areas.

Alternative D passes near a Swainson's hawk nest (Bloom 1985). Even if the line was shifted ~~within the line~~ within the route corridor, construction disturbance near the nest during the nesting season would be a significant adverse impact. This impact could be mitigated to less-than-significant impact levels by restricting construction to non-nesting periods. Alternative D passes along the east side of the Klamath Basin near Newell. The Basin supports high populations of migratory waterfowl and wintering bald eagles. However, collision potential here is not significant because use of the corridor area is low and topography shields birds from collisions (Harlow 1986, Hainline 1986).

This alternative passes through a USFS protected Goshawk territory near the McCloud River (Austin 1986). Impacts to this area could be avoided with careful siting of the line during the project design phase.

This alignment crosses 45 miles of deer and antelope range. Eleven miles would be significantly impacted as a result of construction of access roads and subsequent human use (see the Draft EIS/EIR, Volume 2A, Section 3.5). Road closures designed during project planning would successfully mitigate these impacts in most areas.

Alternative D passes through areas that contain old growth forest habitats important for wildlife diversity (Ross 1986). Impacts to these stands could be avoided by carefully locating the alignment within the corridor. The corridor also crosses forestlands that do not meet minimum USFS standards for standing dead trees (snags) (Ross 1986). Removal of snags from such areas would be a significant impact. This could be mitigated to less-than-significant levels by topping some live trees to create new snags.

Northern Section: Grizzly Peak to Redding Route (4.1.5.2)

This route passes through a USFS spotted owl management territory (MC-2), and would require right-of-way clearing of 8 acres of old growth forest habitat in an area that received frequent use by the owls (Toner 1986). This territory currently contains 880 acres of old growth forest habitat, less than the 1,000 acre minimum required by USFS direction (Smith 1981). Therefore, despite removal of less than one percent of existing old growth habitat, this impact would be significant. Careful location of the route within the 1,500-foot corridor, or minor shifting of the route would mitigate impacts to less-than-significant levels.

The route crosses the Pit River and passes adjacent to Pit 7 Reservoir. This area is used for foraging by breeding and wintering bald eagles (BioSystems Analysis and U. C. Davis Department of Wildlife and Fisheries Biology 1985). Wintering bald eagles also forage extensively in the area where the route crosses the Sacramento River (Detrich 1978, 1985). The high use of these areas by eagles indicated significant potential for collisions, based on criteria in Olendorff and Lehman (1985). Collision potential could be reduced to less-than-significant levels by careful design to avoid flight elevations typically used in these areas (see

Olendorff et al. 1986) and, where necessary, marking static wires. Examples of uses of wire marking are included in the Draft EIS/EIR Volume 2A, Section 3.5.

~~Four miles of important big game range is crossed in this section, but none would be significantly impacted by road construction and subsequent human disturbance.~~

Central Section Upgrade Route (4.1.5.3)

Route segment S-1A crosses waterfowl winter habitat near the Sacramento River crossing. The route passes to the west of major waterbird use areas in the Butte Sink and Sacramento Valley refuges. Additional impacts to wildlife on this route would be minimal beyond those already present because it is an upgrade of an existing transmission line. No major waterfowl collision areas or other impacts have been reported along the existing line.

Southern Section: Alternative Routes A, B, and C (4.1.5.4)

Because most lands on southern Alternatives are in agricultural use, they have low value for most wildlife and low impacts. Collision potentials for waterfowl for these alternatives were determined from waterfowl use levels provided by CDFG (Wernette 1986) for specific Delta areas.

Collision potential for waterfowl is considered significant for ~~18~~ 17 miles of Alternative A due to the high numbers of waterfowl present and frequent poor visibility due to fog. This impact cannot be successfully mitigated. If kit foxes are found to be present in the one mile of suitable habitat, ground disturbance in occupied areas could cause significant impacts by disturbing natal dens. This would be avoided by surveying for dens and avoiding potential den sites.

~~Twenty-six~~ Twenty-four miles of Alternative B would have significant waterfowl collision potential. This impact cannot be mitigated. If kit foxes are found to be present in the one mile of suitable habitat, ground disturbance in these areas could have significant impacts by disturbing natal dens. This potential impact would be eliminated by surveying habitat and avoiding potential den sites.

Twenty-one miles of Alternative C would have significant potential for waterfowl collisions. This cannot be successfully mitigated. If potentially suitable grassland areas are occupied by kit foxes, ground disturbance could cause significant impacts by affecting natal dens. Surveying and avoiding potential dens would eliminate potential impacts.

The H-frame structure between the Sacramento River and Tracy would be taller than the lattice structure (up to 170-190 feet versus 125-140 feet). This difference could affect the potential for collisions by waterfowl, but it is unknown which height might cause fewer collisions and whether the difference in collision potential would be substantial. The static wires would be 30 feet above the H-frame, compared to 18 feet above the lattice structure. The greater height of the static wire above the structure could make collisions more likely with the H-frame. The magnitude of this difference is not determinable.

Land use (4.1.6)

This section summarizes the impacts of the alternatives on the following resources:

- Forestry
- Agriculture
- Recreation
- Developed Land Use
- Planned Land Use
- Land Status

Forestry resources studied included evergreen forests and Timberland Production Zones. Forestry impacts are shown for national forest system lands on Tables 1.1.4-1 through 1.1.4-8. An estimate of the impacts to private prime timberlands can be derived from the tables by subtracting the "miles crossed of prime timber on Forest Service lands" from the "total prime timber crossed in miles". These calculations are approximations since there are other public lands included in the "total miles crossed of prime timber", which amount to less than one percent of the total route miles.

Agricultural resources included irrigated and non-irrigated croplands, rangeland, and agricultural preserves. Section 3.6.3.2 and Table 3.6-10 in Volume 2A of the Draft EIS/EIR address the federal Farmland Protection Policy Act, and route impacts on Prime, Statewide, Unique and Local farmlands, and rangeland. Recreation resources included designated recreation sites and dispersed recreation. Developed land uses included residential, commercial and industrial uses. Planned land uses included specific development proposals. Land status referred to public and private land ownership patterns within each route alternative. Section 3.6 of Volume 2A of the Draft EIS/EIR contains a more detailed discussion of each land use resource area and individual route impacts. The tables in Section 3.6 of the Draft EIS/EIR present the types of land use impacts found in the new and existing rights-of-way. Summaries of impacts by alternative route for agriculture, recreation, and developed land uses are shown in Tables 1.1.4-1 through 1.1.4-8.

Forestry impacts were considered significant wherever route segments cross 40 acres or more of prime timberland of public or private ownership, or a TPZ that crosses 40 or more acres of prime timberland. Impacts from increased fire hazards were considered significant wherever an offsite fire fighting organization that exercises primary jurisdiction would be unable to respond in a timely manner to a wild fire. Transmission lines and towers may create hazards for aircraft used in fighting fires near the lines. However, transmission lines generally do not interfere with or preclude the normal range of fire control activities. Agricultural impacts were considered significant if one-half mile of prime farmland or farmland of statewide importance were crossed by a new route segment, and/or if the route results in a new permanent crossing of at least one-half mile of a non-irrigated farming area that is designated in an adopted environmental plan or local land use policy, such as an agricultural preserve program. Recreation impacts were considered significant if the normal use of a recreation would be restricted or precluded. Residential impacts were considered significant if a house could not be avoided by moving the centerline 750 feet in either direction, or if 50 or more homes were located within 1,000 feet of a centerline for over one mile. Commercial or industrial operation impacts were considered significant if their normal use would be restricted or precluded by the transmission line.

Northern Section: Alternative Routes A, B, C, and D (4.1.6.1)

One dwelling in Alternative A is located within the right-of-way. The right-of-way can be adjusted to avoid the dwelling. However, this Alternative would be located within 1,000 feet of nine dwellings in the Copco corridor.

Recreation impacts of Alternative A are discussed under Visual Resources. Forestry resources are affected most by Alternative A, which crosses 786.94 acres (32.46 miles) of prime timberland. The U.S. Forest Service administers ~~761.87~~ 524.36 acres (~~30.03~~ 21.63 miles) of prime and non-prime timberland crossed by this Alternative; 242.00 acres (10.00 miles) of privately owned land in Timberland Production Zones (TPZ) are crossed. Alternative A would reduce the long term sustained yield of timber on the Klamath and Shasta-Trinity National Forests by less than 267 MBF which is less than one-half of one percent of the allowable cut for these forests. Alternative A affects the least amount of cropland. It crosses .23 mile of irrigated cropland in Siskiyou County, (Corridor N-1), and 14.83 miles of cropland and rangeland in agricultural preserves.

One dwelling in Alternative B is located within the right-of-way. The right-of-way can be adjusted to avoid the dwelling. However, Alternative B will be located within 1,000 feet of two houses in the Butte Valley (N-6) corridor. It also crosses the approved Pleasant Valley subdivision in Siskiyou County. Recreation impacts are discussed under Visual Resources.

Forestry resources are affected by Alternative B, which crosses 706.19 acres (29.13 miles) of prime timberland. The U. S. Forest Service administers ~~931.13~~ 585.45 acres) (~~38.48~~ 24.15 miles) of prime and non-prime timberland crossed by this Alternative. There are also 254.10 acres (10.50 miles) of privately owned land in TPZs crossed. Alternative B would reduce the long term sustained yield of timber on the Klamath and Shasta-Trinity National Forests by less than one-half of one percent of the allowable cut for these forests, which is less than 245 MBF. Alternative B affects the greatest amount of cropland and rangeland, with 2.51 miles of irrigated cropland crossed in Butte Valley (Siskiyou County) (Routes N-6B1, N-6P, and N-6Z). Alternative B crosses 4.1 miles of rangeland and cropland in agricultural preserves.

No dwellings are located within the Alternative C right-of-way. However, ~~five~~ four dwellings and two rural airstrips are located within 1,000 feet of the reference centerline in the Butte Valley corridor. Recreation impacts are discussed under Visual Resources.

Alternative C crosses 692.85 acres (28.63 miles) of prime timberland. The U. S. Forest Service administers ~~657.69~~ 408.48 acres (~~27.18~~ 16.85 miles) of prime and non-prime timberland crossed by this Alternative. The impacts on TPZs are identical to those of Alternative B since the routes are the same in areas where TPZs are located. Like Alternatives A and B, Alternative C would reduce the long term sustained yield of timber in the Klamath and Shasta-Trinity National Forests by less than 112 MBF which is less than one-half of one percent. Alternative C affects a moderate amount of cropland and rangeland, with 1.12 miles of irrigated cropland in Butte Valley (Routes N-6E and N-6N) crossed. Alternative C crosses ~~1.97~~ .96 mile of rangeland and cropland in agricultural preserves.

~~Four~~ Two dwellings are located in the right-of-way of Alternative D. The right-of-way can be adjusted to avoid the dwellings. However, ~~nine~~ five dwellings would be located within 1,000 feet of a reference centerline (Routes N-10A, N-10G, and N-10J). Recreation impacts are discussed under Visual Resources.

Forestry resources are affected least by Alternative D, which crosses ~~478.81~~ 476.64 acres (~~19.66~~ 19.29 miles) of prime timberland. ~~However,~~ Although, the forestland crossed contains the most productive timber in the Modoc National Forest, it would reduce the forest's long term sustained yield by less than 112 MBF which is less than one-half of one percent. The U. S. Forest Service administers ~~1,333.82~~ 1,109.96 acres (~~55.27~~ 45.79 miles) of prime and non-prime timberland and rangeland crossed by this Alternative. Alternative D also affects ~~the smallest amount of land (1.0 miles crossed) in~~ 11.5 miles of privately owned TPZs. Alternative D (North) affects ~~a moderate amount of cropland and rangeland, with 1.37 miles~~ .53 mile of irrigated cropland in the Tulelake/Copic Bay region (Routes N-10A and N-10E) crossed. However, the line can be sited within the 1,500 foot study route to avoid the cropland. Alternative D has no impact on agricultural preserves because Modoc County does not participate in the Williamson Act Program.

Irrigated cropland in the Tulelake/Copic Bay region was considered the key agricultural resource even though there is no Williamson Act participation. The irrigated lands are usually more valuable than non-irrigated land and rangeland which may be in agricultural preserves. The irrigated cropland in this area is classified as Prime Farmland and Farmland of Statewide Importance.

Northern Section: Grizzly Peak to Redding Route (4.1.6.2)

~~Six~~ Seven dwellings would be located in the Grizzly Peak to Redding right-of-way, with the majority located along the N-9 routes in the Millville corridor. Rights-of-way can be adjusted to avoid the dwellings. However, ~~five~~ fifty-three dwellings would be located within 1,000 feet of the reference centerline ~~in the Pit River corridor, thirty-five dwellings in the Millville corridor, and seven dwellings in the Cottonwood corridor.~~ Recreation impacts are discussed under Visual Resources.

This Alternative crosses ~~542.36~~ 473.94 acres (~~22.42~~ 19.55 miles) of prime timberland. The U. S. Forest Service administers ~~386.61~~ 301.17 acres (~~16.81~~ 12.45 miles) of prime and non-prime timberland crossed by this Alternative. The Alternative is located less than one mile from the Forest Service's Grizzly Peak fire lookout, which is a major observation point in the Grizzly Peak/Bartle forest region. There are also ~~444.07~~ 455.52 acres (~~18.38~~ 18.79 miles) of privately owned land in TPZs crossed. It crosses 2.62 miles of irrigated cropland, and ~~5.08~~ five miles of land in agricultural preserves.

Central Section Upgrade Route (4.1.6.3)

There are no prime or non-prime timber resources, woodlands or TPZs on the Upgrade Route. Therefore, there are no impacts. The route crosses 75.76 miles of irrigated cropland, 41.55 miles of rangeland, and 76.70 miles of agricultural preserves but there are no new, permanent impacts. Recreational resources crossed by the Upgrade Route include Argyll Park, a private off-road vehicle facility, and Jepson Prairie, a scientific and nature preserve owned by The Nature Conservancy. Both sites were developed for their current use after the existing Western 230 kV line was built. Neither site would be significantly affected. There are no dwellings within the Upgrade Route's right-of-way. There are 175 dwellings located within 1,000 feet of the reference centerline. However, there will be no new, permanent impacts. There are no commercial/industrial, or planned land uses on the Upgrade Route.

Southern Section: Alternative Routes A, B, and C (4.1.6.4)

Seven dwellings in Alternative A are located within the right-of-way. The right-of-way can be adjusted within the route to avoid the dwellings. However, ~~67~~ 71 dwellings will be located within 1,000 feet of the centerline in the Delta corridor (S-8 routes), and eight dwellings in the Tesla corridor (S-9 routes). Alternative A also passes through the rapidly expanding community of Discovery Bay in Contra Costa County. Several new residential areas are now being graded in preparation for construction, and an elementary school is planned that would be adjacent to Alternative A. Recreation impacts are discussed under Visual Resources. This Alternative crosses ~~18.88~~ 19.46 miles of irrigated cropland, and ~~6.73~~ 6.85 miles of land in agricultural preserves.

~~Six~~ One dwelling~~s~~ in Alternative B is located within the right-of-way. The right-of-way can be adjusted within the route to avoid the dwelling~~s~~. However, ~~63~~ 71 dwellings will be located within 1,000 feet of the centerline in the Delta corridor (S-8 routes), and ~~eight~~ six dwellings in the Tesla corridor (S-9 routes). Alternative B crosses ~~20.88~~ 23.17 miles of irrigated cropland, and ~~13.83~~ 14.90 miles of land in agricultural preserves.

Alternative C contains 11 houses within the right-of-way. Rights-of-way can be adjusted within the route to avoid the dwellings. However, this Alternative will be located within 1,000 feet of 77 dwellings in the Delta corridor (S-8 routes), and eight dwellings near the Tesla Corridor (S-9 routes). It also bisects the community of Bethel Island in Contra Costa County. Recreation impacts are discussed under Visual Resources. This alternative crosses ~~23.50~~ 4.10 miles of irrigated cropland, and ~~17.23~~ 17.33 miles of land in agricultural preserves.

Since the release of the Draft EIS/EIR, Western has identified a new possible tower design for the upgrade section between the Sacramento River and the Tracy Substation. Use of the new H-Frame tubular tower, instead of the steel lattice tower, would reduce impacts to agriculture for the southern preferred route segments (Table 1.1.4-16). Specifically, there would be fewer towers per mile - average of 3.2 compared to 4.4. There would also be approximately an 85 percent reduction in the amount of agricultural acreage removed from tower bases.

Aerial application practices can be affected by transmission lines located above irrigated field and row crops (CEC 1985). Permanent modification of aerial spraying practices within one-quarter mile of the transmission line may be required, resulting in the potential for reduced spray coverage, reduction of crop yields, increased safety risks to applicators, increased need for ground applications of pesticides and herbicides, increased costs to aerial applicators, increased production cost to growers, and increased energy consumption by aerial applicators (CEC 1985). The increased height and wider spans of the H-frame tower would likely have an effect on aerial applications similar to that of the steel lattice tower.

Visual Resources (4.1.7)

Visual impacts of transmission facilities are the result of changes occurring to existing visual resources. Changes or contrast are initiated by the removal and/or addition of landscape elements. Transmission line components would displace existing resources that are valued for their appearance. They would exhibit visual contrast or incompatibility with the existing visual character of the landscape, evaluated in terms such as form, line, color, and texture. The degree of contrast introduced by these new features could adversely affect the appearance of landscapes that are managed partially or wholly for their scenic quality. An important consideration of analyzing the degree of contrast is the presence of existing structures, including existing transmission line facilities, and their visual characteristics.

Viewer response to the visual resource change associated with transmission development would depend on the extent of viewer exposure. Thus, it is important to determine the potential visibility of the transmission alternatives as seen from sensitive viewpoints. Such viewpoints include designated scenic roads, rivers, trails, developed recreation sites, and residential areas. Viewer response also depends on the number of people at the viewpoints and the duration of their views of the facilities. A discussion of methods and criteria, as well as Table 3.7-1 which quantifies indicators of visual impact, are detailed in Section 3.7, Visual Resources, of Volume 2A of the Draft EIS/EIR.

Areas where the transmission line would introduce a high degree of visual contrast were identified as potential locations of significant impact. One indicator of visual sensitivity was the presence of high priority visual management areas. Another indicator of viewer response is the extent of visibility from sensitive viewer locations. The combination of high contrast with either of the two contextual indicators was evaluated as likely to result in significant visual impacts.

Northern Section: Alternative Routes A, B, C, and D (4.1.7.1)

Significant visual impacts can be expected from the construction and operation of a transmission line along Alternative A due to the contrast of the transmission line with existing landscape elements and the visibility of the line from sensitive viewpoints. Impacts would occur at crossings of scenic highways, rivers, and national trails. These impact locations would include Highways 66 (the Green Springs Highway in Oregon), 97 (north of Mount Shasta), 89 (north of the McCloud River), ~~the Pacific Crest Trail (south of Highway 89),~~ and the McCloud River. Impacts would also occur in incompatible landscapes that are flat and open where visibility from sensitive land uses is high or where a number of residences are located in the foreground of the alternative. These situations would occur south of the Klamath River crossing, near Bogus School, in the Shasta Valley, and several miles on either side of Highway 97 which crosses north of the Mount Shasta Vista Point (developed by the California DOT). In addition, significant impacts would occur north and south of the McCloud River on lands managed by the U. S. Forest Service for Retention of existing scenic quality and in the foreground of the Cattle Camp Campground. Impacts are associated with the contrast created by placing the transmission line components in the existing landscape and the visibility of those components from sensitive land uses. Mitigation measures designed to reduce these impacts are: use of nonspecular conductors and predarkened tower steel, the siting of towers off of ridgetops and hilltops, minimizing access road construction, and retention of visual buffers by minimizing vegetation clearing at road and river crossings and in the foreground of residential areas.

Significant visual impacts could be expected from the construction and operation of a transmission line along Alternative B due to the contrast of the transmission line with existing landscape elements and the visibility of the line from these viewpoints. Impacts would occur at crossings of scenic highways and rivers. These impact locations would include Highways 66 (the Green Springs Highway in Oregon), 97 (in Butte Valley), 89 (north of the McCloud River) and the McCloud River. Additional impacts are likely to occur in incompatible landscapes where visibility is high or on lands managed for their scenic quality and where sensitive land uses are located in foreground views. Such areas are located in proximity to the Klamath River, in Butte Valley, east of the community of Tenant, north and south of the McCloud River on lands managed by the U. S. Forest Service for Retention of existing scenic quality and in the foreground of Cattle Camp Campground. Impacts are similar to those mentioned in Alternative A and are associated with visual contrast and visibility. Mitigation measures designed to reduce these impacts have been mentioned above.

Significant visual impacts could be expected from the construction and operation of a transmission line along Alternative C for reasons mentioned above. These impacts would occur at crossings of scenic highways and rivers. Impact locations would include Highways 66, 97 (north of Butte Valley), and 89 (north of the McCloud River) and the McCloud River. Additional impacts occur where the route would be located in proximity to the Klamath River, at the Red Rock Lakes/Sheep Mountain areas where the BLM has assigned a Visual Resource Management Class II to the area, east of Tenant, and north and south of the McCloud River on lands managed by the U. S. Forest Service for Retention of existing scenic quality. Impacts are similar to those mentioned in Alternative A and are associated with visual contrast and visibility. Mitigation measures designed to reduce these impacts have been mentioned above.

Significant visual impacts from the construction and operation of a transmission line along Alternative D are caused by the visual contrasts of the proposed project and visibility of facilities. Impacts would occur at crossings of scenic highways and rivers. These impact locations would include Highway 139 (southeast of the community of Newell), and 89 (north of the McCloud River), and the McCloud River. Additional impacts occur where the route would be visible from sensitive land uses in open landscapes such as northeast of the town of Malin, at Copic Bay, and east of Lava Beds National Monument. Significant impacts are associated with transmission line crossings of U. S. Forest Service roads used by the recreating public in areas managed for Retention or Partial Retention of visual resources and at designated viewpoints. These sensitive road crossings and viewpoint locations occur on the entrance road to Lava Beds National Monument, ~~Tionesta Road, and Medicine Lake Road,~~ Medicine Lake Highway and Powder Hill Road. Mitigation measures that would reduce the effects of visual contrast and visibility are~~a~~: use of nonspecular conductors, darkened tower steel, and opaque insulators, retention of vegetative buffers at road and river crossings, the siting of towers off ridgelines and hilltops, minimizing access road construction, and feather of vegetation along right-of-way edges to emulate natural edges. Significant impacts would remain, but at a reduced level even with the application of mitigation.

Northern Section: Grizzly Peak to Redding Route (4.1.7.2)

Significant visual impacts would occur at crossings of scenic highways, rivers, and national trails. Locations of impacts would include Highway 299 (west of Round Mountain), 44 (at the community of Millville), I-5 (north of Cottonwood), the Sacramento River, and the Pacific Crest Trail (east of Grizzly Peak Lookout). Impacts would also occur in incompatible landscapes that are flat and open, where visibility from sensitive land uses are high, where a large number of residences are located in the foreground of the route and/or where lands are being managed for scenic quality. These situations occur north of Iron Canyon Reservoir where visual quality is being managed by the U. S. Forest Service for Retention, and to residences north and west of Round Mountain. Impacts are similar to those mentioned in Alternative A and are associated with visual contrast and visibility. Mitigation measures designed to reduce these impacts have been mentioned above.

Central Section Upgrade Route (4.1.7.3)

The visual impacts of transmission line upgrading would generally be related to construction activities and the visibility of these short-term activities from sensitive areas. Impact areas include the crossings of numerous local scenic roads and highways, e.g., Black Butte Road and Putah Creek Road; Highways 162, 20, and ~~133~~ 113; and Interstates 5 and 80 in open or agricultural landscapes. Impacts during construction would stem from clearing and grading of the right-of-way and staging areas. Mitigation to reduce the significance of short-term effects include maximizing the use of existing roads, designing new access roads to minimum standards, minimizing the removal of existing vegetation, replanting of vegetation in the right-of-way, and retaining vegetative buffers at road and creek crossings. Predarkened tower steel should be used for the upgrading to match existing tower bases.

Southern Section: Alternative Routes A, B, and C (4.1.7.4)

Significant visual impacts could be expected along most of Alternative A due to the incompatibility and visibility of the transmission structures in the flat, agrarian landscape, coupled with the high number of sensitive viewers in the area, particularly residents and recreationists. Impacts would be lessened because the route runs parallel but not immediately adjacent to an existing corridor which reduces structural contrast. Impacts to recreational users would be evident where the route crosses or is in close proximity to the Sacramento River, Dutch and Taylor Sloughs, Clifton Court Forebay and the California Aqueduct Bikeway. Residential areas in the foreground of Alternative A include Bethel Island (Taylor and Dutch Sloughs), Discovery Bay and Mountain House. Additional impacts would occur at the crossing of scenic highway 160 and the interchange of I-205 and I-580. Several mitigation measures would reduce significant contrast and visibility of Alternative A. These are: using nonspecular conductors and predarkened tower steel, coordinating tower placement, type and span to match existing transmission structures, and retaining existing vegetation as buffers at crossings of highways and water bodies.

Significant visual impacts could be expected along most of Alternative B due to the incompatibility and visibility of transmission structures in the landscape, coupled with the high number of sensitive viewers, particularly residents and recreationists. Visual impacts would be the same as those discussed above (Alternative A) except where the route no longer parallels existing transmission lines causing structural contrast. Significant impacts would occur where the route would cross the Sacramento River, scenic highway 160, and numerous sloughs used by recreational boaters. Impacts also could be expected where the route passes close to residential areas such as the southwest levee of Bethel Island, northeast of Discovery Bay and east of Kings Island. South of Tracy Substation, potential impacts would occur at the crossing of I-205, I-580, at the California Aqueduct Bikeway, and in the open rolling landscape around Mountain House. Several mitigation measures would reduce the significance of impacts along portions of the route that parallel existing facilities. These measures are: use of nonspecular conductors and predarkened tower steel, coordinating tower placement, type and span with existing structures, and retaining existing vegetation. Where there is a new right-of-way, the above measures will reduce visibility impacts but not the contrast of adding transmission facilities to the landscape. Residual impacts along the new right-of-way would remain significant.

Significant visual impacts could be expected along most of Alternative C due to structural contrast and the incompatibility and visibility of the transmission structures in the landscape and because of the high number of potentially sensitive viewers. Impacts would occur at crossings including the Sacramento and San Joaquin Rivers, numerous sloughs, highways 160, I-205, and I-580, and the California

Aqueduct Bikeway. Additional significant impacts would be expected where the route passes in close proximity to residential areas and the golf course on Bethel Island, Franks Tract State Park, and Kings Island. Mitigation measures discussed above would reduce the visibility of this alternative but not the contrast created by adding a major structural feature to the landscape.

Since the towers or structures that support high-voltage conductors are one of the principal visual components of transmission facilities, the possible change in tower design between the Sacramento River and Tracy would have effects on the assessment of visual impacts in the southern Delta. The purpose of this discussion is to identify those effects.

One type of effect would be the difference in appearance between the steel lattice structures assessed in the Draft EIS/EIR and the tubular steel structures. The geometry and number of structural members in the steel lattice towers give them a very complex appearance, which can contrast sharply with the visual character of surrounding landscapes. In comparison, the visual simplicity of tubular steel "H-frame" structures is often regarded as less intrusive. For this reason, they are sometimes termed "improved-appearance" structures and their use is often considered as a mitigation measure in locations subject to adverse visual impacts.

The advantageous effects of this visual simplicity, however, would be foregone where the COTP would be seen in conjunction with other existing transmission lines. The visual complexity created by the mixture of tower types and orientations would generally cancel out the visual simplicity and reduced number of any particular set of towers. This condition would apply along much of the alternative route mileage through the southern Delta.

On the other hand, the increased height of the tubular steel towers would make them visible from greater distances and so would increase the extent of viewer exposure to the COTP in the southern Delta. The analysis of Visual Resources in Section 3.0 of Volume 2A of the Draft EIS/EIR includes a tabulation and discussion of the relative visibility of the alternative route segments from sensitive areas in the foreground and middleground viewing zones.

The lateral extent of these zones is dependent on the average height of the transmission structures. Thus, for 125-foot transmission structures, the foreground would extend to a distance of 1.2 miles from the centerline of each alternative segment and the middleground would extend from the foreground boundary to a distance of 3.4 miles. For the 180-foot tubular steel structures being considered in the southern Delta, the foreground would extend to a distance of 1.8 miles and the middleground to 4.9 miles from the centerline. In other words, the alternative tubular steel structures would increase the area of potential adverse viewer exposure in the southern Delta by approximately 50 percent.

To provide a measure of potential visibility from residential areas, the Draft EIS/EIR reported the number of residences in the foreground viewing zone for each alternative transmission segment. While these residence counts have not been repeated for the 180-foot structures, it is reasonable to assume that the number of residences in the foreground viewing zone along each of the alternative route segments through the southern Delta would probably increase in general proportion to the increased extent of this zone caused by the higher towers. As noted in the Draft EIS/EIR, this indicator is conservative, since views from many of these residences toward the transmission line could be obscured by intervening vegetation or buildings. Nevertheless, it is clear that the 180-foot tubular steel towers would probably be seen from considerably more residences than the 125-foot steel lattice towers in this area.

In conclusion, the simpler appearances of the tubular steel structures is likely to be offset by their considerably increased visibility in the southern Delta. Consequently, the tubular steel structures would impose correspondingly greater adverse visual impacts in the southern Delta than the 125-foot steel lattice structures previously considered for this area.

Socioeconomics (4.1.8)

This section summarizes the impacts of the alternative routes on employment, housing, public services and property taxes, social effects, and economic effects on agriculture and timber. The influx of construction workers for large construction projects can impact local ~~economies~~ economies, ~~and~~ generate temporary employment for local workers, and create indirect employment through local spending of wages. Construction teams can also impact housing and community services. Construction impacts on counties may be lessened by payments from BPA to qualifying counties under the Impact Aid Program if BPA constructs the facilities in Oregon. A large project such as this will also generate property taxes which will increase local government revenues. No property taxes will be paid in Oregon if all facilities located in Oregon are owned and operated by BPA. It may also create antagonism from homeowners who feel a transmission line near their residence will lower their quality of life. The perceived reduction in the quality of life (discussed under the heading of social effects) is measured by the average number of dwelling units per corridor mile and the average length of new access roads per corridor mile. Siting of the transmission line combined with on-going maintenance of the right-of-way, will impact agricultural and timberlands. The impact to timberlands can result in loss of county timber revenues and loss of timber employment. Clearing of the transmission line right-of-way may also create a temporary market glut of timber unless the harvesting of other timber areas is proportionately reduced.

A detailed discussion of the methodology used to generate the data used in the analysis, as well as the criteria to assess the significance of an impact, is provided in Section 3.8 of Volume 2A of the Draft EIS/EIR. Volume 2A also contains a detailed socioeconomic analysis and identifies route segments having significant effects. Mitigation measures are also presented in that section.

Income, economic activity, and tax base impacts were considered significant if an increase in local tax revenue occurred in excess of one percent of the total county revenue. Housing effects were considered significant if the number of transient housing and campground sites would not be available within a reasonable commuting distance (30-50 miles) of the worker reporting stations. The significance of property values was reflected in the determination of social and visual resources effects.

A social effect was considered significant if the average number of residences within 1.2 miles (1.5 miles in the upgraded segments) of the centerline exceeded 50 units per mile of segment, or if the right-of-way passed within 1.2 miles of a community. Social effects were also considered significant wherever there was over 1.75 miles of new access road per mile of segment.

For agricultural impacts, both short- and long-term annual impacts were considered significant if the estimated economic loss exceeded $2,500 per mile of segment. An economic effect on forestry was considered significant if over ten timber related jobs were lost in any county, or if a county's loss in revenue from taxes and federal fees exceeded $50,000.

Northern Section: Alternative Routes A, B, C, and D (4.1.8.1)

Alternative A

It is estimated that 62 workers would be needed over a 2-1/2 year period to construct the transmission line facilities along this alternative. Payroll for this portion of the transmission line is estimated at $~~6~~5.2 million, with another $870,000 from substation work. The greatest impact to local economies from payroll will come from expenditures by non-local employees which are estimated at $~~1.7~~1.3 million. Approximately $480,000 of disposable income will also be expended by local workers. These expenditures will provide a positive impact to communities and counties through which the COTP passes.

Annual property tax revenues generated by this portion of the COTP are estimated to range from $142,000 (if southern Oregon facilities are owned by BPA, since no property taxes will be paid on the portion of the facilities owned by BPA) to $226,000 (if southern Oregon facilities are owned by the COTP Participants). There are an average ~~1.07~~1.12 dwelling units per corridor mile. There will also be an average of 1.29 miles of access roads per mile of transmission line. The only segment in this corridor having a significant impact (more than 1.75 miles of new access road per mile of line) is N-1H, which averages 2.62 miles of new access roads per corridor mile. There are no other significant social effects in this corridor.

No significant agricultural effects would result from development of this route. It is estimated that approximately $85 in timber tax revenue would be lost by Jackson County, and $11,500 by Siskiyou County from loss of forestland. It is also estimated that 0.2 timber jobs would be lost in Jackson County, and 1.8 in Siskiyou County. These losses in funds or jobs are not considered significant.

Alternative B

Because of the shorter length of Alternative B, the composition of the workforce, amount of payroll, and disposable income are slightly less than Alternative A

(North). It is estimated that approximately 55 workers would be needed over a 2-1/2 year period to construct the transmission line along this route. Payroll for the transmission line is estimated at $~~4.7~~4.6 million, together with $870,000 in substation work. Of this amount $~~1.30~~1.2 million is expected to be spent locally by non-local workers and $380,000 is expected to be spent by local workers. Annual property tax revenues generated by this portion of the COTP are estimated to range from $112,000 (if southern Oregon facilities are owned by BPA, since no property taxes will be paid on the portion of the facilities owned by BPA) to $172,000 (if southern Oregon facilities are owned by the COTP Participants). On the average, there are .57 dwelling units per corridor mile (excluding the community of Macdoel). Segment N-6B1 passes near the community of Macdoel, and therefore, has a significant effect. This Alternative route averages 1.16 miles of new access road per corridor mile.

It is estimated that $1,400 in annual timber tax revenue would be lost by Klamath County, and $11,100 by Siskiyou County as a result of the loss of timberland. None of these amounts are considered significant. In addition, it is estimated that 0.4 timber jobs would be lost in Klamath~~,~~ County and 1.2 in Siskiyou County. These levels of job losses are also not considered significant.

Alternative C

It is estimated that 66 workers would be needed over a 2-1/2 year period to construct the transmission line along this alternative. Payroll for this portion of the transmission line is estimated at $~~6.2~~4.8 million, plus $870,000 in substation work. The greatest impact to local economies would come from expenditures by non-local employees which are estimated at $~~1.0~~1.2 million, with another $440,000 from local expenditures. Annual property tax revenues generated by this portion of the COTP are estimated to range from $130,000 (if southern Oregon facilities are owned by BPA) to $210,000 (if southern Oregon facilities are owned by the COTP Participants). There are an average of ~~.23~~.19 dwelling units per corridor mile (excluding the community of Dorris).

Segment N-6E passes near the community of Dorris and therefore has a significant social effect. This Alternative averages ~~.87~~1.36 miles of access roads per corridor mile. The significance threshold of 1.75 miles of new access roads per mile of corridor is exceeded by segment N-6H (1.82 miles per corridor mile). It is estimated that $473 in timber tax revenue would be lost by Klamath County~~,~~ and $10,200 by Siskiyou County. It is also estimated that the reduction in timberland would result in the loss of 0.4 timber jobs in Klamath County, and 1.5 jobs in Siskiyou County. Losses in timber taxes and jobs are not considered to be significant.

Alternative D

It is estimated that 62 workers would be needed over a 2-1/2 year period to construct the transmission line along this route. Payroll is estimated at $~~5.19~~5.80 million for the transmission line with another $870,000 in substation work. Local expenditures by non-local workers should approach $~~1.7~~1.4 million with local expenditures reaching $475,000. Annual property tax revenues generated by this portion of the COTP are estimated to range from $117,000 (if southern Oregon facilities are owned by BPA, since no property taxes will be paid on the portion of the facilities owned by BPA) to $185,000 (if southern Oregon facilities are owned by COTP Participants). There is an average of ~~1.0~~.82 dwelling unit per corridor mile and an average of ~~1.32~~1.38 miles of new access roads per corridor mile. No segments have significant social effects. ~~A significant short-term effect to agriculture would result from the loss of crop production in segment N-10E.~~ It is also estimated that $96 in timber tax revenue would be lost to Klamath County, $1,200 to Modoc County, and $11,100 to Siskiyou County. Likewise, it is estimated that 0.1 timber jobs would be lost in Klamath County, 0.3 in Modoc County, and 1.3 in Siskiyou County. Losses in timber taxes and jobs at the levels shown are not considered significant.

Northern Section: Grizzly Peak to Redding Route (4.1.8.2)

It is estimated that 52 workers will be needed over a 2-1/2 year period to construct the transmission line along this portion of the route. Total construction payroll for the transmission line is estimated at $~~4.1~~4.8 million with another $3.4 million in substation work. Expenditures by local workers ~~and~~ should generate about ~~$1.1 million~~ $340,000 in local expenditures. $1.2 million should be generated by non-local workers. This transmission line segment would create about $131,000 in annual property taxes once construction is completed. These expenditures would provide a positive impact to communities in the vicinity.

There are an average of ~~18.8~~15.6 dwelling units per corridor mile along this route. ~~(excluding the N-9H, N-9M/N-9J, N-9K option areas).~~ Segments N-9"O", N-9Q and N-13A with average dwelling units per corridor mile of 78.6, 131.6, and 54.6 respectively, exceed the significance level of 50 dwellings per corridor mile. In addition, the following segments exceed the significance level for miles of new access roads per corridor mile:
N-7 Alt.1(B)(~~2.18~~2.62 miles), North 3J (2.12 miles) N-8A(3) (~~2.2~~2.05 miles), ~~N-8G (2.12 miles), N-8 Alt. 3 (2.4 miles),~~ and N-9C (2.0 miles).

No significant agricultural effects would result from use of this route. It is estimated that approximately $3,900 in timber tax revenue would be lost by Shasta County as a result of the loss in timberland. It is also estimated that ~~1.4~~2.6 timber jobs would be lost. These losses in funds or jobs are not considered significant.

Central Section Upgrade Route (4.1.8.3)

Although the Central Section has a slightly larger workforce than the Northern Section, the workforce of the Northern and Central sections together are about one-tenth of the size of the Southern Section. Because of the dependence upon lumber and agricultural sectors, and smaller size of local economies, the effects from the Central Upgrade Section are likely to reflect those of the Northern Section.

Southern Section: Alternative Routes A, B, and C (4.1.8.4)

Alternative A

It is estimated that 35 person years (about 15 people over the 28-month construction period) would be needed to construct the transmission line facilities along this alternative route. Payroll for this portion of the route is estimated at $1.1 million. The greatest impact to the local economy from payroll would come from expenditures by non-local employees estimated at $257,000. Approximately $160,000 of disposable income would also be expended by local workers. These expenditures would provide a positive impact to communities and counties through which the transmission line passes. There are sufficient temporary housing facilities within a reasonable commute distance of reporting stations to house the non-local workers.

Since release of the Draft EIS/EIR, Western has identified a new possible tower design for the upgrade section between the Sacramento River and the Tracy Substation. Use of the H-frame tower design instead of the lattice design would reduce the amount of land removed from agricultural production by approximately 85 percent.

Short- and long-term agricultural economic effects would therefore be substantially reduced. For example, in segment S-8 Alt 2, the short-term agricultural effect of using the lattice tower is $31,700 per year; the economic effect along the same segment using the H-frame design would only be $4,755. The annual long-term economic effect along S-8 Alt.2 with the lattice design is estimated at $9,000; use of the H-frame design would reduce the economic effect to $1,350. In essence, use of the H-frame tower would reduce the short- and long-term socioeconomic impacts upon agricultural land in all southern segments to a less-than-significant level.

The COTP would generate up to $83,000 per year in property tax revenues for Sacramento, Contra Costa, and Alameda Counties once the improvements along this portion are constructed. Tax revenues may be lower if Western owns some additional portion of the transmission line south of the Sacramento River. There are, on the average, 17 dwelling units per corridor mile (excluding the Discovery Bay area). Impacts in segment S-9 Alt.2 are significant because it passes by the Discovery Bay area. No new access roads need to be developed. Segment S-8 Alt.2 would also result in a loss of $2,500 in agricultural crops per corridor mile which is another significant effect.

Alternative B

The workforce composition, amount of payroll, and disposable income are approximately the same as in Alternative A (South). This Alternative B route would generate approximately $95,000 in annual property taxes once the facilities are constructed. Tax revenues may be lower if Western owns some additional portion of the transmission line south of the Sacramento River. On the average there are ~~16.9~~15.7 dwelling units per corridor mile. None of the segments exceed the significance level of 50 dwellings per corridor mile. Since no new access roads need to be developed, there are no significant social effects from this

Alternative. Also, there are no significant or forestry-related economic effects from this Alternative. However, Segment S-8H exceeds the significance level for short-term agricultural effects which can be mitigated through adopted mitigation measures.

Alternative C

It is estimated that 40 person years (about 17 people over the 28-month construction period) would be required to build this Alternative. Payroll for this portion of the route is estimated at $~~1.5~~1.2 million and should generate about $~~324,000~~270,000 in local expenditures by non-local workers and $200,000 from local workers. This Alternative C would generate approximately $107,000 in annual property taxes once the facilities are constructed. Tax revenues may be lower if Western owns some additional portion of the transmission line south of the Sacramento River. On the average, there are ~~13.4~~13.2 dwelling units per corridor mile. None of the segments exceed the significance level of 50 dwellings per corridor mile. Since no new access roads need to be developed, there are no significant social effects from this Alternative. Segment S-8I would experience significant short-term agricultural economic effects which can be partially mitigated through adopted mitigation measures.

Cultural Resources (4.1.9)

The number of prehistoric and historic sites that could be affected is currently unknown. However, pedestrian surveys to locate sites in the right-of-way would be conducted prior to construction. Any potentially significant sites located would be evaluated and either avoided during construction or mitigated in accordance with the COTP Memorandum of Agreement for cultural resources. Sensitivity ratings of route segments discussed in the affected environmental section are based on a predictive model of route sensitivity to cultural resources (Van Beuren 1985). Project ethnologists have surveyed the study area for Native American heritage sites, and the discussions below are based on this survey.

The significance of cultural resource impacts will be determined after the site-specific archaeological surveys are conducted. For historical sites, project historians will undertake archival research to determine site significance in relation to the research potential, public interest, or educational value of the resource. Ethnologists will consult with Native Americans to determine the significance of impacts to Native American heritage sites. Appendix H (Cultural Resources Memorandum of Agreement), presented in 1.5.6 of this Final EIS/EIR, discusses impact significance and procedures for mitigating adverse impacts.

Paleontological impacts were considered significant if the potential exists for the location of a route to damage or destroy a fossil resource which meets an established standard of uniqueness or quality of preservation.

Northern Section: Alternative Routes A, B, C, and D (4.1.9.1)

There are 20 Native American heritage sites within 3.4 miles of the proposed line, two of them within 1,000 feet (both in segment N-1E) of the centerline of Alternative A.

There are 16 Native American heritage sites within 3.4 miles of the centerline of Alternative B.

There are 16 Native American heritage sites within 3.4 miles of the centerline of Alternative C.

There is one Native American heritage site within 1,000 feet (in route segment N-10K), and ~~17~~26 sites within 3.4 miles of the centerline of Alternative D.

Northern Section: Grizzly Peak to Redding Route (4.1.9.2)

There are 132 Native American heritage sites within 3.4 miles of the proposed line. ~~Five~~One of these ~~are~~is within 1,000 feet of the centerline. Segment N-8A(A) contains ~~38~~29 sites.

Central Section Upgrade Route (4.1.9.3)

The Central Section Upgrade Route (S-1), which traverses the central valley along an existing transmission corridor, has a predicted sensitivity score of 3.9. This reflects a number of Patwin habitation sites for which there is letter precise locational information. Most are probably on the western side of the corridor in the lower foothills.

Southern Section: Alternative Routes A, B, and C (4.1.9.4)

There are no identified Native American heritage sites within 1,000 feet of the proposed transmission line, although seven occur within 3.4 miles of Alternatives A, B, and C.

Corona, Field, and Safety Considerations (4.1.10)

The corona, field, and safety considerations do not vary by Alternative. See the Draft EIS/EIR, Volume 2A, Section 3.10.

Comparison of Routing Alternatives and Options (4.1.11)

This section presents a comparison summary of all Northern Section and Southern Section alternatives for each resource discipline.

Northern Section (4.1.11.1)

Alternative Routes A, B, C, and D

Climate and Air Quality

The proposed project will not have a significant effect on the climate of this study area for any of the alternative routes.

Construction of the transmission line along all alternative routes in this study area would require extensive clearing and grading of existing forest and rangelands. Air pollutants that would be emitted from these activities include nitrogen oxides (NO_x), sulfur oxides (SO_x), hydrocarbons (HC), carbon monoxide (CO), and total suspended particulates (TSP). Emissions of NO_x, SO_x, HC, and CO would be attributable to construction machinery exhaust and the burning of cleared vegetation (open burning). TSP emissions would arise from vehicle exhaust, open burning, and fugitive dust generated from vehicular traffic associated with clearing and grading operations. These emissions may cause some minor, localized impacts; however, they will be short-term in nature and would not significantly alter the air quality in the vicinity of any of the alternative routes within the Northern Section study area.

Earth Resources

The northern portions of Alternatives A-D do not differ substantially from each other from the standpoint of geologic hazards. Therefore, estimates of soil erosion are the primary measure for distinguishing routes and their relative impacts. ~~In this respect,~~ Alternative D has 40 percent of the area over which soil loss exceeds tolerances. This is the lowest among the alternatives. Alternative D has ~~the least potential impact (~~an average exceedance of soil loss tolerances ~~would be~~ at ~~1.0~~2.0 tons/acre/year~~)~~, whereas Alternative A has the highest average exceedance of soil loss tolerances at 3.6 tons/acre/year. Alternative B has the second highest potential impact (average exceedance of soil loss tolerance is 2.1 tons/acre/year) although there is not a major difference between it and Alternative C (1.9 tons acre/year).

Water Resources/Fisheries

Alternatives A, B, C and D cross 33, ~~19~~18, ~~25~~23 and 26 water bodies, respectively. Alternative D does not closely parallel any streams. Alternatives A, B and C parallel 8, 7 and 11 miles of stream, respectively. Alternatives B, C and D have either 4 (Alternative B), ~~or~~ 5 (Alternative~~s~~ C) ~~and D)~~ or 3 (Alt. D) high slope crossings, while Alternative A has 11. All of the alternatives cross or closely parallel drainages which support either the candidate endangered Jenny Creek sucker (Catostomus rimiculus) or candidate endangered redband trout (Salmo sp.). Alternatives B and D have the least impact on water resources because they cross or closely parallel fewer streams, or cross fewer drainages with sensitive aquatic species. Segment N-10 Alt.5 of Alternative D contains ~~22~~15 of the 26 stream crossings, all ~~5~~2 of the high slope crossings, and the only drainage with endangered species in this Alternative.

Vegetation

All alternatives would require clearing of substantial amounts of forest and woodlands, and lesser amounts of shrublands. Although precise amounts of clearing in certain route segments have not been quantified, it appears that Alternative A could clear the most forest and woodland, followed by Alternatives C, D and B. All alternatives cross wetland areas, but these are narrow in extent and can be avoided or spanned during final siting of a selected route. Special-status plants have the potential to occur in all alternatives, but impacts to these could be avoided by conducting field surveys and avoiding these areas.

Wildlife

All alternatives could cause impacts to important deer, antelope, and bear ranges due to access road construction and subsequent human use. Most or all of these impacts would be reduced to less-than-significant levels by implementing road closures during project design and construction. Alternative B has the greatest impact on wildlife because of high potential for collisions by bald eagles and sandhill cranes in Butte Valley, which could not be successfully mitigated. Alternative A would also result in high potential for collisions by bald eagles and other sensitive raptors near Copco Reservoir, and moderate collision potential by bald eagles and sandhill cranes at Grass Lake. These impacts could be mitigated to less-than-significant levels by placement of line markers and careful project design. Alternative C passes close to a major bald eagle roost at Bear Valley and crosses some bald eagle foraging areas in Red Rock Valley; collision potential is moderate at both areas. Alternatives A, B, and C all cross a spotted owl territory identified by the USFS for protection. Clearing of old-growth forest habitat here (route N-7H1) would be a significant impact. Careful route alignment within the 1,500-foot corridor would reduce impacts to less-than-significant levels. Alternative D has the fewest potential impacts for raptors and old-growth forest. It passes near a Swainson's hawk nest and sites used by golden eagles and prairie falcons. Restrictions on construction during the nesting season would avoid disturbance impacts. It crosses some old-growth forest areas of high wildlife value and some areas which are deficient in snags. Old-growth areas could be avoided during route siting; snag loss could be mitigated by creating new snags.

Land Use

Alternative D would have the least overall impact on land use resources. ~~because it~~ It affects less prime timberland ~~and TPZs~~ than Alternatives A, B, and C. ~~It is the only Alternative that does not affect agricultural preserves since it lies in Modoc County which does not participate in the Williamson Act Program.~~ Alternative A has the greatest overall impact on land use resources because it affects more prime timberland, and agricultural preserves than Alternatives B, C, and D. ~~Alternative A also affects a substantial TPZ area. Alternative B would have the least overall impact on dwellings, with the Alternative located within 1,000 feet of two dwellings.~~ Alternative~~s~~ A ~~and B~~ would have the greatest impact on dwellings~~, with both alternatives~~ and is located within 1,000 feet of nine dwellings. Recreation impacts are discussed under Visual Resources.

Alternative D would have the least impact on prime timberland and TPZs with ~~19.60~~ 17.85 miles of prime timberland. ~~and 1.00 miles of TPZ crossed.~~ Alternative A would have the greatest impact on prime timberland with 32.46 miles crossed. Alternatives B and C cross of moderate amount of prime timber, with 29.13 miles crossed by Alternative B and 28.23 miles crossed by Alternative C. Alternatives B and C would have common impacts on TPZ land (10.50 miles crossed) since they share common route segments in the TPZ areas. ~~These two alternatives have the greatest impact on TPZs, although~~ Alternative A affects nearly as much TPZ land with 10.00 miles crossed. Alternative A would have the least impact on cropland with .23 mile of irrigated land crossed, while Alternative B would have the greatest impact with 2.51 miles crossed. ~~However, Alternative A would have the greatest impact on agricultural preserves with 14.83 miles crossed, whereas Alternative D would have the least impact, since no agricultural preserves are crossed (Modoc County does not employ the agricultural preserve system).~~ When Alternatives A, B, C, and D were compared with respect to agricultural land impacts, the key factor was the impact on irrigated cropland. Agricultural preserves were not a factor for Alternative D since Modoc County does not participate in the Williamson Act Program. However, Modoc County's Tulelake/Copic Bay region does contain the key resource of irrigated croplands with more than .5 mile crossed by a 1,500-foot wide route. Therefore, Alternative D has a significant impact on irrigated cropland, along with Alternatives B and C. The reference centerline of Alternative D would cross ~~1.37~~ .53 mile~~s~~ of irrigated cropland, but could be adjusted within the 1,500-foot wide route to ~~minimize impacts,~~ avoid most, if not all, of the irrigated cropland. In summary, Alternative D would have the least impact on land use resources, and Alternative A would have the greatest impact.

Visual Resources

Alternative C would produce fewer overall visual effects. Alternative C would be visible from fewer residences and other sensitive land uses, and is located in more compatible landscapes than the other alternatives.

Alternative B would be the second choice. This alternative is located in more compatible landscapes than Alternatives A or D, impacts fewer miles of landscape managed for its visual quality by the USFS or BLM, and would be visible from fewer residences and other visually sensitive areas. Alternatives A and D are comparable in the overall impacts each would produce; however, the types of effects would be different. Alternative A would affect fewer miles of landscape managed for visual quality, while being in the foreground of more residences than Alternative D. Alternative D would be more visible from sensitive areas while being located in more compatible landscapes than Alternative A.

Socioeconomics

None of the alternative routes appear to be significantly better or worse than the others. All routes have at least one segment that would have significant effects. Of the four routes, Alternative B (North) appears to be slightly better. Use of that route results in the smallest loss in timber jobs. It also has the second smallest average number of access roads per corridor mile and the second lowest number of dwelling units per corridor mile. The one significant factor is that the route passes near the community of Macdoel.

By comparison, Alternative C (North) appears to be the least desirable since it has two segments which have significant effects: N-6E passes near the community of Dorris and N-6H averages 1.8 miles of access roads per corridor mile. Alternatives A (North) and D (North) are ranked between Alternatives B and C as far as desirability. Alternative D (North) has slightly less dwelling units per corridor mile (~~1.0~~.82 compared to A (North) which has ~~1.7~~1.1). Alternative D would result in the loss of an estimated 1.7 timber jobs compared to the Alternative A estimated loss of 2.0 timber jobs. Alternative D has a higher average number of access roads required per corridor mile than Alternative A (~~1.32~~1.38 versus 1.29). Alternative A has one short segment N-1H (.89 mile long) which will require 2.33 miles of access roads. ~~Alternative D, however, has one segment, N-10E (1.03 miles long), that has a significant short-term agricultural impact.~~

Cultural Resources

Alternative A is least sensitive to prehistoric cultural resources. It has an average predicted sensitivity of ~~2.50~~2.40, and contains segments of low sensitivity (1 on a scale of 1~~-~~ to 5), such as N-1H~~,~~ and N-1I. Alternatives B and D are of higher predicted sensitivity, though at ratings ~~2.75~~2.80 and ~~3.56~~3.00 respectively.

Alternative A is least sensitive to historical cultural resources. Its corridors contain 86 archivally identified sites, 30 of them potentially sensitive. The most sensitive, Alternative D, contains 99 sites, 40 potentially sensitive.

Alternative B is least sensitive to Native American cultural resources. It contains 13 sites. Alternative D (North) is most sensitive. It contains 24 sites, including one site within 1,000 feet of the proposed line.

Overall, Alternative A is the least sensitive for cultural resources. It should be kept in mind, however, that this judgment is based primarily on the results of studies of potential sensitivity to prehistoric and historic sites. These studies considered currently recorded sites, archival data, and estimated sensitivities based on geographic analyses, and are not based on actual field reconnaissance.

Corona, Field, and Safety Considerations

The corona, field, and safety considerations do not vary by Alternative.

Options Within Alternatives: Northern Section

Described below are nine options within identified alternatives in the Northern Section Study Area. An analysis of the potential impacts that would occur with these optional route segments is presented for each option.

A. Butte Valley (N-6 Alt.1)

This is an option to Alternative B. It was proposed at a public meeting in Dorris, California as a means to avoid the Pleasant Valley rural subdivision, agricultural land, and a planned pivot irrigation system.

Climate and Air Quality

Climate and air quality impacts do not vary significantly by option.

Earth Resources

This route option crosses forested soils developed on volcanic rock. It also crosses a greater number of steep slopes than the alternative. As a result, the use of this option would result in slightly higher soil erosion than the comparable segment N-6B.

Water Resources/Fisheries

The Butte Valley Option crosses six tributary streams along the east side of the Klamath River. One of these is located in an area where the slope exceeds 30 percent. Due to the steeper terrain and larger number of stream crossings, the Butte Valley Option would have a greater impact on water resources than segment N-6B.

Vegetation

Right-of-way siting on route N-6 Alt.1 would require clearing of over 200 acres of forest vegetation. Any wetlands along the route can be easily spanned between structures. The entire length of the segment is potential habitat for six special-status plant species.

Wildlife

The area is used by wintering bald eagles and sandhill cranes. Collisions or disturbance of these species with conductors or shield wires could occur in foggy weather, resulting in significant impacts. These impacts are not mitigable. The area around the option receives frequent use by wintering bald eagles and migrating sandhill cranes. Potential for collisions with these species is high and not practical to mitigate. Swainson's hawks nest and forage along the route. Disturbance during the nesting or removal of junipers (nest trees) would be significant. Both route options could cause significant impacts to bald eagles, sandhill cranes, and Swainson's hawks. Potential for impacts is greater on N-6B1.

Land Use and Status

The Butte Valley Option passes through a mix of forest and rangeland in Klamath and Siskiyou Counties. There are no residential or recreational impacts. It crosses 4.50 miles of prime timberland, with much of it being privately owned. No timberland production zones are affected; 2.70 miles of rangeland agricultural preserves are crossed. This option avoids the approved Pleasant Valley subdivision in Siskiyou County, which is crossed by the N-6B route. The N-6B route is part of Alternative B (North).

Visual Resources

This option is located in a more compatible landscape than the length of segment N-6B that it would replace. In addition, its length in Butte Valley is less, reducing effects on an area that has a Visual Quality Objective (VQO) of Partial Retention as classified by the U. S. Forest Service (USFS). Visibility of this option from Highway 97 would be less than that of N-6B because of its greater distance from the highway.

Socioeconomics

The Butte Valley Option crosses a greater number of steep slopes than the corresponding portion of N-6B. Consequently, the number of access road miles per corridor mile should be higher for the option than for N-6B. N-6 Alt.1 has 4.5 miles of prime timberland (most of which is in the northernmost portion of the route), while N-6B1 located in Klamath County, contains all of the prime timberland in segment N-6B. Because the option contains more prime timberland it will also have higher losses of timber taxes and timber jobs. This option will avoid the approved Pleasant Valley subdivision in Siskiyou County which will be crossed by segment N-6B, thus avoiding a significant effect.

Cultural Resources

The Butte Valley Option (N-6 Alt.1) is of moderate to low sensitivity to cultural resources. Its sensitivity rating for prehistoric resources is 3.0 on a scale of 1 to 5. The edge of the Butte Valley Flatlands, and the table lands adjacent to the Klamath River might be the most sensitive portions of this alternative for prehistoric resources. By comparison, N-6B1 is of slightly lower sensitivity (2.8) to prehistoric resources.

Historical resources near this optional route include three roads, a school, two visual sites and one other home site. The proposed line would probably not affect these sites adversely. There is no reason to prefer either alternative option because of sensitivity to historical resources.

The Butte Valley Option is of low sensitivity to Native American cultural resources. Ethnologists have identified one site, a rock art site, of high sensitivity. It is located approximately one mile from the proposed line. The line may indirectly affect this site due to increased accessibility. By comparison, N-6B1 might also affect a Native American cemetery. On balance, there is no reason to prefer either route in terms of cultural resources sensitivities.

Corona, Field, and Safety Considerations

Corona, field, and safety considerations do not vary by options.

B. Copic **Bay** (**N-10 Alt.2 + N-10 Alt.3 + N-10 Alt.4**)

This is an option to Alternative D and was proposed as a means to avoid impacts to farmland in the Copic Bay/Tulelake region. This option would entail moving the two existing Intertie lines to the east and constructing the new line on the alignment of the westernmost existing line. This option is very similar to one proposed by the Modoc County Powerline Committee.

Climate and Air Quality

Climate and air quality impacts do not vary significantly by option.

Earth Resources

This option crosses forested stoney soils developed on volcanic rock. Because its slopes are steeper and of greater length, this option would result in considerably more soil erosion than the alternative.

Water Resources/Fisheries

The Copic Bay Option crosses four small streams and ~~7~~one spring~~s~~ in the Klamath River drainage. Two of these stream crossings are located in an area where the slope exceeds 15 percent. Due to the steeper terrain and larger number of stream crossings, the Copic Bay Option would have a greater impact on water resources than segments N-10E, N-10G and N-10J.

Vegetation

None of these three route segments would require clearing of forest vegetation and none would necessitate siting of structures in wetlands. Nearly the entire length of all three segments may provide habitat for seven special-status plant species. Vernal pools may occur along small portions (less than 1 mile each) of segments N-10 Alt.3 and N-10 Alt.4.

Wildlife

These route segments all occur in upland juniper and shrub habitats. One Swainson's hawk nest is known adjacent to N-10 Alt.2. A second nest site is thought to occur near the Faine Ranch near N-10 Alt.3 (Bloom 1985). Sensitive raptors have nested on Horse Mountain near N-10 Alt.2 (Hainlain 1985). They do not appear to have been detrimentally affected by the existing Bonneville Power Administration line here. Impacts to these three sites would be avoided by constructing during periods when nests are active.

Bald eagles use the upland areas along these routes to a moderate extent. Segment N-10 Alt.4 would receive highest use due to its proximity to Clear Lake NWR. Collision impacts in this area are not considered significant, however. Road construction would cause significant impacts to deer and antelope range over the following distances for each segment: N-10 Alt.2 (2 miles); N-10 Alt.3 (3 miles); N-10 Alt.4 (8 miles).

Land Use and Status

The Copic Bay Option passes through rangeland and irrigated cropland in Modoc County. There are no residential, recreational, or forestry impacts. It crosses .80 mile of irrigated cropland, with no agricultural preserves affected. Impacts to irrigated cropland are considered insignificant because the option would replace one of the existing Intertie lines which would be moved to the east in a rangeland area. There would be no new impacts on irrigated cropland. This option avoids the irrigated cropland and residential development which may be crossed by the N-10E, N-10G, N-10J, and N-10K routes in the Tulelake Basin/Copic Bay area.

Visual Resources

The affected environment for optional segment N-10 (Alt.2, Alt.3, and Alt.4) are similar. All segments are located on a semi-arid, raised plain to the east of Tulelake Basin. The rolling landscape is generally incompatible, with long vistas being occasionally interrupted by buttes and mountains. Segment N-10 Alt.2 would parallel an existing EHV transmission corridor, reducing visual contrast and overall effect. At the north and south end of the option, the line does not parallel the existing corridor, allowing contrast to increase. This segment also crosses Highway 139 at an oblique angle in an open landscape increasing visibility of the line. The Alt.3 segment is located approximately one mile east of N-10 Alt.2. The landscape is incompatible, allowing extended views and vistas to surrounding features. There are no residences in the foreground, however visual contrast with existing conditions would be high. Impacts would be significant. The affected environment and environmental consequences of the Alt.3 segment are similar to N-10 Alt.2. This segment is longer, allowing for an accumulation of more effects. In addition, accessibility for this segment is less than for others, which increases the effects on visual resources from road construction.

Socioeconomics

Except for N-10 Alt.2, the Copic Bay Option has steeper slopes than the comparative segments which will result in more miles of access roads per corridor mile than the corresponding route. Although this option passes through some irrigated cropland, the land will not be significantly affected because it would replace the existing line which already crosses the cropland. This option avoids use of N-10E which may have significant short-term economic effect on agriculture.

Cultural Resources

The Copic Bay Option is moderately sensitive to cultural resources. The most sensitive areas are near the contact zone between the Tulelake flatlands and the hills next to Copic Bay. This contact zone is highly sensitive to prehistoric sites. it also contains ~~8~~ eight Native American heritage sites, several of which are also historical sites associated with the Modoc Indian War. These include sites of the battles of Bloody Point, Scorpion Point, and Lands Ranch. The Bloody Point site is also a California Historic Landmark. Other Native American Heritage sites include gathering places, village sites, and ceremonial places. Alternative 2 passes within 2,000 feet of 3 of these identified sites.

Corona, Field, and Safety Considerations

Corona, field, and safety considerations do not vary by option.

C. Grizzly Peak-Kosk Creek Option (N-7H2)

This segment is an option to N-7 Alt.1. It crosses steep terrain as it attempts to avoid soils to the west which are unstable and highly susceptible to mass wasting activity.

Climate and Air Quality

Climate and air quality impacts do not vary significantly by option.

Earth Resources

This route option crosses slopes in excess of 50 percent and portions of the unstable Montgomery Creek Formation. The use of this option would increase soil erosion by 40 to 50 percent over the Alternative and would have a much higher potential for inducing landslides.

Water Resources/Fisheries

The Grizzly Peak Option crosses eight tributary streams along the north side of the Pit River. Five of these are located in an are where the slope exceeds 30 percent and two of these five are in areas where the slope exceeds 50 percent. This option would have less impact on water resources due to a smaller number of stream crossings, fewer stream crossings in steeper terrain and no crossings of streams containing candidate endangered fish.

Vegetation

This route option would result in clearing of an estimated 120 acres of forest and woodland vegetation. Three special-status plants may occur along about 1 mile of the segment. Potential vegetation impacts would be very similar to those on N-7 Alt.1

Wildlife

~~A spotted owl territory (MC-2) occurs along this route. The transmission line could require clearing of approximately 8 acres of old-growth out of 880 old-growth acres present. Careful siting of the route within the 1,500 foot corridor or minor relocation outside the corridor would reduce this impact to less-than-significant levels.~~

~~With careful mitigation, neither route would have significant impacts on other special-status or sensitive wildlife species. Careful siting of the route within the 1,500 foot corridor or minor relocation outside of the corridor would reduce this impact to less-than-significant levels.~~ The alternative route N-7H2 avoids the spotted owl territory MC-2. If avoidance of critical old- growth habitat within the spotted owl territory on N-7 Alt.1 is not feasible, this option (N-7H2) would be preferred.

Land Use and Status

The Grizzly Peak-Kosk Creek Option passes through forestland in Shasta County. There are no residential, recreational, or agricultural impacts. It crosses 2.80 miles of prime timberland (67.76 acres), with 4.85 miles of Timberland Production Zones affected. Most of the forestland crossed by this option is privately owned. This option crosses less prime timberland than the N-7 Alt.1 route, which is part of the Grizzly Peak to Redding Alternative.

Visual Resources

This option's visibility and compatibility are comparable to N-7 Alt.1, however, this option would pass through a landscape managed for its visual quality. The USFS has classified much of the area north of Iron Canyon Reservoir and south of Grizzly Peak as VQO-Retention.

Socioeconomics

This option crosses extremely steep slopes and an unstable soil area resulting in more access roads per corridor mile (2.32) than N-7 Alt.1 (2.15 miles). This option crosses 2.80 miles of prime timberland, substantially less than the 7.05 miles of prime timberland crossed by N-7 Alt.1. As a ~~result~~ consequence, the option will result in lower timber tax losses and fewer losses of timber jobs.

Cultural Resources

The Kosk Creek Option (N-7H2) is of moderate sensitivity to cultural resources. Its prehistoric resources sensitivity rating is 2.8 on a 1 to 5 scale. There are ~~six~~ three recorded Native American heritage sites within 3.4 miles of the proposed line. Three of these are named places of low sensitivity and three are sacred mountains, locations of high sensitivity. The named places are near the line, while the sacred mountain sites are each three miles or more from it. By comparison, the Grizzly Peak route (N-7 Alt.1) is rated as highly sensitive to prehistoric resources (4.0 on a 1~~-~~ to 5 scale). This route is also sensitive for native American heritage sites. It passes nearer to more sites than N-7H2. These are sites of low sensitivity, however. In general, this option is slightly preferrable.

Corona, Field, and Safety Considerations

Corona, field, and safety considerations do not vary by option.

D. Roaring Creek Option (N-8 Alt.3)

This segment is an option to route segment N-8 Alt.2. The option avoids crossing the Pit River and much of the steeper terrain associated with N-8 Alt.2.

Climate and Air Quality

Climate and air quality impacts do not vary significantly by option.

Earth Resources

This route option crosses steep and potentially unstable slopes. However, it crosses fewer slopes which exceed 30 percent than does the alternative. The use of the option would produce soil loss half of that of the alternative.

Water Resources/Fisheries

The Roaring Creek Option crosses three tributary streams along the east side of the Pit River. The alternative crosses two tributary streams and also crosses the Pit River twice. Both option and alternative cross three water bodies located in an area where the slope exceeds 50 percent. Because the alternative crosses the Pit River, the option would have less impact on water resources.

Vegetation

This route option would require clearing of ~~78~~ 60 acres of forest compared to ~~120~~ 176 acres for the alternative. The option could support the same ~~four~~ three special-status plant species as N-8 Alt.2.

Wildlife

The option would pass within 1,000 feet of the Pit 7 Reservoir area used by bald eagles for a distance of 0.75 mile. The alternative crosses Pit 7 Reservoir in two areas. Presence of unmarked shield wires in this area could result in eagle collisions. Collision potential of both N-8 Alt.2 and N-8 Alt.3 would be significant.

Land Use and Status

The Roaring Creek Option passes through forestland in Shasta County with scattered residential development found in the Cove area. The route will be located within 1,000 feet of two dwellings. There are no recreation or agricultural impacts. It crosses .77 mile of prime timberland compared to 1.30 miles crossed by the alternative. All of the land crossed by N-8 Alt.3 is privately owned. This option crosses near the southwest corner of the Roaring Creek Native American Rancheria.

Visual Resources

This option is visually comparable to N-8 Alt.2 because both traverse forested slopes which would allow the cleared right-of-way to be visible.

Socioeconomics

The Roaring Creek Option passes through .77 mile of prime timberland whereas the alternative route passes through 1.30 miles of prime timberland. Consequently, use of the option would result in fewer timber job losses and timber tax losses.

Cultural Resources

Option N-8 Alt.3 is highly sensitive to cultural resources. While its sensitivity rating for cultural resources (3.0 on a scale of 1 to 5) is slightly lower than the alternative, there are three more Native American heritage sites (22) within 3.4 miles of the proposed line, with a greater number of these (5) within 1,000 feet of the line. Adverse effects to Native American heritage sites may occur along either alternative.

Corona, Field, and Safety Considerations

Corona, field, and safety considerations do not vary by option.

E. Round Mountain Option (N-9B)

Route segment N-9B is an option to route segment N-9A. At Fender Ferry Road, the route comes close to 3 residences. Segment N-9A avoids the residences.

Climate and Air Quality

Climate and air quality impacts do not vary significantly by option.

Earth Resources

This route option is slightly longer than the alternative option(s). Therefore its selection would result in a greater amount of soil disturbance and slightly more soil erosion.

Water Resources/Fisheries

The Round Mountain Option crosses one tributary stream and one spring along the east side of the Pit River. Due to the less steep terrain, this option would have less impact on water resources than segment N-9A.

Vegetation

Thirty-six acres of forest and woodland would be cleared. The alternative segment would require clearing of 37 acres of forest and woodland vegetation. Two special-status species could occur on about 0.1 mile of both routes. These routes would have nearly identical vegetation impacts.

Wildlife

Clearing of this route option and the alternative would reduce some forest and woodland species. Effects would be similar for both alternatives due to similar amounts of woodland clearing. Neither option would affect special-status wildlife species. Impacts would not be significant.

Land Use and Status

The Round Mountain Option passes through forestland and a small scattered residential area in Shasta County. Two dwellings are located within the right-of-way. The right-of-way can be adjusted to avoid the dwellings. However, the route will still be located within 1,000 feet of three dwellings. There are no recreational or agricultural impacts. This option crosses 1.67 miles (40.48 acres) of prime timberland. All of the land is privately owned. This option affects slightly less prime timberland than the N-9A route, but it affects more residences.

Visual Resources

The differences in impacts on visual resources between N-9B and N-9A are negligible.

Socioeconomics

The Round Mountain Option will require only 2.0 miles of new access road per corridor mile, compared with the 2.63 miles for the alternative route. The option route is slightly shorter (1.67 miles versus 1.75 miles) than the N-9A segment. Both routes cross prime timberland their entire length. Thus, the option route should have slightly lower job and tax losses.

Cultural Resources

Option N-9B is moderately sensitive to cultural resources. Its sensitivity for prehistoric resources is low, at 1.5, but its sensitivity to Native American heritage sites is high. There are ~~nine~~ 19 sites within 3.4 miles of the proposed line. Considering the length of this segment, this is a large number. These sites include two cemeteries, habitation sites and places associated with mythological events, of which the cemeteries would be the most sensitive.

The sensitivity of N-9A to cultural resources is roughly the same as that for N-9B. The same number and same kinds of sites are located within the visual middleground. N-9A would be preferred because of its slightly greater distance (1/4 mile) from these sites.

Corona, Field, and Safety Considerations

Corona, field, and safety considerations do not vary by option.

F. **Millville Plains Option (N-9H + N-9M)**

This option parallels existing 230 kV lines owned by Western and PG&E. It is an option due to the proximity of the route to the town of Millville and the crossing of several approved rural subdivisions. Segment N-9J to the east avoids these problem areas.

Climate and Air Quality

Climate and air quality impacts do not vary significantly by option.

Earth Resources

This route option crosses soils of the Modoc Plateau. The Plateau possesses moderate slopes and a network of access roads (which reduce the need for additional soil disturbance). Therefore, soil loss from this option will be lower than that of the alternative.

Water Resources/Fisheries

The Millville Plains Option crosses twelve tributaries to the Sacramento River and parallels one tributary for four miles. Two of these crossings are located in areas where the slope exceeds 50 percent. Due to the less steep terrain, the Millville Plains Option would have less impact on water resources than segments N-9G, N-9J, and N-9N.

Vegetation

About 120 and 35 acres of forest and woodland would be cleared on segments N-9H and N-9M, respectively. Clearing would be required on 160 acres on N-9J. Both routes could contain habitat for 7 special-status plants within vernal pool-grassland mosaics on the Millville Plains and similar areas. Impacts would be similar on both routes.

Wildlife

This route option would involve clearing of woodland vegetation, which would affect populations of certain wildlife species. Effects would be simlar due to similar amounts of woodland clearing. Neither option would affect special-status wildlife species. Impacts would not be significant.

Land Use and Status

The Millville Plains Option passes through rangeland, a small amount of irrigated cropland and residential development within Shasta County. Three dwellings are located within the N-9H + N-9M right-of-way. the right-of-way can be adjusted to avoid the dwellings. However, the route will still be located within 1,000 feet of 30 dwellings. It crosses .35 mile of irrigated cropland and 4.58 miles of rangeland in agricultural preserves.

Visual Resources

Segment N-9H crosses a more incompatible landscape than N-9J. In addition, there are more residences in the foreground than for N-9J, increasing the viewer sensitivity of this option.

Socioeconomics

This option possesses moderate slopes and existing access roads. Therefore, only ~~.16~~ .41 mile of new access road is required per corridor mile.

Cultural Resources

The Millville Plains Option is of moderate sensitivity to cultural resources in general. It is of high sensitivity (4 on a scale of 1 to 5) to prehistoric resources because of its location on well-watered foothill woodland. Sensitivity to historical cultural resources is moderate. The site of Fort Reading, a California Historical landmark, is located nearby. Potential historical sites discovered archivally include home sites, cemeteries, and roads.

Sensitivity to Native American heritage sites is moderate. There are ~~seven~~ 10 sites within 3.4 miles of the proposed line. One of these, a habitation/cemetery ceremonial/historical site, is located within 1,000 feet of the line.

Corona, Field, and Safety Considerations

Corona, field, and safety considerations do not vary by option.

G. **Oak Run Option (N-9S)**

Route segment N-9S is an option to route segment N-9G. The option is approximately 1,500 feet farther south from Morley School than N-9G.

Climate and Air Quality

Climate and air quality impacts do not vary significantly by option.

Earth Resources

This option is shorter than N-9G. However, N-9S crosses about one-half mile of moderately steep slopes (31-50 percent), whereas N-9G ~~cross~~ does not cross any moderately steep slopes. Therefore, the selection of this option should not result in a a great difference in the amount of soil disturbance or soil erosion.

Water Resources

Both the option and N-9G cross three small creeks. One of the creeks crossed by the option is located in a small canyon. Due to the steeper terrain, N-9S would have more impact on water resources than N-9G.

Vegetation

Thirty-four acres of forest and woodlands would be cleared. The alternative segment would require the removal of 42 acres. Four special-status plant species could occur on both sites. These routes would have nearly identical vegetation impacts.

Wildlife

Clearing of this option and the alternative would reduce some forest and woodland species. Effects would be similar for option and alternative due to similar amounts of woodland clearing. Neither option would affect special-status wildlife species.

Land Use and Status

The Oak Run Option crosses less forestland and woodland than N-9G. Neither option crosses prime timberlands. One dwelling unit is located within the right-of-way of the option. The right-of-way can be adjusted to avoid this residence. One residence is within 1,000 feet of N-9S. Two are within 1,000 feet of N-9G. The option is about 1,500 feet farther south of Morley School than N-9G. The option affects less forest, woodland, and residences, and is farther away from Morley School.

Visual Resources

The difference in impacts on visual resources between N-9S and N-9G are negligible.

Socioeconomics

The option will require ~~1.04~~ 1.53 miles of new access road per corridor mile, compared with 1.28 miles for N-9G. The option route is slightly shorter (1.60 miles versus 1.96 miles) than the alternative segment.

Cultural Resources

The option has a moderate sensitivity to prehistoric resources because of its location on well-watered foothill woodlands. There are several potential historic sites located near the option. Sensitivity cannot be determined until a qualified historian conducts a field analysis. Sensitivity to Native American heritage sites is low. There is only one site within 3.4 miles of the option.

Corona, Field, and Safety Considerations

Corona, field, and safety considerations do not vary by option.

H. Anderson Creek (N-9K + N-9P)

These segments are an option to route segments N-9M + N-9"O". These segments are located to try to minimize impacts to agricultural and residential land uses.

Climate and Air Quality

Climate and air quality impacts do not vary significantly by option.

Earth Resources

This route option is longer, would require more access roads, and would result in six times the amount of soil disturbance than the alternative.

Water Resources/Fisheries

The Anderson Creek Option crosses seven tributary streams to the Sacramento River. This option also parallels a tributary to the Sacramento River for 2 miles. Due to a large number of stream crossings, this option would have more impact on water resources than segments N-9M and N-9"O".

Vegetation

This route option would result in clearing of ~~80~~ 64 acres of woodland habitat compared to clearing of ~~30~~ 34 acres in the N-9"O" alternative. Habitat for seven species of special-status plants may occur on both routes. Both routes would require siting of structures in floodplains (Bear Creek, Cow Creek, Anderson Creek, Sacramento River) but wetland and riparian impacts could be avoided after detailed field surveys.

Wildlife

Removal of woodland habitat from this route option would affect populations of oak-depend~~a~~ent species. Clearing of woodland on the right-of-way of the options would also affect species of oak habitats but impacts would be less. Neither impact would be significant. Bald eagles could be significantly impacted due to potential for collisions with unmarked shield wires along the Sacramento River on both alternatives. This would be mitigated to less-than-significant levels by tower and wire design and placement of shield wire markers.

Land Use and Status

The Anderson Creek Option passes through rangeland and irrigated cropland with some residential development in Shasta County. Four dwellings are located within the right-of-way of this option. The route can be adjusted to move the right-of-way from the dwellings. However, the route will still be located within 1,000 feet of 16 dwellings. There are no recreation or forest impacts. This option crosses 4.02 miles of irrigated cropland, with .32 mile of this land in an agricultural preserve. This option affects more irrigated cropland than the N-9"O" route.

Visual Resources

All of the options in this area north of the Sacramento River and south of Millville pass through a similar landscape. This landscape is gently rolling, and partially vegetated, making it moderately compatible with transmission line development. This option is visible from a number of residences located in the foreground. Moderately significant impacts to the visual environment are anticipated. This option is located in the same landscape as the two previous options and is visible from nearby residences. Effects would be reduced because of the compatibility of the landscape. This option crosses the Sacramento River and enters the agricultural landscape east of Cottonwood. This landscape is flat and open, making it incompatible to transmission line development and allowing for this segment to be visible from the large number of rural residences occurring in the valley. Impacts would be highly significant.

Socioeconomics

This option appears to require less new access roads per corridor mile than the alternative route. The option will also avoid the more populated areas thus minimizing significant social effects. This option also traverses less farmland than the alternative route.

Cultural Resources

The Anderson Creek Option is highly sensitive to prehistoric cultural resources (4/0 on a scale of 1 to 5), largely because it passes through bottomlands of Bear and Dry Creeks, and the Sacramento River. The N-9"O" route, by contrast, crosses the Sacramento floodplain, but across less sensitive uplands adjacent to Dry Creek. Neither alternative is particularly sensitive to Native American cultural resources. Each passes within 3.4 miles of 3 sites, including Fort Reading and two habitation sites. In general, N-9"O" is less sensitive for cultural resources because of its lower predicted prehistoric sensitivity.

Corona, Field, and Safety Considerations

Corona, field, and safety considerations do not vary by option.

I. Cottonwood Option (N-9 Alt.1)

This option is located to avoid planned and current residential developments.

Climate and Air Quality

Climate and air quality impacts do not vary significantly by option.

Earth Resources

This route option crosses soils of the fossil-laden Tehama Formation. However, there would be little difference in impacts to fossil resources or soils because this option is the same length and would disturb the same amount of soil/fossils as the alternative.

Water Resources/Fisheries

The Cottonwood Option crosses two small streams in the Sacramento River drainage. Due to a smaller number of stream crossings, the Cottonwood Option would have less impact on water resources than segments N-9"O" and N-9Q.

Vegetation

Because it would pass through woodlands away from existing transmission lines, it would require additional clearing. The option would follow an existing transmission line along a part of this alignment. As a result, it would require little vegetation clearing in this area. Habitat for three species of special-status plants may occur on the route.

Wildlife

Clearing of oak woodland habitat would reduce certain wildlife populations, but no special-status species would be affected. The possible greater amount of clearing on N-9 Alt.1 would result in greater impacts to wildlife of oak woodland habitats. These impacts would not be significant.

Land Use and Status

The Cottonwood Option passes through irrigated cropland, oak woodland with some grazing activity, and some residential development in Shasta County. One dwelling is located within the right-of-way of this option. The right-of-way can be adjusted to avoid the dwelling. However, the route will still be located within 1,000 feet of 16 dwellings. There are no recreation or forest impacts. This option crosses 1.40 miles of irrigated cropland, with no agricultural preserves affected. It affects somewhat less irrigated cropland and residential development than the N-9"O" and N-13A routes.

Visual Resources

The largely agricultural and rural landscape is incompatible to transmission lines and would be visible from local residences.

Socioeconomics

This option will require more new access road miles per corridor mile than the alternative route (N-9"O" and N-13A). Both the Cottonwood Option and the alternative route will pass through residential areas where the average number of dwelling units is significant.

Cultural Resources

Both the option (N-9 Alt.1) and the existing route (N-9"O") are of moderate sensitivity to cultural resources. Both pass through the Sacramento River bottomlands, which are highly sensitive for prehistoric sites, and are also somewhat more likely to contain significant early historical sites. Both also pass through adjacent uplands, which are of moderate sensitivity to prehistoric and historical sites. Both routes pass within 3.4 miles of a Native American heritage site, and a historically known habitation site. Neither route is clearly preferable.

Corona, Field, and Safety Considerations

Corona, field, and safety considerations do not vary by option.

Central Section Upgrade Route (4.1.11.2)

Climate and Air Quality

The proposed project will not have a significant effect on the climate of this study area.

Since this route section is an upgrade of an existing transmission line, construction activities will not include extensive clearing and grading of the surrounding land. Therefore, fugitive dust emissions will arise primarily from construction equipment traveling on unpaved access roads. These emissions will cause some localized short-term impacts, but would not have a significant effect on ambient air quality. NO_x, SO_x, HC, CO, and TSP emissions associated with the operation of equipment necessary for tower construction and erection, and line stringing would not contribute significantly to the existing air quality of the Central Study Section.

Earth Resources

Seismicity is the only hazard which could affect the transmission line in this section. However, the transmission line would not be located adjacent to any active faults in this area. Therefore, COTP facilities are not expected to be significantly affected by seismic activity.

Land in this section is level to gently sloping, and no new access roads would likely be built in this section. The potential for significant adverse impacts on soils is minimal. Impacts will only be short-term, related to the construction phase. Consequently, significant soil impacts will not result in the Central/Upgrade Section.

Water Resources/Fisheries

There will be no impacts to water supply in the Central/Upgrade Section. No new access roads are proposed to be built and no known groundwater wells or aquifer recharge areas have been identified within proposed rights-of-way for this section.

Existing towers and access roads would likely be used in this section and no new stream crossings would be constructed. In addition, there are no special-status aquatic species that would be affected by upgrading the existing transmission line. Consequently, no significant impacts to fisheries in the Central/ Upgrade Section are anticipated.

Vegetation

The upgrade corridor route S-1A crosses wetlands or floodplains in several locations. The potential for adverse impact depends on whether existing structures would be used or whether new structures would be built at these locations. Potential habitat for special-status plants may occur along most of this corridor.

The corridor crosses The Nature Conservancy's Jepson Prairie Preserve, an area that supports both vernal pool habitats and a rare native bunchgrass community. Vernal pools also occur elsewhere in the corridor. The potential for adverse impacts depends on whether new structures would be built and the extent of construction disturbance to these resources. Proper planning of construction activities should adequately avoid adverse impacts through the Jepson Prairie Preserve (Leitner 1985).

Wildlife

Route segment S-1A crosses waterfowl winter habitat near the Sacramento River crossing. Additional impacts to wildlife would be minimal beyond those already present because it is an upgrade of an existing transmission line.

Land Use and Status

Route segment S-1A crosses privately owned irrigated cropland, rangeland, and the private recreational resources of Argyll Park and the Jepson Prairie. Argyll Park is an off-road vehicle facility, and the Jepson Prairie is a scientific and nature preserve owned by the Nature Conservancy. Both sites were developed for their current use after the existing Western line was built. Neither site would be significantly affected. There are no new, permanent impacts to land use resources because the route is an upgrade of Western's existing line.

Visual Resources

The visual impacts of transmission line upgrading would generally be related to construction activities and the visibility of these short-term activities from sensitive areas. Impact areas include the crossings of numerous local scenic roads and highways, e.g., Black Butte Road and Putah Creek Road; Highways 162, 20, and 133; and Interstates 5 and 80 in open or agricultural landscapes. Impacts during construction would stem from clearing and grading of the right-of-way and staging areas. Mitigation to reduce the significance of short-term effects include maximizing the use of existing roads, designing new access roads to minimum standards, minimizing the removal of existing vegetation, replanting of vegetation in the right-of-way, and retaining vegetation buffers at road and creek crossings. Predarkened tower steel should be used for the upgrading to match existing tower bases.

Socioeconomics

Although the Central Section has a slightly larger workforce than the Northern Section, the workforce of the Northern and Central Sections together are about one-tenth of the size of the Southern Section. Because of the dependence upon lumber and agricultural sectors, and smaller size of local economies, the economic effects from the Central Upgrade Section are likely to reflect those of the Northern Section.

Cultural Resources

Among the southern corridors, S-1A which traverses the Central Valley along an existing transmission corridor has a score of 3.9. This reflects a number of Patwin habitation sites for which there is little precise locational information. Most are probably on the western side of the corridor in the lower foothills.

Corona, **Field, and Safety** Considerations

Corona, field, and safety considerations do not vary by option.

Southern Section (4.1.11.3)

Alternative Routes A, B, and C

Climate and Air Quality

The proposed project will not have a significant effect on the climate of this study area for any of the alternative routes. Construction of the transmission line along all alternative routes in this study area would require the clearing and grading of portions of farm and rangelands for access roads and transmission tower pads. Air pollutants that would be emitted from these activities include NO_x, SO_x, HC, CO, and TSP. Emissions of NO_x, SO_x, HC, and CO would be attributable to construction machinery exhaust and open burning. TSP emissions would arise from vehicle exhaust, open burning, and fugitive dust generated from vehicular traffic associated with clearing and grading operations. These emissions may cause some minor, localized impacts; however, they will be short-term in nature and would not significantly alter the air quality in the vicinity of any of the alternative routes within the Southern Section study area.

Earth Resources

Alternatives A, B, and C do not differ substantially from each other from the standpoint of soil erosion or geological hazards. All impacts can be mitigated by implementation of standard engineering practices. However, Alternative B (the shortest route) would have a moderate impact on soils, relative to Alternatives A and C. This is because it crosses more miles ~~of~~of organic soils than does Alternative A, but less than Alternative C. Likewise, Alternative B crosses more soil which is susceptible to liquefaction than does Alternative C, but crosses less soil subject to liquefaction than Alternative A. Alternative A, which crosses the most soil subject to liquefaction but the smallest amount of organic soil, has the second greatest potential for soil erosion and geologic hazards. Alternative C, which crosses the most organic soil but the smallest amount of soil subject to liquefaction, has the highest potential for impacts.

Water Resources/Fisheries

Impacts on water resources in the Southern Section would be approximately equal among the three alternatives. Alternatives A, B and C cross 16, ~~14~~22 and 15 water bodies, respectively, and closely parallel approximately equal lengths of waterways. Alternative A crosses smaller waterways, and would therefore have a reduced potential for significant impacts to water resources. Alternatives B and C have more large stream crossings that are located further east and that may impact navigation. None of the southern alternatives have stream crossings in high slope areas where the erosion and sedimentation potential could be significant, and access roads are already present along all routes.

Vegetation

All alternatives would have generally similar impacts. Alternative C would require placement of more towers in floodplain areas, but most of these are diked agricultural lands. Special-status plants could occur on all routes, with a slightly higher number possible on Alternatives A and B. All alternatives could affect the sensitive iodine bush scrub and vernal pool communities.

Wildlife

All alternatives cross about one mile of grassland habitat that has potential to support San Joaquin kit foxes. Potential for collisions by waterfowl is highest in Alternative B (~~24~~37 miles), then C (~~20~~21 miles), then A (~~7~~17 miles).

Land Use and Status

Alternative B would have the least overall impact on land use resources, since it runs several miles east of the community of Discovery Bay and affects less agricultural land than Alternative C. When Alternatives A and B are compared on a strictly quantitative basis, Alternative A would have less impact on dwellings, irrigated cropland, and agricultural preserves. However, the deciding factor is that Alternative A runs within one mile of Discovery Bay's existing developed area and directly over 400 feet of the new development areas. Recreation impacts are discussed under Visual Resources.

Alternative C would have the greatest impact on land use resources since it is located within 1,000 feet of 85 dwellings and bisects the community of Bethel Island. It also would affect the greatest amount of agricultural land, crossing 23.50 miles of irrigated cropland and 17.23 miles of land in agricultural preserves. In summary, Alternative B would have the least impact on land use resources, and Alternative C would have the greatest impact.

Visual Resources

Of the three alternatives considered, Alternative A would produce fewer overall visual effects. This alternative involves a tradeoff between viewer exposure and visual contrast with existing conditions. While Alternative A is in the foreground of more residences, its proximity to and paralleling of existing EHV transmission lines reduces the contrast of adding this route to the landscape.

Impacts from Alternatives B and C are almost comparable, with Alternative C being slightly longer and therefore accumulating slightly more effects along its length.

Socioeconomics

Although the differences between the southern alternatives are slight, Alternative C (South) appears to be the best option while Alternative A (South) is the least desirable. All three alternatives have one segment which will generate a significant short-term agricultural impact. The segment length is the shortest for Alternative C (2.35 miles) and the longest is Alternative A (12.75 miles). ~~Segment S-8H in Alternative B is slightly longer than C (only 3.83 miles long).~~ In addition to creating a significant short-term agricultural effect, Segment S-8 Alt.2 passes near the Discovery Bay community and therefore has significant social effects.

Cultural Resources

Each of the southern alternatives is sensitive to prehistoric resources. All route segments pass through portions of the Sacramento-San Joaquin Delta area that are highly sensitive for prehistoric sites. Alternative A has the lowest overall sensitivity rating (2.7), and Alternative C is the highest for prehistoric resources. Each contains several segments rated 4 or higher on a scale of 1 to 5. Each of the southern alternatives is highly sensitive for historical cultural resources. The historical studies focused on impacts within corridors rather than routes. Corridors N-8 and N-9 contain 274 historical sites. Each of the southern alternatives is of low sensitivity for Native American cultural resources. Each contains nearly the same number of sites ~~(7)~~ and all of the known sites are abandoned habitation sites. These tend to be of moderate sensitivity. Alternative C (South) is least sensitive to cultural resources compared to the other two alternatives. However, the differences between these alternatives are small.

Corona, Field, and Safety Considerations

Corona, field, and safety considerations do not vary by option.

Options Within Alternatives: Southern Section

A. Coney Island Option (S-8K)

Route segment S-8K is an option to route segment S-8J. This option was proposed as an option to avoid Clifton Court Forebay and to more closely follow two existing 230 kV lines.

Climate and Air Quality

Climate and air quality impacts do not vary significantly by option.

Earth Resources

Both option and alternative cross the Rindge-Kingile Association, organic soils subject to subsidence and liquefaction. The option crosses about one-quarter mile more of this soil than S-8J, and therefore would be subject to a slightly higher hazard due to subsidence and liquefaction.

Water Resources/Fisheries

The option crosses four water bodies, while S-8J crosses three. qHowever, S-8J parallels 1 1/2 miles of West Canal and therefore would have greater impacts to water resources than would the option.

Vegetation

Several special-status plant species could be supported along both option and alternative. Thus, the impacts would be similar for either route.

Wildlife

High waterfowl collision potential occurs along both S-8J and S-8K. Because the option is located about one-quarter mile farther east from Clifton Court Forebay, this potential would be less than for S-8J.

Land Use and Status

The Coney Island Option passes through cropland in Contra Costa, San Joaquin, and Alameda Counties. One dwelling is within the option's right-of-way. The right-of-way can be adjusted to avoid the residence. About the same number of houses are within 1,000 feet of either segment. The option crosses 5.25 miles of irrigated cropland, and 3.90 miles of cropland and rangeland in agricultural preserves, slightly more cropland and agricultural preserves than does S-8J. Thus, the option affects more irrigated cropland and agricultural preserves than the alternative.

Visual Resources

Both the option and alternative are located in an area dominated by agricultural activity. Rural residential areas are scattered near each route segment. Also, both routes are situated in an area with several existing transmission lines. Impacts would be similar for either route.

Socioeconomics

The option crosses ~~through~~ slightly more farmland than ~~the~~ S-8J. However, neither the option nor the alternative have any significant effects.

Cultural Resources

Both the option and the alternative are rated high in terms of sensitivity to prehistoric resources. Each passes through an area of moderate sensitivity to historical resources. Each is of low sensitivity to Native American heritage sites, with no site located within 3.4 miles of either line.

Corona, Field, and Safety Considerations

Corona, field, and safety considerations do not vary by option.

B. Tracy-Tesla (S-9G)

This segment was proposed as an option to S-9F to avoid the wind farm development near the California Aqueduct.

Climate and Air Quality

Climate and air quality impacts do not vary significantly by option.

Earth Resources

This route option crosses more Sacramento-San Joaquin Delta soils than does the alternative. Therefore, this option would be subject to greater hazards of soil subsidence and liquefaction.

Water Resources/Fisheries

The Tracy-Tesla Option proceeds across relatively level land east of the Delta-Mendota Canal before crossing over the canal ~~2~~two miles north of the Tesla Substation. This option crosses the same number of intermittent streams as the S-9F route, but has a slightly decreased potential for erosion. Differences in the severity of impacts to water resources between this option and the S-9F route are insignificant.

Vegetation

This route option could support 7 special-status plants in contrast to 11 species possible along S-9F. No other vegetation resources of importance occur on either option.

Wildlife

These routes are similar. This route may pass through less grassland habitat than the proposed alternative. Thus, less potential habitat for the San Joaquin kit fox would be affected. Significant impacts to kit foxes would be prevented by surveying proposed routes and avoiding potential den sites.

Land Use and Status

The Tracy-Tesla Option passes through rangeland and cropland in Alameda County. One dwelling is located within the option's right-of-way. The route can be adjusted to move the right-of-way away from the dwelling. However, the route will still be located within 1,000 feet of ten dwellings. There are no recreational impacts. This option crosses .70 mile of irrigated cropland, and 2.38 miles of cropland and rangeland in agricultural preserves. It affects more irrigated cropland and agricultural preserves than the S-9F route which is common to Alternatives A, B, and C (South).

Visual Resources

This option is located in the transition area of the San Joaquin Valley and the foothills of the Coastal Range between Tracy and Tesla Substations. The Valley is dominated by irrigated agriculture while the foothills are being developed for wind farms. Rural residential areas are scattered throughout, particularly east of Mountain House and along Midway Road. Effects would be significant due to the incompatibility of the landscape, the visibility of the proposed transmission line, ~~and~~ viewer exposure from residences, and where the line would cross I-580, I-205, and the California Aqueduct Bikeway. Impacts would be similar to those of its replacement segment S-9F.

Socioeconomics

This option has fewer dwelling units within 1.2 miles than the alternative route. The option crosses ~~through~~ slightly more farmland than the alternative route. However, neither the option nor the alternative route have any significant effects.

Cultural Resources

The Tracy-Tesla Option (S-9G) is of moderate sensitivity to cultural resources, as is the existing route (S-9F). Each is rated moderate to low (2.3 on a scale of 1 to 5) in terms of sensitivity to prehistoric resources. Each passes through an area of moderate sensitivity to historical resources. Each is of low sensitivity to Native American heritage sites, with two sites located within 3.4 miles of the proposed line. Both are abandoned habitation sites of low sensitivity.

Corona, Field, and Safety Considerations

Corona, field, and safety considerations do not vary by option.

Substation and Related Facilities (4.1.12)

This section summarizes the environmental consequences of substation and related facilities construction. A summary of the Round Mountain crosstie sites (CT1 and CT2) and substation sites (CW1 and CW2) is not included in this section because these sites are no longer under active consideration. However, an analysis of impacts is included in Appendix C of Volume 3A of the Draft EIS/EIR.

W1 and W2 (Pinehurst) (4.1.12.1)

Construction traffic could cause short-term impacts to the soils of sites W1 and W2 including accelerated erosion and soil compaction. Compaction could be mitigated through the use of imported fill and/or the removal, compaction, and replacement of existing soil. Erosion could be reduced through implementation of a revegetation and/or landscaping program.

Other impacts to soils include increased erosion when access roads are built. Although a dirt road between the two sites may require realignment, no significant soil impacts are expected because the road is located on relatively flat terrain. Existing access roads will be used as much as possible.

Increased sedimentation of surface waters due to soil erosion from new access roads and construction activities on sloped terrain could cause impacts to water quality. However, it is expected that sedimentation rates on W2 would generally be low and of short duration because the site is located on relatively flat terrain with well drained soils. Also, existing access roads would be used, precluding the need to disturb streambanks for new access road construction. Placing the facility on the moderate slopes of W1 could cause a high sedimentation rate. Constructing the switching station east of this area should mitigate the problem. Contamination of water bodies with harmful substances would be unlikely because of their limited, controlled use, and the application of a 100-foot buffer between herbicide use and water body, and compliance with state and federal water quality regulations.

More trees would be removed from W1 or W2 than the other proposed switching station sites. No impacts to special-status plant species or sensitive plant communities are expected to occur. No impacts to special-status, sensitive, or game species are expected. There are no significant long-term land use impacts associated with sites W1 and W2. Neither site can be seen from Highway 66, a scenic highway, because they are located in a dense coniferous forest one mile north of the highway. The sites are not considered by the BLM to be of great scenic value. Although there would be no significant visual impacts associated with either site, W2 would be less visible from the gravel logging road because of the short rise between the road and the site. Construction of a switching station on W1 or W2 would not pose significant impacts to cultural resources.

C1 and C3 (Keno) (4.1.12.2)

Accelerated erosion and soil compaction could be caused by construction traffic at both C1 and C3. Compaction could be mitigated through the use of imported fill and/or the removal, compaction, and replacement of existing soil. Erosion could be reduced through implementation of a revegetation and/or landscaping program. No soil impacts from access road construction are expected for either C1 or C3 since existing access roads are present at each location.

Sedimentation of surface waters caused by soil erosion from new access roads and construction on slopes is not expected to present a problem on either site since the sites are located on flat terrain and are adjacent to existing access roads. Parts of each site are highly saturated, indicating a high water table. In order to build on the saturated portion, appropriate construction practices should be observed. Contamination of water bodies with harmful substances would be unlikely because of their limited, controlled use, the application of a 100-foot buffer between herbicide use and water body, and compliance with federal and state water quality regulations.

Forest clearing of C1 or C3 would require removal of less tree cover than for W1 or W2, but more than E1 or E2. Fewer trees would be cleared from C1 than from C3. Vegetation clearing could result in the loss of populations of special-status plant species potentially occurring in the meadows at both sites, an impact that is considered significant. Clearing could remove potential nest sites for breeding bald eagles on both sites. Clearing of site C1 could remove potential nest trees for great gray owls. Clearing of C3 could remove potential nest trees for osprey. Construction activity within 0.25-0.75 mile of nests during the breeding season may cause nest abandonment. This impact would be considered significant. Nest surveys should be conducted to determine if any nests occur and to determine mitigation needs.

Conversion of C1 would take the site out of pasture use and require diversion of an existing drainage. This impact would be mitigated by locating the site approximately 500 feet to the west and would require use of State Board of Forestry lands. C3 would require improvements to the access road which may increase use of the Klamath River near tower 1/43. The area south of the site is heavily forested and impacts to timber production could be reduced by locating the site toward the north of towers 2/43 and 3/43.

Visual impacts vary with potential location. Although C1 is within 2,300 feet of Highway 66, it is located in an open field which is partially screened by vegetation. Chase Mountain provides a background. There would be no significant impacts on visual resources associated with this site. Proposed switching station site C3, on the other hand, is immediately adjacent to Highway 66, is in close proximity to Klamath River, and would require a 500 kV transmission line (route segment N-6A) crossing the highway. There would be significant visual impacts associated with this site. Screening the facility with vegetation and/or fencing could reduce visual impacts. Following the existing 230 kV transmission line right-of-way would reduce the visual impacts of N-6A. Construction of a switching substation on C1 or C3 would pose no significant impacts to cultural resources.

E1, ~~and~~ E2, and E3 (Malin) (4.1.12.3)

Construction traffic could cause impacts to the soils of Sites E1, ~~and~~ E2, and E3 including accelerated erosion and soil compaction. Compaction could be mitigated through the use of imported fill and/or the removal, compaction, and replacement of existing soil. Erosion could be reduced through revegetation and/or landscaping. No soil impacts from access road construction are expected for either E1, ~~or~~ E2, or E3 since existing access roads are present and will be used as much as possible.

Sedimentation rates on E1 should generally be low and of short-term duration because the site is located on flat terrain with well-drained soils. In addition, use of existing access roads would preclude the need to disturb streambanks for new access road construction. Construction on E2 could cause significant impacts to water resources because the site lies on moderate slopes of 12 to 20 percent with shallow soils. However, proper drainage control features could reduce these impacts. Although E3 is located on shallow, stoney soil, impacts to water resources are not anticipated due to proper drainage control features. Contamination of water bodies with harmful substances would be unlikely because of their limited and controlled use, the application of a 100-foot buffer between herbicide use and water body, and compliance with federal and state regulations.

Clearing of ~~either~~ each site and the taplines would involve the removal of less than 100 juniper trees per site. Grading of ~~either~~ E1, ~~or~~ E2, or E3 could eliminate some populations of special-status plant species. Vernal pools could be destroyed by construction activities. Locating special-status species and avoiding them during siting and construction could reduce the impact. Clearing at either site could remove potential or currently unknown nest trees for Swainson's hawks. Construction activities at sites E2 or E3 could affect breeding raptors that may occur on cliffs east of the sites. Surveys should be conducted at each site and at the nearby cliff. Nest trees could be avoided during siting. Disturbance to nearby nesting raptors could require seasonal activity restrictions.

Construction on either site would remove forage on deer and pronghorn winter range. Removal of less than 10 acres of habitat would not have significant effects. Use of E1 would result in the conversion of irrigated and non-irrigated cropland. Although 46 acres would be involved, the amount of land is considered small. No significant impacts on land use are expected. Construction on E2 or E3 (or tapline A and B) would have no significant land use effects.

Constructing a switching station on E1 should not pose significant visual impacts because a switching station at this location would be backgrounded by Bryant Mountain and Buck Butte. Views from the town of Malin will be partially screened by Turkey Hill. E2 is located higher up on a hillside on a relatively undisturbed south facing slope which would require clearing of native vegetation and grading to level terrain. This would make the site visible from Malin. As such, there may be significant visual impact associated with this proposed location. Revegetation and fencing could reduce the visual impacts.

E3 would require the clearing of some junipers. Using vegetation and/or fencing as a screen could reduce the switching station's visibility. A 5,100-foot high plateau behind the site would provide a background to the facility, further reducing its visibility. Tapline A would be visible from the south; however, the high terrain to the north of the line would act as a background, reducing the line's visibility. Tapline B would cross an area with less junipers than E3 or Tapline A. It would also cross along a bench. The plateau behind the bench would reduce the visibility of the line, but the line would still be visible from the Malin area.

Construction of a switching station on E1, ~~or~~ E2, or E3 would not pose a significant impact to cultural resources.

GP1, GP2, GP3, and GP4 (Olinda) (4.1.12.4)

Erosion from the construction of access roads is not expected to occur on either GP1, GP2, GP3, or GP4 since existing roads are present and should be used whenever possible. Erosion and soil compaction from heavy equipment is also not expected to result in a significant impact because both sites are located on flat terrain.

Sedimentation rates due to substation and new line construction are expected to be low and of short duration because the sites are located on relatively flat terrain with well-drained soils. In addition, existing access roads would preclude the need to construct new access roads over streambanks. Contamination of water bodies with harmful substances would be unlikely with their limited and controlled use, and application of a 100-foot buffer between herbicide use and water body, and compliance with state and federal regulations.

Two unique or sensitive plant communities could be potentially affected: valley oak woodlands, which occur on GP1, GP2, and GP4, and vernal pools, which have the potential to occur on all four sites. Clearing on either of GP1, GP2, or GP4 would remove a small number of oaks (less than 20). This represents less than two percent of the valley oaks within two miles; therefore, oak removal from GP1, GP2, and GP4 would not be significant. Approximately 12 vernal pools would be eliminated at the GP4 site. Biological surveys conducted in the Spring of 1987 did not reveal any sensitive plant species in the pools. In wetter years, one special-status plant, the Red Bluff Rush (Juncus leiospermus), could be present. Construction would result in the loss of suitable habitat for this species. ~~Construction on these sites may eliminate vernal pools which could contain populations of special-status species. Locating and avoiding these populations during siting would reduce the impact.~~

Since no important, special-status, or sensitive wildlife species habitat exists on either GP1, GP2, GP3, or GP4, no significant impacts to wildlife would occur.

Land use impacts vary for each proposed location. Approximately 90 acres of irrigated pasture would be taken out of production on GP1, although grazing would still be allowed along and under the single-circuit 500 kV and double-circuit 230 kV lines looping into the substation. On GP2, about 80 acres of rangeland may be lost and the vineyard may need to be removed or relocated. Careful alignment of the facility would partially mitigate these impacts. On GP3, approximately 100 acres of irrigated cropland would be taken out of production. This impact would be significant. On GP4, 69 acres of rangeland would be lost. This impact would not be significant because of the relatively small amount of rangeland to be removed.

Since GP1 is situated adjacent to West Valley High School, Gas Point Road, and Happy Valley Road, the substation and the transmission lines looping into the substation would create significant visual impacts. There would also be significant visual impacts if a substation was constructed on GP2, GP3, or GP4 because of the number of surrounding homes and Gas Point Road. Planting trees or building a fence around the facility at these sites would partially screen the substation from viewers, reducing the visual impact. Construction of a substation at any of the four locations would not create significant impacts on cultural resources.

T1 and T2 (Tracy) (4.1.12.5)

Some soil loss is expected to occur from the construction of new access roads at T1 and T2. However, the well drained, level terrains of the area should insure that soil impacts are minimal.

Sedimentation rates are expected to generally be low and of short duration because both sites are located on flat terrain with well-drained soils. In addition, use of existing roads would preclude the need to build new access roads over streambanks. Contamination of water bodies by harmful chemicals would be unlikely because of their limited and controlled use, the application of a 100-foot buffer between herbicide use and water body, and compliance with federal and state regulations. The irrigation canal on T1 may be diverted. Since the diversion would not cause a major alteration of the landscape, there would not be a significant impact.

Construction of a substation on T1 or T2 would not pose significant impacts on any special-status or sensitive plant species. No unique or sensitive plant communities would be affected. Neither site provides suitable habitat for special-status plants or sensitive animals.

The primary impact resulting from expansion of the substation to site T1 would be permanent conversion of a small area of Prime Farmland. This action would be significant because federal agencies are mandated to preserve farmland when possible. Impacts associated with substation expansion site T2 would be the permanent conversion of pastureland, and relocation of three storage and maintenance buildings. This action would not be considered significant since the pasture is part of an area classified for future development and the buildings are temporary structures. Because of the close proximity of the existing substation, neither site poses a significant impact to visual resources. Construction of a substation at either location would not pose significant impacts to cultural resources.

SC1, SC2 and SC3 (Maxwell Series Compensation Station) (4.1.12.6)

A review of existing resource maps of the sites indicates that no significant biological resources, sensitive plant or animal species, or visual resource concerns have been identified for these areas. However, it should be noted the impacts for the sites are based on a preliminary analysis that will be followed up with site-specific investigations at a later date.

Construction of the proposed series compensation station is not expected to have significant impacts on the environment. All three sites are located on cultivated land along the existing Western 230 kV transmission line proposed for upgrading. The station would require an area approximately 400 feet by 400 feet that would overlap the existing right-of-way for the 230 kV line.

Sedimentation rates are expected to be low and of short duration because the three sites are located on flat terrain. Contamination of water bodies by harmful chemicals would be unlikely because of their limited and controlled use within the station yard, the application of a 100-foot buffer between herbicide use and a water body, and compliance with federal and state regulations.

Construction of a series compensation station at either SC1, SC2, or SC3 would not pose significant impacts on any special-status or sensitive plant species. None of the sites provide suitable habitat for sensitive or endangered animal species.

SC1, SC2, and SC3 do not pose a significant impact to visual resources since the sites would involve the existing Western Area Power Administration 230 kV line proposed for upgrading and no residences or other sensitive viewer categories occur within the foreground. Construction of a series compensation station at any of the three locations is not expected to pose significant impacts to archaeological, ethnographic, or historical resources.

Communication Facilities (4.1.12.7)

A review of existing resource maps of the areas near the proposed microwave sites was performed to assess the level of impact on biological resources, sensitive plant or animal species, and visual resources.

Construction of the proposed communications sites is not expected to have a significant impact on the environment. Of the 24 sites investigated, 21 (E-1 through E-14, P-2 through P-7, and P-10) are located at or near sites which already contain microwave and/or radio developments.

Sedimentation rates are expected to be low and of short duration because the construction time at each site would be very short (approximately 1 month). Contamination of water bodies by harmful chemicals would be unlikely because all sites are in excess of one mile from the nearest water body, chemical use would be controlled within the site, and activities would be in compliance with federal and state regulations.

Of the 24 sites investigated, 7 (E-1, E-5, E-10, E-13, P-1, P-7, and P-8) are in areas where sensitive plant or animal species are known to exist. However, no significant impacts on these species are expected because of the limited area of disturbance (less than 0.24 acres), short construction times, and planned biological surveys to ensure avoidance of critical habitat.

None of the proposed sites would pose a significant impact to visual resources since they either involve an existing site or are located in remote areas. The sites are not expected to pose significant impacts to archaeological, enthnographic, or historical resources.

Environmental assessments for some of these communication sites are being prepared by the USFS. The final planning and design of the facilities will be coordinated with the appropriate land management agencies.

Los Banos-Gates Transmission Project (4.2)

This section presents the findings of impact analyses on resources potentially affected by the Los Banos-Gates Project. Volumes 2B and 3B of the Draft EIS/EIR present more detailed information supporting analyses on the potential impacts from construction and operation of the project. The following describes the environmental impacts considered significant prior to mitigation.

Climate and Air Quality: Construction and operation of the project would not significantly affect climate or air quality.

Earth Resources: There is no seismic constraint to the design, construction, or siting of the project. There is no known fault rupture hazard to the project. Removal of vegetation (clearing) and disturbance of the upper soil horizon for construction of access roads, tower sites, pulling sites, and staging areas can result in increased erosion potential during and immediately following construction. These potential impacts on soils are moderate and construction of roads, tower sites, conductor-pulling sites, and other work areas in hilly or mountainous terrain ~~has~~ have the potential for creating unstable conditions on slopes. These activities may also result in a significant impact by changing the configuration and stability of natural slopes. No impact on mineral resources is anticipated. There is the potential for constraints to some oil production activities within the transmission line right-of-way.

Water Resources/Fisheries: The construction and operation of the proposed transmission line will not significantly affect water resources. Groundwater wells cannot be located within the transmission line right-of-way. These wells will be avoided whenever possible.

Impact on water quality can occur due to disturbance of streambanks and streambeds at water crossings by construction equipment or where access roads are built on steep slopes adjacent to well-defined drainages. Since no perennial streams would be crossed by this project, water quality impacts will be minor. No impacts on fisheries are expected to result from construction of the project.

Vegetation: The primary impact will occur during construction when temporary removal of vegetation will be required for tower footings, access roads, conductor pulling and tensioning sites, and construction yards. The known or suspected presence of sensitive plants was a factor in the route selection process. The preferred route has been located so that an alignment could be located that avoids known sensitive plant habitats.

During operation of the line, a maximum of 150 acres of vegetation habitat will be permanently replaced by tower footings or eliminated by access road construction. There is a possible increase in fire hazard due to the presence of construction equipment.

Wildlife: During construction, wildlife habitats and activities will be disturbed by clearing and other earthwork activities. The known or suspected presence of sensitive wildlife habitats was a factor in the route selection process.

During operation of the line, a maximum of 150 acres of potential wildlife habitat will be replaced by tower bases and access roads. Other habitat features will be created in new perching and nesting sites for raptors and other birds. The potential for increased human access to remote areas will have a minor effect on wildlife. The presence of an additional transmission line will create a potential for bird collisions.

Land Use: The proposed project will have no effect on land ownership or jurisdiction. Right-of-way easements will be acquired through negotiation with the landowners. The proposed project would not conflict or be inconsistent with any established federal, state, or local plans and policies. Most land use conflicts can be avoided during alignment location including residential, agricultural operation areas, planned developments, canals, oil field and operation areas, dams, recreation areas, wind farms, and pipelines. A maximum of approximately 260 acres of land will be temporarily disturbed during construction. A maximum of 150 acres of land will be permanently required during operation of the project for tower bases and access roads. A 200-foot wide easement will be required for the transmission line right-of-way. Over 2,000 acres of right-of-way would be required in the preferred route. Only 10 acres (less than one-half of one percent) of the right-of-way would be permanently used for tower bases; the remainder would be available for the landowner's use.

The potential impacts on agricultural land will vary by route alternative depending on the percent of intensively farmed land, the cropping pattern, and the transmission line alignment. Potential agricultural impacts include: loss of productive land, interference with agricultural equipment and operation, interference with irrigation practices, possible conflict with aerial applications, and weed and pest control.

No significant impacts on recreation activities are anticipated.

Visual Resources: Visual impacts would result primarily from structural contrast and proximity of the proposed alignment to sensitive viewpoints. The transmission line could be seen from designated scenic highways Interstate 5 and State Highway 33, and also from San Luis Dam, the Los Banos Reservoir, Little Panoche Reservoir, and the proposed Los Banos-Grandes Reservoir. Significant visual impacts on scenic quality would not occur.

Socioeconomics: Construction activity would have a beneficial effect on the regional and local economy. Construction activity would not generate any direct employment, but would stimulate employment in related sectors.

No permanent population increase would occur as a result of this project. Likewise, no significant demand for housing will result from the project.

Corona, Field, and Safety Considerations: A complex electrical environment is found near overhead transmission lines. There are some possible effects that may be caused by these lines. Corona and short-term electromagnetic field effects can be mitigated by proper design of the transmission line or, in the case of an object (such as a building or propane tank) exposed to those fields, proper grounding procedures should be followed to avoid any harmful effects. Long-term electromagnetic field effects are being addressed through extensive research.

The design, construction, and operation of the proposed transmission line would meet or exceed all applicable safety standards. The line will be designed with strengths and clearances equal to or greater than the requirements and safety factors specified by the California Public Utilities Commission General Order No. 95.

Noise impacts during the construction of the line would be generated by the equipment used during access road and right-of-way grading, construction yard and laydown area preparation, tower siting and erection, wire pulling and splicing, and cleanup activities. Since the preferred route is generally remote, construction noise would be heard primarily by construction workers. Because predicted noise levels from operation of the proposed line are not significantly higher than ambient levels, no impact is anticipated.

Cultural and Paleontological Resources: Cultural resource impacts could occur from land alteration associated with the construction of towers and access roads, the development and use of material laydown and equipment storage areas, and related project features. These activities could disturb or destroy both surface and subsurface cultural deposits and features that are potentially significant. The known or suspected presence of cultural and paleontological resources was a factor in the route selection process.

The preferred route alignment contains four documented archaeological resources that could be affected. The east alternative route exhibits a low impact sensitivity, despite the occurrence of one documented archaeological resource. No documented historic resources are located within the preferred project route or route alternatives. No documented Native American resources are within the preferred project route or route alternatives.

The project could result in impacts on paleontological resources. The preferred route alignment contains 11 known fossil locations that could be affected. The east route has a low impact sensitivity, despite the moderate potential for fossil-bearing formations in the northern portion of the route.

Pacific Northwest (PNW) Reinforcement Project (4.3)

PNW facilities improvements would require removal of existing equipment and adding new equipment. Some additional land would be necessary to accommodate some of the new equipment and possible new Marcola Substation. New rights-of-way would be required for the eight miles of new transmission lines.

Construction would be planned and executed consistent with federal, state, and local plans. The project is expected to be consistent with the local plans in 12 affected Oregon counties (Deschutes, Douglas, Gilliam, Jackson, Jefferson, Josephine, Klamath, Lake, Lane, Marion, Sherman, and Wasco) and one affected Washington county (Benton).

The U. S. Fish and Wildlife Service (FWS) has agreed with BPA's finding of no effect on threatened and endangered species. The FWS has identified the bald eagle (winter resident/migrant) and peregrine falcon (migrant) as occurring in the area of Fort Rock, Sycan, and Malin facilities (September 17, 1985). The effects on other wildlife would be insignificant because the amount of habitat removed represents a minute amount of similar adjacent habitat.

Review of cultural resources literature and consultation with the Oregon State Historic Preservation Officer have produced a conclusion that, since previous intensive research in the area has not located important sites, none are likely to be found. Should any be found during construction, work will be stopped while consultation occurs and appropriate measures are determined. None of the actions would affect any known Native American religious practice or site.

Many resources would receive minor or no impacts. Relatively little timber would need to be cut; the consequent lack of slash burning would therefore not degrade air quality. Dust from construction would be temporary and would remain below levels of concern. No water resources would potentially be affected, so no changes would occur to water quality. Only dispersed recreational activities occur in the project area, and these would not be affected. Since most substation yard expansions would occur within fee-owned land, loss of land from yard expansion would have little effect on local landowners and adjacent land use. Construction workers would not be at any one facility long enough to affect the local economy. The location of the facilities makes it unlikely that impacts would occur on urban or residential communities. Similarly, visual effects would be minor or negligible. Environmental Protection Agency (EPA) and Oregon limits on noise would be observed at each substation perimeter, and no significant noise effects are expected.

East of the Cascades, the affected vegetation would be primarily sagebrush and bunchgrass interspersed with juniper and ponderosa pine. West of the Cascades, the proposed actions would primarily affect pastureland, Oregon white oak, and Douglas fir. Vegetative impacts would be minimal because similar vegetation is abundant in adjoining areas. A noxious weed survey would be taken before and after construction, and measures would be taken to minimize infestation.

Prime farmland may be affected by proposals at the Malin Substation and the Marcola and Grizzly-Malin loop-ins. At Malin, the Soil Conservation Service (SCS) noted that agricultural development was unlikely because the site is isolated. Consultation with SCS is continuing on the other two locations.

Safe drinking water, which becomes a concern where polychlorinated biphenyls (PCBs) might enter it from equipment, will not be a concern for this project. New equipment will not contain PCBs. No sole source aquifers are located in the project area.

Herbicides will be used for total vegetation control in equipment yards. Minor amounts would be applied to control undesirable vegetation for 4 to 5 feet outside the fenced yards. Most of the herbicide would remain in the upper soil profile. The overall use of herbicide would be small for each proposed action. Even the potential for cumulative impacts of all of the actions would be short term or insignificant.

Excess materials and waste would be recycled. Domestic solid waste would be disposed of in a sanitary landfill. Solvents or thinners used to prepare and clean electrical and other material will be shipped to BPA's Ross Complex, PP&L's Medford transformer shop, or PGE's Central Stores in Portland and then disposed of with other hazardous waste in accordance with EPA regulations. The project is consistent with the Resource Conservation and Recovery Act, the Toxic Substances Control Act, and Oregon's hazardous waste regulations.

At three facilities (Fort Rock, Sand Spring, and Sycan) all PCB-containing compensating capacitor banks may be replaced with non-PCB equipment if necessary to meet the project requirements. The cells may first be shipped to a storage facility prior to shipment for disposal. All shipments will be made in accordance with state and U. S. Department of Transportation regulations covering the movement of PCB materials. The chances of any adverse impacts through potential exposure to the public would be minimal if transportation regulations were followed during shipment. No PCB series capacitors would be introduced into the existing or new facilities.

More detailed information on the potential environmental consequences of the PNW reinforcement facilities can be found in Volume 2C of the Draft EIS/EIR.

Cumulative Impacts (4.4)

~~Proposed projects in the vicinity of the Projects have been reviewed to determine the potential for significant environmental impacts due to the cumulative effects of the projects on the individual resource elements. For this analysis, "cumulative effect" is defined by NEPA as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Both temporal and spatial factors influence the potential for a significant effect when more than one project is examined. The construction schedule is the primary temporal factor, and the location and extent of the project sites in relation to each other are the major spatial factors. Other factors which influence the cumulative impact include sensitivity of the resource and magnitude of the individual effects.~~

The COTP, the Los Banos-Gates Project, and the Pacific Northwest Reinforcement Project were assessed together in one environmental document so that their cumulative impacts could be assessed. Proposed projects in the vicinity of the COTP and Los Banos-Gates Project have been reviewed to determine the potential for significant environmental impacts due to the cumulative effects of the projects on the individual resource elements.

CEQA and NEPA require the analysis of cumulative impacts; definitions and guidance are provided in the statutes and regulations for each Act. CEQA defines cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts," and states further that "(t)he individual effects may be changes resulting from a single project or a number of separate projects" and "(t)he cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonable foreseeable probable future projects." Similar language is included in NEPA, where cumulative impact is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future action regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." Both temporal and spatial factors influence the potential for a significant effect when more than one project is examined. The construction schedule is the primary temporal factor, and the location and extent of the project sites in relation to each other are the major spatial factors. Other factors which influence the cumulative impact include sensitivity of the resource and magnitude of the individual effects.

California-Oregon Transmission Project (4.4.1)

~~The following actions were considered in the analysis:~~

1. ~~Proposed projects that may produce related effects and are located within three miles of the preferred alternative route.~~

2. ~~Transmission line projects 200 kV or above located within three miles of the preferred alternative route.~~

~~An area within three miles of the preferred alternative routes was selected primarily because it is a commonly used range for visual effects. Proposed projects were defined as those that have commenced the environmental review process (the filing of a Notice of Preparation with the State Clearinghouse).~~

~~Within the defined area for assessment of cumulative effects, 7 projects are proposed (see Table 4.4-1) and 5 projects have been approved (see Table 4.4-2). Developed and planned land uses are discussed in Sections 3.8.4.4 and 3.8.4.5 of Volume 2A and Tables 3.8-20 and 21 of Volume 2A. Nine of these projects are residential developments or rural subdivisions, one is an industrial redevelopment, and two are geothermal resource areas.~~

~~In addition to these non-transmission projects, three transmission projects over 200 kV have been proposed within the defined area for potential cumulative impacts. These include:~~

1. ~~City of Redding Direct Interconnection Project. This is a 0.5-mile, 230 kV transmission line and expansion of an existing substation. It is being proposed by the City of Redding and the Western Area Power Administration. An Environmental Report was prepared in 1988 which resulted in a finding of no significant impact.~~

2. ~~Lawrence Livermore Laboratory (LLL) Direct Interconnection Project. This is an approximately 11-mile, 230 kV transmission line between Western's Tracy Substation and the LLL and new substation at the LLL. It is being proposed by the LLL and Western Area Power Administration. An Environmental Assessment is being prepared.~~

3. ~~Geothermal Public Power Line Project. This is an approximately 50-100 miles in length, 230 kV transmission line between the Geysers and a new substation near Williams, California. It is being proposed by a group of Northern California municipal utilities. The Application for Certification is currently being reviewed by the California Energy Commission.~~

~~Possible related effects could occur if the above-mentioned projects are constructed at the same time as the COTP is constructed. These would include socioeconomic impacts due to the effects of the combined workforces and direct construction effects (i.e., noise, air pollution, increased traffic, and earth disturbance). Other related impacts would be the disturbance and use of land and increased human activity. Due to the relatively short construction period and relatively minor disturbance and use of land involved in transmission line construction, it is anticipated that the COTP would not have significant cumulative effects from these projects beyond those already identified in this document.~~

Projects in the defined area of the California-Oregon Transmission Project have been identified to assess the potential for significant cumulative effects.

Cumulative Impact Analysis Process (4.4.1.1)

The following actions were considered in the analysis:

1. Projects that may produce related effects, and are located within three miles of the COTP preferred route.

2. Transmission line projects 200 kV or above.

3. The present level of cumulative watershed effects caused by sedimentation from land-disturbing activities and the percent increase of disturbance which will result from COTP construction/operation.

An area within three miles of the proposed alternatives was selected primarily because it is a commonly used range for visual effects. Proposed projects were considered as were those for which the environmental review process has begun (the filing of a Notice of Preparation with the State Clearinghouse).

Within the area defined for the assessment of cumulative effects, 10 projects are proposed (see Table 1.1.4-9) and 7 projects have been approved (see Table 1.1.4-10). Developed and planned land uses are discussed in Sections 3.6.4.4 and 3.6.4.5 of Volume 2A of the Draft EIS/EIR and Tables 3.6-20 and 3.6-21 of Volume 2A of the Draft EIS/EIR. The discussion and tables are incorporated by reference.

In addition to these non-transmission projects, 21 transmission line projects over 200 kV have been proposed or approved statewide from 1982-1986. Of these 21 projects, 3 are within the defined area for potential cumulative effects (City of Redding Direct Interconnection Project, Lawrence Livermore Laboratory Direct Interconnection Project, and the Geothermal Public Power Line Project). These projects are identified in Table 1.1.4-11. The table also identifies transmission line projects that are in the study area but are less than 200 kV, and therefore not included in the assessment. Existing transmission line projects within the defined area are presented in Table 1.1.4-12.

The level of land-disturbing activity and the percent increase caused by proposed projects is one measure used by the USFS to assess cumulative watershed effects (Haskins 1987, personal communication). Land-disturbing activities are expressed in terms of equivalent road acres (ERA) and a 15 percent or more increase in the ERA is considered significant. The ERA is then compared to the threshold of concern (TOC) for the watershed to determine whether the potential for sediment loading has reached a critical stage. To determine whether there may be cumulatively significant watershed effects, ERAs and the TOC for watersheds along the COTP preferred route are shown in Table 1.1.4-14.

Impacts (4.4.1.2)

The COTP would result in the commitment of numerous resources as identified in Section 4.8 of Volume 1 of the Draft EIS/EIR. Potential significant cumulative effects of existing and proposed projects include visual, biological, cultural, and land use impacts. Since the construction schedule coincides with relatively small projects with short construction periods, no significant cumulative socioeconomic impacts are expected.

Cumulative visual impacts would result from existing and proposed transmission lines in the defined area. Generally, the incremental increase in visual impacts from placing a new line in an established corridor is not considered to be significant since high voltage transmission lines are similar in appearance and the introduction of another set of structures alongside existing structures does not introduce a new element into the landscape. Construction of lines in new corridors introduces a significant, often incompatible, element into the landscape.

Impacts to some land uses are less severe if new transmission lines are located in one corridor than if they were separated; these include impacts to some agricultural operations, timber harvest practices, and residential and commercial developments. Forest land uses are the most likely to be significantly affected. Because of the requirements for removal of land from timber production by access roads and the right-of-way, as well as the limitations on timber harvesting and management practices in the vicinity, COTP would add to the amount of prime timberland already removed from production by existing transmission lines. Because forest landowners are fully compensated for damages or loss of use to their property, there will be no significant cumulative impacts to timberlands.

Impacts to biological resources, cultural resources, and others where the impacts are primarily related to construction activities, such as vegetation clearing along the right-of-way, are comparable whether the line is constructed in a new or established corridor. Impacts associated with access road construction are generally less severe when an established corridor is used since existing access roads can be used.

Potential cumulative effects of the COTP, in combination with existing and future projects in the same watershed, such as timber sales, include:

- Changes in existing beneficial water uses
- Restrictions on future beneficial water uses
- Changes in existing and future land uses

Because the ERA varies over time as projects now under construction are completed and new projects begun, it is difficult to say with any certainty what the ERA will be at the time the COTP is constructed and what effect the COTP will have on the ERA and TOC. The COTP preferred alternative traverses 3 fifth-order watersheds in the Shasta-Trinity National Forest (Table 1.1.4-15). The portion of route that crosses the Upper McCloud River watershed will increase the existing 10 percent ERA by 0.05 percent. In the Iron Canyon watershed, the route will increase the existing 6 percent ERA by 0.16 percent, and in the Pit River #6 watershed, the route will increase the existing 4 percent ERA by 0.14 percent. These changes associated with the project preferred alternative will not significantly increase the ERAs in these watersheds, and therefore will not represent a significant cumulative watershed impact.

Discussions with representatives of appropriate land management agencies indicate that in most sensitive areas it is unlikely that any of the COTP routes will increase the ERA by more than 15 percent or exceed the TOC (Haskins 1987, personal communication). Furthermore, COTP cumulative watershed effects will be short-term in nature and limited mainly to project construction. Long-term watershed effects may occur from access roads but should be insignificant as the result of mitigation.

Potential cumulative effects of other transmission line projects with Northwest power as a source include:

- Changes in river operations and the effect on water quality, fish, and wildlife in the Northwest
- New resource development
- The use of land, rights-of-way, and nonrenewable resources
- Air quality

~~BPA and~~ COTP Participant decisions on construction, operation, and interconnection of the COTP, Los Banos-Gates Project, and PNW Reinforcement Project will be based on: 1) the environmental impacts discussed in this EIS/EIR; 2) the environmental effects of changes in resource operation in British Columbia, PNW, California, and Inland Southwest as described in the Draft IDU EIS (BPA, 1986) and BPA's Hydro Operations Information Paper (BPA, 1987) and herein incorporated by reference; and 3) the economic benefits available through transactions between the PNW and the Pacific Southwest.

~~Appendix D of Volume 2A~~ Section 1.5.4 of the Final EIS/EIR contains an updated summary of the information and analyses that will appear in the Final IDU EIS prepared by Bonneville Power Administration. ~~Section 3.0 of Appendix D~~ Section 7 of the summary discusses the potential environmental impacts associated with increases in intertie capacity and use. These include potential impacts to sales levels, generation mixes, new resource development, use of land and non-renewable resources, air quality, water quality and consumption, resident and anadromous fish, wildlife, vegetation, cultural resources, irrigation, hydroelectric system operations, and electricity rates.

Mitigation Measures

Mitigation measures for the COTP are included in Section 1.1.5 of this document. These measures would mitigate the cumulative effects related to the COTP. In addition, landowners are fully compensated for any damages or loss of use to their property; this, in effect, is also a mitigation measure. Cumulative effects related to other projects may be mitigated by the respective local jurisdictions through the adoption of ordinances.

To ensure that no significant cumulative watershed effects will occur during construction/operation, the COTP will meet with the appropriate land management agencies to determine the percent increase of ERA and compare it to the TOC at the time of project construction. Site specific mitigation measures will be developed and implemented, as necessary.

Los Banos-Gates Transmission Project (4.4.2)

The following steps and assumptions were used in the analysis:

1. Assessment of all proposed projects within the project area and up to 5 miles away from the Los Banos-Gates Transmission Project. Four of these projects are described in the Land Use Section 3.6 of Volume 2B of the Draft EIS/EIR; the others are described below.

2. Selection for the analysis of only proposed projects that were in the final planning stages or had entered into the environmental process (i.e., issued a Notice of Preparation and/or Draft EIR).

3. Elimination of proposed projects that did not have any related impacts or were over 5 miles away from the Los Banos-Gates study area boundary.

4. A search for any proposed transmission line projects (none were found in the cumulative impact analysis area).

5. Identification and comparison of key characteristics, project schedules, and major environmental effects of each of the selected projects.

Seven projects have the potential for cumulative effects with the development of the Los Banos-Gates Project. Four projects, Los Banos Grandes Reservoir, Apricot Hill Development, Polvadero Country Club, and the San Joaquin Pipeline are described in the Land Use Section 3.6 of Volume 2B of the Draft EIS/EIR. The remaining three projects not in the project area are described below for a comparative evaluation.

Santa Nella Public Utilities District. A proposal by the Santa Nella Water District to expand its water and sewer services has been approved. Community Development Block Grant (CDBG) and State Department of Water Resources funds have been obtained for an expansion of water service. Expansion of wastewater treatment facilities and construction of the water lines is being funded through an approved assessment district. Water and sewer improvements are now about sixty percent complete. The District expects to complete improvements in May of 1988. Approved development also includes a 350-room hotel and three fast food restaurants which are contingent upon the expanded water services. The commercial portion of the development is being funded, in part, by CDBG funds. Letters of commitment to develop are required to obtain CDBG economic development funds; these letters have been received and are on file. The Court will process building permits when the Santa Nella Water District assures the County that sewer and water improvements are complete. A housing development adjacent to the Santa Nella Golf Course is under consideration for a later date. The land adjacent to the golf course is zoned R-1, single-family residential. The amount of housing to be proposed is not known precisely at this time, nor has it been approved. ~~Construction of approved development would begin about March 1987.~~

National Cemetery. A national veterans' cemetery is proposed on approximately 300 to 400 acres northwest of Santa Nella, south of McCabe Road, and north of O'Neill Forebay. Access to the cemetery would probably be along McCabe Road. The United States Veterans' Administration (VA), responsible for preparing the federal Environmental Impact Statement (EIS), identifies the Santa Nella site as its preferred alternative. The VA in determining the necessary acreage for the cemetery; ~~it~~ indicated 350 acres as a "best guess" at this stage of planning. The VA will probably decide on the location and size of the proposed cemetery ~~by May 1987~~ in early 1988. Development would take approximately 12-15 months. ~~and would probably be completed in mid- to late 1989.~~

UTC Quinto Ranch Project. The 13,254-acre project site encompasses approximately 12,544 acres of unincorporated land in western Merced County and approximately 700 acres in southern Stanislaus County. The site is bounded by Interstate 5 to the east, O'Neill Forebay and San Luis Reservoir Recreation Areas to the south, foothills of the Diablo Range to the west, and hunting lands and rangelands to the north. The site is used for grazing and limited agriculture.

Project operations in Phase I would initially consist of two rocket motor production lines, administration buildings, "inert operations" areas, firefighting and security facilities, raw materials and finished product storage magazines, wastewater treatment plant, helipad, airstrip (tentative), and other facilities accessory to an industrial plant. Phase II of the project would be an expansion to five rocket motor production lines, with some expansion of inert operations facilities and other accessory facilities. Production materials, including stabilized nitroglycerine and other propellant raw materials, would be transported to the site for rocket motor fabrication. Finished rocket motors and wastes generated as a by-product of production would be transported from the site. Scrap propellant generated during production would be burned on the site, and limited test burns of rocket motors would be conducted on the site. An Environmental Impact Report was prepared and a Conditional Use Permit was granted by Merced County; however, the permit was appealed and during these procedures, UTC withdrew the project from further consideration.

Construction Impacts

Construction activities for ~~three~~ two projects (Santa Nella Public Utilities District, and Polvadero Country Club Planned Unit Development (PUD))~~, and San Joaquin Pipeline,~~ will be completed prior to the initial construction phase of Los Banos-Gates; therefore, there would be no combined effects with these projects (Figure 1.1.4-1). Construction of the National Cemetery, Apricot Hill Development, ~~possibly the Los Banos Grandes Dam,~~ and Los Banos-Gates Project may take place during ~~late~~ 1988 to 1991. Construction of the Los Banos-Grandes Dam is currently scheduled to begin in January 1996 and be completed in July 1999. Given this situation, there would be an impact on the local workforce and possible significant socioeconomic effects to accommodate the combined workforce. Other possible effects of this would be the consumptive use of land, increased human activity, and increased potential for disturbance of biological and cultural resources. Table 1.1.4-17 indicates the amount of land required for each project. The combined effect of constructing both the UTC Quinto Ranch Project and the Los Banos Grandes Reservoir would change the character of more than 27,000 acres of land. The Los Banos-Gates Transmission Project would consume approximately 150 acres of land over the 84-mile length of the route. The incremental increase in land consumption represents approximately 0.5 percent of the total area disturbed by the four projects under construction. (Note: This assumes that all of the present land uses in the National Cemetery, ~~the Quinto Ranch,~~ and Apricot Hill will be altered. The consumptive land use for the Los Banos-Gates line represents 1 percent of that required for the Los Banos Grandes Reservoir.)

The direct construction effects (i.e., noise, air pollutants, increased traffic, earth disturbance) could be significant only with the Los Banos Grandes Reservoir Project if they are constructed at the same time. All other projects are sufficiently removed from the preferred route to avoid a cumulative effect (Table 1.1.4-17).

Operation Impacts

Los Banos-Gates Transmission Project will have no significant operational effects except the change in visual character of the area and the consumed use of about 150 acres. These will not have a significant cumulative effect with the impacts of the other projects proposed in the vicinity.

Pacific Northwest (PNW) Reinforcement Project (4.4.3)

Cumulative impacts to land use and vegetation from the PNW Reinforcement Project would be associated with the potential construction of the Marcola Substation, expansion of existing substations, and construction of new transmission line segments and access roads. The additional areas to be disturbed total approximately 53 acres. About 0.5 acre is existing cropland, the remainder would be rangeland and pastureland or woodland. Approximately 12 acres of land designated as prime farmland but not now used for growing crops would be affected.

Visual impacts from the new substation at Marcola and new transmission line segments are expected to be small in view of the remote locations and relatively small magnitude of construction requirements. Cumulative impacts to recreation, wildlife, water, air quality, and other resources are expected to be negligible.

Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity (4.5)

Relative to the time required for the evolution of natural systems and environmental productivity, the COTP, Los Banos-Gates Project and PNW Reinforcement Project propose short-term use of area resources. Accordingly, most impacts associated with these activities will be localized, short-term, less than significant and/or totally mitigable.* The long-term productivity of some resources will be impacted wherever project rights-of-way, access roads, or substation sites limit and/or change local uses of the environment or inhibit the regenerative ability of plant and animal communities.

Use of or impacts to earth resources would primarily be short-term in nature and associated with soil disturbances, compaction and erosion, fossil removal and/or destruction, and limited access to mineral deposits during construction and abandonment activities. Impacts to air quality would be short-term and associated only with localized fugitive dust and gaseous emissions from ground transportation during construction and abandonment activities. Sediment loading from erosion or accidental spillage of construction waste, such as crank case oil or solvents, would be the main short-term impact(s) to water resources. Long-term loss of productivity might also occur if project features inhibit fish migration or impact a locally important stream or aquifer.

Potential short-term impacts to biological resources include the loss and/or displacement or plant and animal species as the result of clearings for rights-of-way, access road construction, and substation construction activities. Calculations for temporary construction impacts for tower assembly sites were assumed to be 100' x 100'. Further design indicates that the area needed for tower assembly is 200' x 200'. The larger area of impact anticipated with the 200' x 200' tower assembly sites will increase the affected area. This amounts to .7 acre per tower assembly site. No plant or wildlife species is expected to become extinct as a direct result of project-related activities. Investigation of long-term impacts to biological resources must include analysis of any potential reductions in the number, habitat or range of proposed or listed rare, threatened, endangered, sensitive, or unique plants and animals. The impacts to migratory waterfowl and the wildlife that use the Delta must also be considered long-term.

Potential impacts to human resources will be both short- and long-term and will be beneficial as well as adverse. The projects will enable the more efficient use and exchange of energy resources, much of which is based on renewable resources. These and other benefits of the projects are described in Section 1.0 of Volume 1 of the Draft EIS/EIR. Short-term impacts include noise and the occasional congestion of roadways during construction. Long-term impacts include the loss of cultivated cropland, ~~and~~ the loss of productive timberland, and the loss of recreational opportunities (particularly in the Delta). Long-term loss of cultivated cropland would be a cumulatively significant adverse impact. However, the approximately 1,600 MW of additional transmission capacity (equivalent to the production of a large baseload power plant) to be exchanged between California and the Pacific Northwest will encourage economic power transactions between the two regions and help to minimize power costs for consumers. Furthermore, the projects will create new jobs and stimulate local economies. The proposed use of the land resources will therefore be beneficial and will offset the negative resources impacts.

The impacts to visual resources will be primarily long-term and detract from views along scenic highways and in residential areas. The evaluation of potential routes included the visual concerns leading to incorporation of mitigation measures. Potential impacts to cultural resources include both short- and long-term impacts. Short-term impacts include any potential increased exposure of existing sites of high archaeological, ethnological, or historic value. Investigation of long-term impacts must include analysis of any potential ~~d~~effect on nonrenewable archaeological resources as the result of construction, operation, maintenance, or abandonment activities. Historic and Native American resources must also be considered in evaluating visual impacts from the projects.

In summary, the short-term, localized nature of the projects will result in impacts to resources that are limited and/or can be easily mitigated. Long-term loss of resource productivity will occur for the life of the projects, with benefits to the human and natural environments expected to be significant from the increased

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* For the purpose of this discussion, short-term is defined as the construction period plus 2 to 3 years for reclamation. Long-term is defined as 50 years (the estimated project life) and thereafter.

efficiency of inter-regional exchanges of power. These include reduction in the reliance of fossil fuels in California, deferral of baseload power plant construction, and utilization of available hydroelectric power that is often foregone due to Intertie constraints.

Impacts on Beneficial Uses

The projects will narrow the range of beneficial uses for prime timberlands. Prime timberland in the right-of-way and along access roads will be removed from timber production for the life of the Project. The designation of prime timberlands is a function of the location of a site, its soil characteristics, and climate, and is an indicator of site productivity; therefore, prime timberland cannot be replaced.

While there are significant impacts to irrigated agricultural lands, these impacts will not narrow the range of beneficial uses. Most farming practices can continue in the vicinity of the transmission lines except for those areas displaced by the transmission line structures. Further, additional agricultural lands can be created by irrigation, chemical fertilizers, and other modern technologies.

Transmission line shield wires can be the cause of avian mortality in areas of high raptor or waterfowl concentration under conditions of low visibility such as fog. The extent of the mortality directly attributable to transmission lines has not been substantiated to date, but the potential for significant impact exists. The presence of the transmission line is not expected to diminish the value of the Delta for migratory waterfowl along the Pacific Flyway. Mortality from hunters is anticipated to have greater effects on waterfowl than the construction and operation of the COTP.

Growth Inducing Impacts (4.6)

~~The increased availability of power from the projects is likely to enhance the economic environment in California and the Pacific Northwest. While the energy transmitted by the projects could be provided by alternative transmission or generation sources, such energy would likely be at some incrementally higher cost as discussed in Sections 2.4 and 2.5 of this volume.~~

~~The increase in reliability of the AC Intertie between California and the Pacific Northwest should result in economic benefits in the long-term. The availability of more reliable, lower cost power is likely to stimulate growth in both areas.~~

~~The projects may cause secondary growth impacts in local areas where project investments are made. Increases in employment may result from construction, operations, and maintenance activities.~~

~~No significant growth-inducing impacts are anticipated as a result of these projects providing economical power. There are currently no known energy-related obstacles to population or industrial growth in California or the PNW. Furthermore, the relatively small size of the workforces, the short-term duration and phased construction, and other characteristics of the projects indicate that community services would not be unreasonably stressed, and communities should benefit from the construction of the projects. The potential for impacts to land use and communities is addressed in Section 4.9 of this volume.~~

No significant growth-inducing impacts are anticipated from the construction and operation of the projects. This is primarily due to the relatively small size of the workforce, the short-term duration and phased construction, and the character of the projects. Temporary impacts would not require major improvements (which could induce growth in an area).

The projects may cause secondary growth impacts in local areas where project investments are made. Increases in employment may result from construction activities and operations and maintenance.

There are no energy-related obstacles to growth in California. The increased availability of power in California and the Pacific Northwest could result in greater economic health within the region. The increase in reliability of the AC Intertie between California and the Pacific Northwest will result in economic benefits in the long term. The availability of reliable, lower cost power that could be marketed more economically than power generated locally may result in a healthier economic climate in both areas. However, the energy transmitted by the combined projects could otherwise be provided by alternative transmission or generation sources. The increased availability of energy will not necessarily remove existing obstacles to growth.

Unavoidable Adverse Impacts (4.7)

~~The construction and operation of the COTP, Los Banos-Gates Project, and the PNW Reinforcement Project would result in unavoidable adverse impacts. These impacts occur when adopted mitigation measures do not reduce the impacts to a level less than significant. For the COTP, Table 2 of the Summary in Volume 1 identifies the effectiveness of mitigation measures and whether or not the impact will remain significant after implementation of mitigation. The unavoidable adverse impacts for each project are described in Volumes 1, 2A, 2B, and 2C, and are summarized below.~~

~~Considering the impacts identified below, the benefits from construction and operation of the projects are expected to significantly outweigh potentially adverse effects. The benefits from the projects of supplying power, creating jobs, providing tax revenues, increasing transmission system reliability, decreasing dependence on fossil fuels, and enhancing inter-regional power transfers are addressed in Sections 1.0 through 1.3, 2.4 and 2.5 of Volume 1, and Appendices B and D of Volume 2A.~~

~~**COTP**~~

~~Unmitigable unavoidable adverse impacts would include: water erosion, potential collisions of birds with conductors, the crossing of small areas of prime timberland, Timber Production Zones (TPZ), Prime Farmland, Farmland of Statewide Importance or agricultural preserves, and visibility of the project in open landscape, the visibility of the project from USFS lands managed for scenic quality, and the visibility of the project from local scenic roads and highways.~~

~~**Los Banos-Gates**~~

~~Unmitigable unavoidable adverse impacts would include: the temporary and permanent replacement of vegetation and wildlife habitat with tower footings, construction areas, and access roads, the disturbance of wildlife habitat during construction, the potential collision of birds with conductors, loss of productive farmland and interference with agricultural equipment and operations, and visibility of the project from designated scenic highways including Interstate 5 and State Highway 33, Little Panoche Reservoir, and Panoche Hills Wilderness Study Area.~~

~~**PNW Reinforcement Project**~~

~~There would be no significant unavoidable adverse impacts from the PNW Reinforcement Project.~~

The construction and operation of the COTP, Los Banos-Gates Project, and the PNW Reinforcement Project would result in unavoidable adverse impacts. These impacts occur when adopted mitigation measures are applied to significant impacts but are not totally effective in eliminating the impact. For the COTP and Los Banos-Gates Project, Tables 2A and 2B of the Summary at the beginning of this volume list the significant impacts of these projects prior to mitigation, the mitigation which has been adopted to reduce these impacts to less-than-significant levels, the effectiveness of mitigation and whether or not the impact will remain significant after implementation of mitigation. The unavoidable adverse impacts for each project are also discussed in Volumes 1, 2A, 2B, and 2C of the Draft EIS/EIR and are summarized below.

COTP

Unmitigable, unavoidable adverse impacts would occur from water erosion, the collisions of birds with project conductors, the crossing of prime timberland, prime timberland in Timber Production Zones (TPZs), Prime Farmland, Farmland of Statewide Importance, irrigated cultivated farmland, or agricultural preserve, the visual contrast and visibility of the Project in open landscape, the visibility of the Project from Lava Beds National Monument, the visibility of the Project from USFS lands managed for scenic quality retention or partial retention, the visibility or the Project from local scenic roads and highways, and the socioeconomic impacts of locating the line and access roads near concentrations of residences.

Soil erosion will occur primarily during construction, along access roads, and rights-of-way for approximately three years following grading and site preparation activities. Collisions of birds with the shield wire or conductor are likely to occur within major migratory flyways during fall and spring throughout the life of the project. All other unavoidable adverse impacts of the project will occur whenever valuable timber or agricultural land is crossed, or wherever open landscape, lands with high scenic value, or local scenic roads or highways are crossed. These impacts will occur throughout the life of the project, although right-of-way cuts through forested land may take many years after the project is decommissioned to return to pre-project conditions.

Los Banos-Gates

Unmitigable, unavoidable adverse impacts would occur from the removal of vegetation due to the clearing for tower footings, access roads, conductor pulling and tension sites and construction yards, the permanent replacement of vegetation and wildlife habitat with tower footings and access roads, the disturbance of wildlife habitat during construction activities, the collision of birds with project conductors, restricted development (no building or structures, wells or trees in excess of 15 feet in height) within the project right-of-way, loss of productive farmland, interference with agricultural equipment and operation (including interference with irrigation practices, aerial applications, and weed and pest control), and visual impacts resulting from views of the project from designated scenic highways including Interstate 5 and State Highway 33 and from San Luis Dam, Los Banos Reservoir, Little Panoche Reservoir, and the proposed Los Banos Grandes Reservoir.

PNW Reinforcement Project

Unmitigable, adverse impacts would occur from the clearing of vegetation due to construction of new substations and approximately 8 miles of new transmission line, expanding or relocating equipment with substation yards or removing or retiring stations, and the upgrading of approximately 47 miles of transmission line; the permanent replacement of 53 acres of vegetation and wildlife habitat with tower footings, access roads and substations, the collision of birds with project conductors and visual impacts resulting from views of the project in open landscape and along local scenic roads and highways. Unmitigable adverse impacts resulting from the Eugene-Medford Project are addressed in that EIS.

Irreversible/Irretrievable Commitment of Resources (4.8)

~~The COTP, Los Banos-Gates Project, and PNW Reinforcement Project would result in the irreversible and irretrievable commitment of certain resources. An irreversible commitment of a resource is one that cannot be changed once it occurs. An irretrievable commitment occurs when the resource cannot be recovered or reused.~~

~~The preferred alternative for COTP would result in the following irreversible commitments of resources.~~

- ~~Approximately 11 crossings of scenic highways, 1 crossing of an existing or eligible wild and scenic river, 1 crossing of a national trail, and crossings within the foreground (within 1/2 miles) of 1,658 dwelling units.~~

- ~~Approximately 6 Native American sites within 1,000 feet and up to 153 Native American sites within 3/4 miles of the COTP right-of-way.~~

- ~~Up to 10 acres of wetlands or floodplains, 80 acres of deer and elk range, 6 acres of raptor nesting habitat, and 32 miles of flightways would be used for transmission line rights-of-way, tower bases, access roads, conductors and substations.~~

- ~~Activities on 2,070 acres of forest land (1,270 acres of USFS administered land) including 22 acres of prime timber, 21 acres of non-prime timberland, 19 miles of timber production zones, 80 acres of rangeland, 28 miles of irrigated cropland, 20 miles of agricultural preserve, and an undetermined amount of mineral laden and watershed land.~~

~~The preferred alternative for the Los Banos-Gates Project would result in the following irreversible commitment of resources.~~

- ~~Up to 120 acres of grassland and scrub used for transmission line rights-of-way, tower bases, access roads, and substations.~~

- ~~Activities on up to 31 acres of agricultural land and over 11 miles of irrigated cropland.~~

- ~~Up to 4 archaeological sites.~~

- ~~The visual character of the area.~~

~~The PNW Reinforcement Project would result in the following irreversible commitment of resources:~~

- ~~Activities on as much as 11 acres of pasture land, woodland and forest, and 0.5 acres of cropland currently used for the production of ponderosa pine and wheat.~~
- ~~As much as 42 acres of rangeland and 11 acres of forest land. This vegetation, which includes 85 mature junipers, 75-95 mature ponderosa pine, and 20 mature deciduous trees, supports many animal communities.~~
- ~~The visual character of some areas.~~

~~Irretrievable commitments of COTP resources would include:~~

- ~~Fuel for equipment during construction and routine operations and maintenance activities.~~
- ~~Approximately 885 tons of conductor wire and 3,140 tons of tower steel, although much of this material could be reusable.~~
- ~~Concrete for tower footings and substation foundations.~~
- ~~Energy and fuel utilized in the manufacturing and delivery of steel, conductor, and other physical components.~~
- ~~Up to 5,000 tons/year of topsoil from wind or water erosion.~~

~~Irretrievable commitments of Los Banos-Gates resources would include:~~

- ~~Fuel for equipment during construction and routine operations and maintenance activities.~~
- ~~Up to 3,300 tons/year of topsoil from wind or water erosion.~~
- ~~Up to 230 tons of conductor wire and 770 tons of tower steel, although much of this material could be reusable.~~
- ~~Concrete for tower footings and substation foundations.~~
- ~~Energy and fuel utilized in the manufacturing and delivery of steel, conductor, and other physical components.~~
- ~~Concrete, steel, and conductor wire for towers, tower footings, and substation foundations.~~

~~Irretrievable commitments of PNW Reinforcement Project resources would include:~~

- ~~Concrete for tower footings and substation foundations.~~
- ~~Energy and fuel utilized in the manufacturing and delivery of steel, conductor, and other physical components.~~
- ~~Fuel for equipment during construction and routine operations and maintenance activities.~~
- ~~Concrete, steel, and conductor wire for towers, tower footings, and substation foundations.~~

The COTP, Los Banos-Gates Project, and PNW Reinforcement Project would result in the irreversible and irretrievable commitment of certain resources. An irreversible commitment of a resource is one that cannot be changed once it occurs. An irretrievable commitment occurs when the resource cannot be recovered or reused.

The preferred route for the COTP would result in the following irreversible commitments of resources:

- Activities on 2,070 acres of forestland (1,411 acres of Forest Service administered land) including the crossing of 15 miles (364 acres) of prime timber and 27 miles (654 acres) of non-prime timberland on Forest Service lands, 30 miles of Timber Production Zones, .0946 timber-related jobs per year would be lost, 101 acres of rangeland, 25 miles of irrigated cropland, 19 miles of agricultural preserve and an undetermined amount of valuable mineral laden land or land which possesses valuable water resources would be restricted or eliminated as the result of right-of-way construction project placement and the value of these lands during the life of the project would be irreversibly lost. In the case of agricultural land, restricting or eliminating farming may result in the irreversible loss of $5,600-$16,400 of revenue per corridor mile annually.

- Approximately 2 Native American sites within 1,000 feet of the COTP right-of-way and 164 Native American sites within 3.4 miles of the COTP right-of-way would be irreversibly impacted. Right-of-way cuts which would cause visual impacts on these resources may be revegetated and the majority of impacts to these sites substantially reduced when/if towers are removed, but these resources cannot be completely restored.

- Some wildlife habitat impacts from the COTP may be irreversible. Clearing of old-growth forest habitats is essentially irreversible within a 200-300 year time frame. Loss of younger forest stands is irreversible over shorter periods. Construction of roads in big game habitats in areas where road closures are difficult may have partially irreversible impacts because once public use is established, it is difficult to eliminate. Such impacts may be partially or fully eliminated through proposed mitigation. Habitat losses to substations are also partially irreversible because habitats cannot be fully restored.

The preferred alternative for the Los Banos-Gates Project would result in the following irreversible commitment of resources:

- As much as 120 acres of grassland and scrub vegetation cleared for or replaced by transmission line rights-of-way, tower bases, access roads and substations would be irreversibly lost. This vegetation, while not critical or sensitive, supports many animal communities and both the vegetation and the habitat it provides may only be partially restored to project areas through revegetation or reclamation if tower sites, access roads, rights-of-way and substation sites are abandoned.

- Activities on as much as 31 acres of agricultural land and over 11 miles of irrigated cropland will be restricted or eliminated as the result of right-of-way construction/project placement and the value of these lands would be irreversibly lost during the life of the project. This will also result in the loss of revenue from these lands.

- As many as four archaeological sites would be irreversibly altered or destroyed. These resources would be lost forever and, short of documenting their location and carefully excavating finds associated with each site, there is no way to replace artifacts which are disturbed by construction activities.

The PNW Reinforcement Project would result in the following irreversible commitment of resources:

- Activities on as much as 11 acres of pasture land, woodland and forest and 0.5 acre of cropland currently used for the production of ponderosa pine and wheat will be restricted or eliminated irreversibly. This will result in the loss of revenue from these lands.

- As much as 42 acres of rangeland and 11 acres of forest land with communities of rabbitbrush, cheatgrass, sagebrush, bunchgrass, sparse juniper, and ponderosa pine would be irreversibly cleared for and/or replaced by substations and new facilities. This vegetation, which includes 65 mature junipers, 75-95 mature ponderosa pine and 20 mature deciduous trees, supports many animal communities and both the vegetation and the habitat it provides may be only partially restored to project areas through revegetation or reclamation if facilities are later abandoned. Unmitigable adverse impacts resulting from the Eugene-Medford Project are addressed in that EIS.

Irretrievable commitments of COTP resources would include:

- A financial investment would be irretrievably committed to the extent that future salvage and market value of facilities and rights-of-way are less than the total investment.

- Fuel for equipment during construction of the transmission line. Fuel would also be needed for routine operations and maintenance activities.

- As much as 885 tons of conductor wire and 3,140 tons of tower steel would be irretrievably committed to project construction. This material can and will be recycled as much as possible, but not all of it will be totally reusable and some may have to be discarded.

- Concrete for tower footings and substation foundations. This concrete could be recovered, but would be generally unusable except as fill material.

- Energy and fuel utilized in the manufacturing and delivery of steel, conductor and other physical components. As mentioned above, tower steel and conductor wires will be salvaged, but only portions of the original energy utilized in manufacturing may be recovered.

- As much as 5,000 tons/year of topsoil would be irretrievably lost from wind or water erosion as the result of project construction or operation. One inch of topsoil takes many hundreds of years to form and, once removed or displaced, is never again available for revegetation or reclamation of the site from which it came.

Irretrievable commitments of Los Banos-Gates resources would include:

- Fuel for equipment during construction of the transmission line. Fuel would also be needed for routine operations and maintenance activities.

- As much as 3,300 tons/year of topsoil which experiences either wind or water erosion may be irreversibly lost as the result of project construction or operation. One inch of topsoil takes many hundreds of years to form and once removed or displaced is never again available for revegetation or reclamation of the site from which it came.

- As much as 230 tons of conductor wire and 770 tons of tower steel. This material can and will be recycled as much as possible but not all of it will be totally reusable and some may have to be discarded.

- Concrete for tower footings and substation foundations. This concrete could be recovered but would be generally unusable except as fill material.

- Energy and fuel utilized in the manufacturing and delivery of steel, conductor and other physical components. As mentioned above, steel and conductor wires will be salvaged but only portions of the original energy utilized in manufacturing may be recovered.

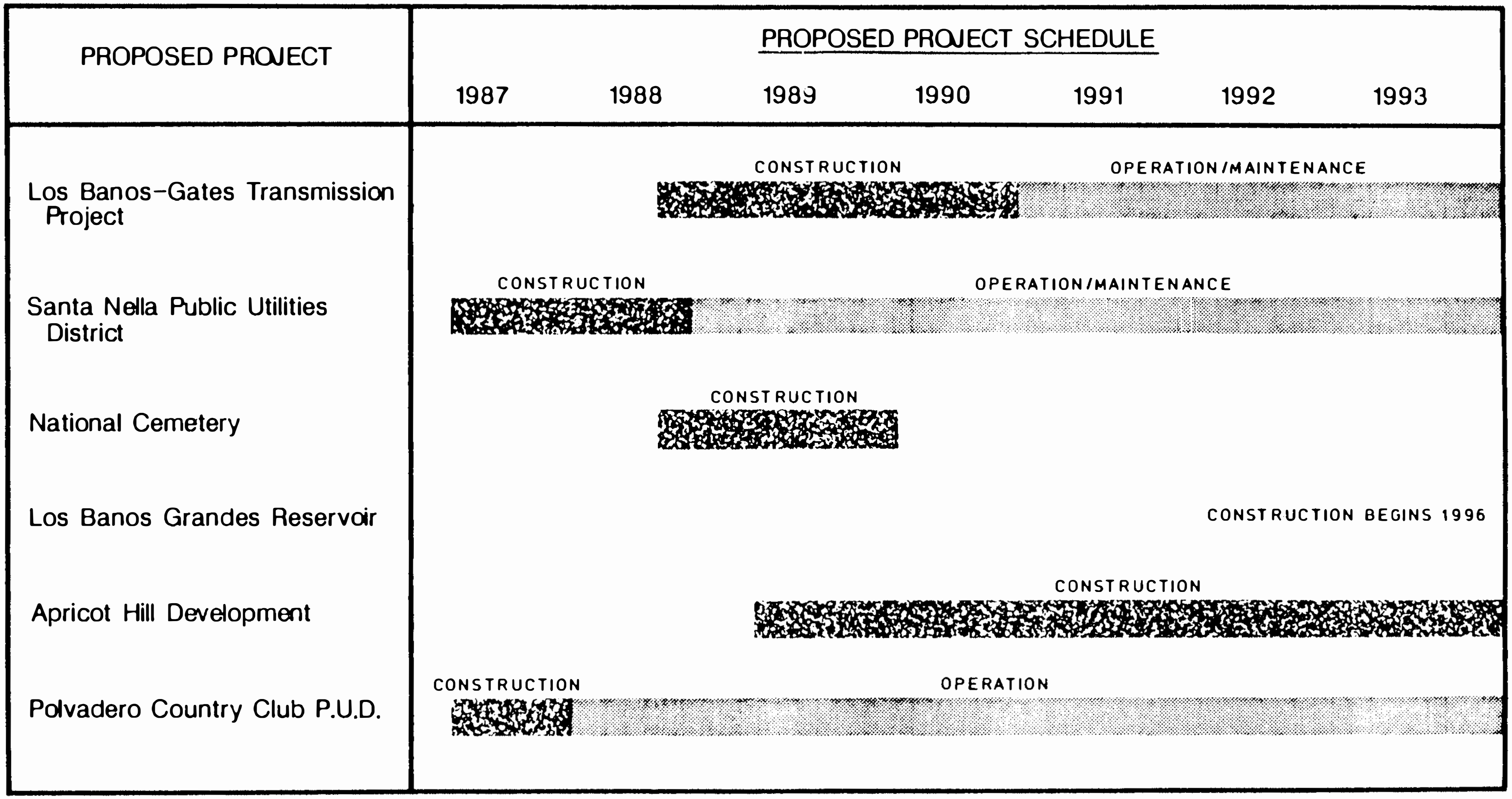
Irretrievable commitment of PNW Reinforcement Project resources would include:

- Fuel for equipment during construction of the transmission line. Fuel would also be needed for routine operations and maintenance activities.

- Concrete, steel and conductor wire for towers, tower footings and substation foundations. Conductor wire and towers will be salvaged but only portions of these original materials may be reused and the energy utilized in their manufacture recovered. Concrete will also be recovered but will be generally unusable except as fill material.

FIGURE 1.1.4-1

PROPOSED CONSTRUCTION/OPERATION SCHEDULES FOR PROJECTS IN THE LOS BANOS-GATES PROJECT VICINITY



SOURCES: F. Ornelas, Manager,Santa Nella Water District,1986
UTC Quinto Ranch Project DEIR, 1986
California Department of Water Resources, 1986
E. Gould, President, Apricot Hill Development Company, 1986
D. Chapen, Fresno County Community Development and Planning Division, 1986
J. Lien, State Lands Commission, 1986

Los Banos-Gates Transmission Project

TABLE 1.1.4-1

SUMMARY FOR ALTERNATIVE NORTH A (a)

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
N-1B	Copco	7.19	174	9.43	22.85	110.85	$3,151	86.58	154.42	0.00	23.87	0	6	0.00
N-1E	Copco	4.77	115	7.98	19.36	52.89	$2,140	114.72	70.48	5.04	15.00	1	8	1.50
N-1H	Copco	0.89	22	2.33	5.65	12.22	$658	69.47	17.62	0.00	5.79	0	4	0.50
N-1I	Copco	1.84	39	0.73	1.77	8.25	$1,077	15.33	10.85	1.40	0.63	0	4	0.00
N-1K	Copco	1.36	29	0.44	1.06	0.00	$647	6.33	0.00	1.09	0.00	0	4	0.00
N-1L	Copco	9.01	191	1.28	3.11	52.06	$4,245	19.85	71.76	1.69	1.68	0	9	0.00
N-4A	Whaleback	22.45	543	36.42	88.28	250.34	$12,870	260.80	332.51	24.17	67.33	0	8	1.00
N-4G	Whaleback	11.33	274	17.79	43.12	173.66	$5,606	203.28	242.33	0.00	44.74	0	9	0.00
N-4J	Whaleback	5.70	138	7.18	17.41	88.32	$2,542	66.18	122.86	0.00	18.21	1	5	0.00
N-7H(1)	Bartle	10.40	252	13.20	32.00	142.96	$5,683	182.40	195.09	0.00	29.39	0	3	0.00
		74.94	1777	96.77	234.61	891.55	$38,619	1024.94	1217.92	33.39	206.64	2	N/A	3.00

NUMBER	MILES OF DEER,ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000'	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
N-1B	0.06	0.0	0	0	0.0	2	0.00	0.00	0.00	3.69	0.00	0.00	0.00	0	0.00
N-1E	4.20	2.1	0	0	0.0	24	0.00	0.00	0.00	0.00	0.00	0.64	0.00	0	0.17
N-1H	0.90	0.0	0	0	0.0	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
N-1I	1.80	0.0	0	0	0.0	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.18
N-1K	1.20	0.0	1	5	3.7	9	0.00	0.00	0.00	0.00	0.00	0.86	0.00	0	0.17
N-1L	3.90	0.0	0	4	0.4	30	0.00	0.00	0.00	0.00	0.00	5.33	0.23	1	0.73
N-4A	11.40	1.0	0	0	0.0	2	256.48	4.60	2.60	8.52	4.40	4.98	0.00	0	0.83
N-4G	5.40	0.0	0	0	0.0	0	194.18	4.40	1.40	8.25	2.60	3.02	0.00	0	0.00
N-4J	2.40	0.0	0	0	0.0	0	106.91	3.00	0.00	5.70	0.00	0.00	0.00	0	0.00
N-7H(1)	7.00	2.5	0	0	0.0	1	184.24	2.85	2.78	6.30	3.00	0.00	0.00	0	0.04
	38.26	5.6	1	9	0.1	84	741.82	14.85	6.78	32.46	10.00	14.83	0.23	1	2.12

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS STATE/COUNTY	WILD AND SCENIC RIVERS EXISTING/ELIGIBLE	NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
N-1B	1	-	-	$498.27	$125.56	0.28	1.31	$0.00	$0.00	0.35	3.00	0	0
N-1E	-	-	-	$330.56	$83.30	5.03	1.67	$0.00	$0.00	0.01	2.00	2	3
N-1H	-	-	-	$61.68	$15.54	11.24	2.62	$0.00	$0.00	0.00	1.00	0	1
N-1I	-	-	-	$127.51	$32.13	3.26	0.40	$0.00	$0.00	0.00	1.00	0	0
N-1K	-	-	-	$94.25	$23.75	6.62	0.32	$0.00	$0.00	0.00	3.50	0	0
N-1L	-	-	-	$624.40	$157.30	3.33	0.14	$0.20	$0.10	0.01	2.50	0	0
N-4A	1	-	-	$1,555.79	$392.06	0.09	1.62	$0.00	$0.00	1.11	3.00	0	3
N-4G	-	-	-	$785.17	$197.86	0.00	1.57	$0.00	$0.00	0.89	2.30	0	4
N-4J	-	-	-	$395.01	$99.54	0.00	1.26	$0.00	$0.00	0.53	3.00	0	3
N-7H(1)	1	1	-	$720.72	$181.62	0.10	1.27	$0.00	$0.00	0.70	2.80	0	6
	3	1	0	$5,193.35	$1,308.68	1.12	1.29	$0.02	$0.01	3.60	2.40	2	20

(a) Variations in summation of totals due to rounding of column numbers
N/A Not applicable
* Total agricultural acreage includes rangeland in addition to cultivated agricultural land

TABLE 1.1.4-2

SUMMARY FOR ALTERNATIVE NORTH B (a)

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
N-4K	Whaleback	3.54	86	4.97	12.04	54.13	$1,590	59.49	75.58	0.00	12.55	0	2	0.00
N-6A	Butte Valley	3.54	86	5.44	13.20	53.54	$1,716	66.30	75.00	0.00	13.70	0	3	0.00
N-6B1	Butte Valley	18.64	451	20.44	49.55	99.80	$8,202	292.33	108.87	0.00	17.66	0	6	4.50
N-6P	Butte Valley	5.71	138	6.30	15.28	76.19	$2,309	20.56	103.34	0.93	13.60	2	6	0.00
N-6U2	Butte Valley	3.50	85	4.20	10.18	54.57	$1,540	25.76	75.79	0.00	10.68	0	0	0.00
N-6W	Butte Valley	5.48	133	6.58	15.94	80.62	$2,412	37.89	115.83	0.00	16.38	0	4	0.00
N-6Y	Butte Valley	5.92	143	7.10	17.21	92.15	$2,605	52.49	128.02	0.00	18.05	0	7	0.00
N-6Z	Butte Valley	9.55	231	12.22	29.62	61.56	$4,202	42.07	70.31	0.59	12.97	0	7	0.00
N-7N(1)	Bartle	10.40	252	13.20	32.00	142.96	$5,683	182.40	195.09	0.00	29.39	0	3	0.00
		66.28	1604	80.45	195.02	715.52	$30,259	779.28	947.83	1.52	144.98	2	N/A	4.50

NUMBER	MILES OF DEER,ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000'	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
N-4K	2.10	0.0	0	0	0.0	0	71.76	3.20	0.00	3.54	0.00	0.00	0.00	0	0.00
N-6A	2.40	0.0	0	0	0.0	1	0.00	0.00	0.00	2.94	0.00	0.00	0.00	0	0.00
N-6B1	5.00	0.5	1	1	0.1	40	181.58	0.00	0.00	4.05	0.00	2.40	1.36	6	1.74
N-6P	1.50	0.0	0	0	0.0	3	103.27	0.30	3.30	0.61	0.00	0.00	0.55	2	0.12
N-6U2	0.00	0.0	0	0	0.0	0	71.27	0.70	0.00	2.20	4.00	0.00	0.00	0	0.00
N-6W	0.00	0.0	0	0	0.0	0	25.70	0.00	1.40	3.57	3.50	0.00	0.00	0	0.00
N-6Y	0.00	0.0	0	0	0.0	0	126.06	5.92	0.00	5.92	0.00	0.00	0.00	0	0.00
N-6Z	5.00	0.0	0	1	0.1	5	167.27	0.00	3.70	0.00	0.00	1.70	0.60	3	0.70
N-7N(1)	7.00	2.5	0	0	0.0	1	184.24	2.85	2.78	6.30	3.00	0.00	0.00	0	0.04
	23.00	3.0	1	2	0.0	50	931.15	12.97	11.18	29.13	10.50	4.10	2.51	11	2.60

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS STATE/COUNTY	WILD AND SCENIC RIVERS EXISTING/ELIGIBLE	NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
N-4K	-	-	-	$245.32	$61.82	0.00	1.40	$0.00	$0.00	0.33	4.00	0	2
N-6A	1	-	-	$245.32	$61.82	0.28	1.54	$0.00	$0.00	0.28	1.00	0	4
N-6B1	1	-	-	$1,291.75	$325.52	2.15	1.10	$0.20	$0.00	0.48	2.80	0	2
N-6P	-	-	-	$395.70	$99.72	0.53	1.10	$0.53	$0.15	0.22	3.50	0	0
N-6U2	-	-	-	$242.55	$61.12	0.00	1.20	$0.00	$0.00	0.26	2.50	0	0
N-6W	-	-	-	$379.76	$95.70	0.00	1.20	$0.00	$0.00	0.40	4.00	0	1
N-6Y	-	-	-	$410.26	$103.38	0.00	1.20	$0.00	$0.00	0.55	3.00	0	1
N-6Z	-	-	-	$661.82	$166.78	0.52	1.28	$0.30	$0.10	0.14	2.00	0	0
N-7N(1)	1	1	-	$720.72	$181.62	0.10	1.27	$0.00	$0.00	0.70	2.80	0	6
	3	1	0	$4,593.20	$1,157.49	0.75	1.26	$0.15	$0.03	3.36	2.84	0	16

(a) Variations in summation of totals are due to rounding of column numbers
N/A Not applicable
* Total agricultural acreage includes rangeland in addition to cultivated agricultural land

TABLE 1.1.4-3

SUMMARY FOR ALTERNATIVE NORTH C (a)

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
N-4K	Whaleback	3.54	86	4.97	12.04	54.13	$1,590	59.49	75.58	0.00	12.55	0	2	0.00
N-6A	Butte Valley	3.54	86	5.44	13.20	53.54	$1,716	66.30	75.00	0.00	13.70	0	3	0.00
N-6C	Butte Valley	2.72	66	3.53	8.55	42.10	$1,298	43.90	58.58	0.00	8.94	0	0	0.00
N-6E	Butte Valley	9.33	226	11.40	27.62	67.11	$4,114	117.04	84.57	9.55	13.90	0	4	2.00
N-6F	Butte Valley	8.42	204	14.49	35.13	41.54	$5,112	198.46	39.10	24.13	12.21	0	1	0.00
N-6H	Butte Valley	4.83	117	8.78	21.28	70.37	$2,462	58.56	99.64	0.00	21.98	0	9	1.00
N-6M	Butte Valley	11.19	271	13.88	33.64	147.41	$4,975	27.41	200.31	4.60	29.81	4	5	1.00
N-6U2	Butte Valley	3.50	85	4.20	10.18	54.57	$1,540	25.76	75.79	0.00	10.68	0	0	0.00
N-6W	Butte Valley	5.48	133	6.58	15.94	80.62	$2,412	37.89	115.83	0.00	16.38	0	4	0.00
N-6Y	Butte Valley	5.92	143	7.10	17.21	92.15	$2,605	52.49	128.02	0.00	18.05	0	7	0.00
N-7N(1)	Bartle	10.40	252	13.20	32.00	142.96	$5,683	182.40	195.09	0.00	29.39	0	3	0.00
		68.87	1667	93.56	226.80	846.49	$33,507	869.70	1147.51	38.28	187.59	4	N/A	4.00

NUMBER	MILES OF DEER, ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000'	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
N-4K	2.10	0.0	0	0	0.0	0	71.76	3.20	0.00	3.54	0.00	0.00	0.00	0	0.00
N-6A	2.40	0.0	0	0	0.0	1	0.00	0.00	0.00	2.94	0.00	0.00	0.00	0	0.00
N-6C	0.00	0.0	0	0	0.0	0	0.00	0.00	0.00	2.33	0.00	0.00	0.00	0	0.00
N-6E	5.40	0.0	0	0	0.0	2	2.42	0.00	0.00	1.83	0.00	0.04	0.86	4	0.62
N-6F	7.80	0.2	0	0	0.0	0	7.27	0.00	0.00	0.00	0.00	0.92	0.00	0	0.65
N-6H	5.10	0.9	0	0	0.0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
N-6M	6.00	0.0	0	4	0.4	9	168.97	0.00	0.00	0.00	0.00	0.00	0.26	1	0.24
N-6U2	0.00	0.0	0	0	0.0	0	71.27	0.70	0.00	2.20	4.00	0.00	0.00	0	0.00
N-6W	0.00	0.0	0	0	0.0	0	25.70	0.00	1.40	3.57	3.50	0.00	0.00	0	0.00
N-6Y	0.00	0.0	0	0	0.0	0	126.06	5.92	0.00	5.92	0.00	0.00	0.00	0	0.00
N-7N(1)	7.00	2.5	0	0	0.0	1	184.24	2.85	2.78	6.30	3.00	0.00	0.00	0	0.04
	35.80	3.6	0	4	0.0	13	657.69	12.67	4.18	28.63	10.50	0.96	1.12	5	1.55

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS STATE/COUNTY	WILD AND SCENIC RIVERS EXISTING/ELIGIBLE	NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
N-4K	-	-	-	$245.32	$61.82	0.00	1.40	$0.00	$0.00	0.33	4.00	0	2
N-6A	1	-	-	$245.32	$61.82	0.28	1.54	$0.00	$0.00	0.28	1.00	0	4
N-6C	-	-	-	$188.50	$47.50	0.00	1.30	$0.00	$0.00	0.23	2.00	0	0
N-6E	1	-	-	$646.57	$162.94	0.21	1.22	$0.56	$0.15	0.18	2.50	0	0
N-6F	-	-	-	$583.51	$147.04	0.00	1.72	$0.00	$0.00	0.01	2.00	0	1
N-6H	-	-	-	$334.72	$84.35	0.00	1.82	$0.00	$0.00	0.01	1.00	0	0
N-6M	-	-	-	$775.47	$195.42	0.80	1.24	$0.13	$0.00	0.03	3.30	0	1
N-6U2	-	-	-	$242.55	$61.12	0.00	1.20	$0.00	$0.00	0.26	2.50	0	0
N-6W	-	-	-	$379.76	$95.70	0.00	1.20	$0.00	$0.00	0.40	4.00	0	1
N-6Y	-	-	-	$410.26	$103.38	0.00	1.20	$0.00	$0.00	0.55	3.00	0	1
N-7N(1)	1	1	-	$720.72	$181.62	0.10	1.27	$0.00	$0.00	0.70	2.80	0	6
	3	1	0	$4,772.69	$1,202.72	0.19	1.36	$0.10	$0.02	2.98	2.55	0	16

(a) Variations in summation of totals due to rounding of column numbers
N/A Not applicable
* Total agricultural acreage includes rangeland in addition to cultivated agricultural land

TABLE 1.1.4-4

SUMMARY FOR ALTERNATIVE NORTH D [a]

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
NORTH 1	Newell	9.70	235	14.68	35.59	60.00	$3,545	160.66	30.46	18.20	12.51	0	7	0.00
N-10G	Newell	4.92	119	5.64	13.68	0.00	$2,046	31.53	0.00	11.63	0.00	0	9	0.50
N-10J	Newell	3.25	79	3.40	8.24	0.00	$1,354	17.81	0.00	7.36	0.00	0	10	0.00
N-10K	Newell	5.00	121	6.00	14.55	0.00	$1,941	40.92	0.00	15.25	0.00	0	10	0.00
N-10L	Newell	7.47	181	8.96	21.73	18.21	$2,934	137.91	8.80	22.12	0.67	0	10	0.00
N-10M1	Newell	3.10	75	3.72	9.02	45.22	$1,313	66.91	62.28	0.00	8.85	0	10	0.00
N-10M2(A1)	Newell	8.70	211	10.44	25.30	130.91	$2,948	53.41	108.39	0.00	21.82	0	9	0.00
N-10M2(A)	Newell	14.10	342	22.56	54.69	145.50	$5,972	67.66	96.83	18.41	32.01	0	9	0.00
NORTH 2B	Newell	9.10	221	11.00	26.67	136.40	$3,084	44.47	113.20	0.00	22.90	0	9	0.00
N-10 ALT5(D)	Newell	6.80	165	11.94	28.94	20.99	$7,136	229.58	351.41	0.00	18.37	0	9	0.00
N-10ALT5(B)	Newell	3.40	82	5.62	13.62	61.80	$1,152	44.53	50.22	0.00	14.09	0	9	0.00
N-10ALT5(C)	Bartle	4.10	99	5.90	14.30	75.50	$1,507	65.07	63.35	0.00	14.81	0	6	0.00
		79.64	1929	109.87	266.33	694.53	$34,932	960.44	884.94	92.97	146.03	0	N/A	0.50

NUMBER	MILES OF DEER, ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000'	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
NORTH 1	9.70	0.0	0	0	0.0	22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	[illegible].78
N-10G	3.90	2.1	0	1	0.2	18	40.00	0.00	0.00	0.00	0.00	0.00	0.53	0	[illegible].58
N-10J	2.70	0.0	2	4	1.2	24	21.33	0.00	0.00	0.00	0.00	0.00	0.00	0	0.39
N-10K	5.10	0.0	0	0	0.0	1	121.21	0.00	0.00	0.00	0.00	0.00	0.00	0	0.70
N-10L	6.90	0.0	0	0	0.0	0	174.30	0.00	0.00	0.00	0.00	0.00	0.00	0	0.88
N-10M1	3.00	0.0	0	0	0.0	0	75.15	0.00	0.00	0.00	0.00	0.00	0.00	0	0.03
N-10M2(A1)	0.00	0.0	0	0	0.0	0	29.04	0.60	0.00	7.35	7.50	0.00	0.00	0	0.00
N-10M2(A)	1.50	0.0	0	0	0.0	0	193.60	4.00	4.00	4.00	0.00	0.00	0.00	0	0.00
NORTH 2B	1.50	0.0	0	0	0.0	0	182.70	4.90	2.65	4.90	0.00	0.00	0.00	0	0.00
N-10 ALT5(D)	9.00	0.0	0	0	0.0	0	185.54	0.00	9.20	0.00	0.00	0.00	0.00	0	0.00
N-10ALT5(B)	2.50	0.5	0	0	0.0	0	77.40	0.00	3.20	0.00	0.00	0.00	0.00	0	0.00
N-10ALT5(C)	0.00	0.0	0	0	0.0	0	9.68	0.16	0.24	1.60	3.60	0.00	0.00	0	0.00
	45.80	2.6	2	5	0.1	65	1109.96	9.66	19.29	17.85	11.10	0.00	0.53	0	3.36

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS STATE/COUNTY	WILD AND SCENIC RIVERS EXISTING/ELIGIBLE	NATIONAL TRAILS	TRANSMISSION LINE PATROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
NORTH 1	0	0	0	$672.20	$169.40	2.27	1.51	$0.00	$0.00	0.13	1.50	0	7
N-10G	-	-	-	$340.96	$85.92	3.66	1.15	$0.87	$0.24	0.00	2.50	0	0
N-10J	1	-	-	$225.23	$56.76	7.38	1.05	$0.00	$0.00	0.00	5.00	0	0
N-10K	-	-	-	$346.50	$87.32	0.20	1.20	$0.00	$0.00	0.00	4.00	1	6
N-10L	-	-	-	$517.67	$130.45	0.00	1.20	$0.00	$0.00	0.01	3.50	0	4
N-10M1	1	-	-	$214.83	$54.14	0.00	1.20	$0.00	$0.00	0.12	3.00	0	0
N-10M2(A1)	0	0	0	$602.90	$151.90	0.00	1.20	$0.00	$0.00	0.66	2.00	0	2
N-10M2(A)	0	0	0	$977.10	$246.20	0.00	1.60	$0.00	$0.00	0.53	2.50	0	3
NORTH 2B	0	0	0	$630.60	$158.90	0.00	1.21	$0.00	$0.00	0.56	3.80	0	1
N-10 ALT5(D)	0	0	-	$755.40	$190.30	0.00	1.76	$0.00	$0.00	0.29	3.00	0	0
N-10ALT5(B)	0	0	0	$235.60	$59.40	0.00	1.65	$0.00	$0.00	0.12	3.00	0	2
N-10ALT5(C)	1	0	0	$284.10	$71.60	0.00	1.44	$0.00	$0.00	0.24	3.00	0	1
	3	0	0	$5,803.08	$1,462.29	0.82	1.38	$0.05	$0.01	2.66	3.00	1	26

[a] Variations in summation of totals due to rounding of column numbers
N/A Not applicable
* Total agricultural acreage includes rangeland in addition to cultivated agricultural land

TABLE 1.1.4-5

SUMMARY FOR ALTERNATIVE GRIZZLY PEAK TO REDDING (a)

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS. ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
N-7ALT1(A)	Bartle	2.50	61	3.59	8.70	45.50	$919	123.16	38.98	0.00	9.01	0	6	0.00
N-7ALT1(B)	Bartle	0.69	17	1.81	4.39	12.54	$254	70.35	9.25	0.00	4.48	0	6	0.00
NORTH 3J	Bartle	8.70	211	18.48	44.80	147.27	$3,197	1365.58	113.62	3.16	42.70	0	6	0.00
N-8A(3)	Pit River	4.85	118	9.96	24.13	61.17	$2,484	559.00	111.74	0.00	24.74	0	6	2.00
N-8C	Pit River	2.09	51	2.72	6.59	32.20	$998	46.27	44.87	0.00	6.88	0	0	0.00
NORTH 4	Pit River	4.60	112	8.08	19.59	80.00	$2,962	166.27	62.76	0.00	19.29	0	4	1.00
N-8 ALT2(A)	Pit River	4.50	109	10.99	26.63	51.25	$2,898	787.89	84.73	0.00	26.18	0	1	0.00
N-9A	Millville	1.75	42	2.63	6.37	26.53	$946	63.87	37.13	0.00	6.62	0	2	0.00
N-9C	Millville	2.68	65	5.35	12.97	38.48	$1,614	183.91	54.73	0.00	13.36	0	2	0.00
N-9D	Millville	6.62	160	2.18	5.28	89.93	$3,313	57.68	127.29	0.11	5.81	0	5	0.00
N-9G	Millville	1.96	47	2.50	6.07	30.23	$896	35.52	42.11	0.00	6.35	0	4	0.00
N-9J	Millville	14.61	309	3.50	8.48	61.34	$6,788	37.21	159.47	4.40	5.64	1	7	0.00
N-9N	Millville	1.51	32	0.30	0.73	22.22	$602	2.83	31.37	0.00	0.94	0	7	0.00
N-9O	Millville	4.43	94	0.00	0.00	22.42	$1,735	4.05	31.39	0.00	0.20	3	7	2.00
N-9Q	Millville	0.57	14	0.91	2.21	8.59	$331	8.29	12.05	0.00	2.29	0	6	0.00
N-13A	Cottonwood	6.87	42	1.69	4.11	104.49	$2,735	0.00	22.26	0.00	3.14	0	3	0.00
		68.93	1464	74.70	181.05	834.18	$32,672	3311.87	983.76	7.67	177.62	4	N/A	5.00

NUMBER	MILES OF DEER, ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000'	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
N-7ALT1(A)	0.00	0.0	0	0	0.0	0	0.00	0.00	0.00	1.00	2.50	0.00	0.00	0	0.00
N-7ALT1(B)	0.00	0.0	0	0	0.0	0	0.00	0.00	0.00	0.48	0.69	0.00	0.00	0	0.00
NORTH 3J	0.00	3.0	0	0	0.0	0	135.76	1.45	3.65	3.15	1.50	0.00	0.00	0	0.00
N-8A(3)	0.00	0.0	0	0	0.0	5	75.24	1.34	0.06	4.69	2.00	0.00	0.00	0	0.00
N-8C	0.00	0.0	0	0	0.0	0	0.00	2.09	0.00	2.09	2.90	0.00	0.00	0	0.00
NORTH 4	2.00	0.5	0	2	0.4	19	14.50	0.00	0.00	4.60	3.50	0.00	0.00	0	0.00
N-8 ALT2(A)	0.00	0.0	0	0	0.0	0	36.40	0.00	3.90	0.00	3.50	0.00	0.00	0	0.00
N-9A	0.00	0.0	0	1	0.6	21	39.27	0.00	0.00	1.75	1.80	0.00	0.00	0	0.00
N-9C	0.00	0.0	1	1	0.4	32	0.00	0.00	0.00	1.79	0.40	0.00	0.00	0	0.02
N-9D	0.00	0.0	2	12	1.8	98	0.00	0.00	0.00	0.00	0.00	1.08	0.00	0	0.12
N-9G	0.00	0.0	0	2	1.0	29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
N-9J	0.00	0.0	2	7	0.5	62	0.00	0.00	0.00	0.00	0.00	3.92	0.00	0	0.86
N-9N	0.00	0.0	0	0	0.0	13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
N-9O	0.00	0.0	2	20	4.5	348	0.00	0.00	0.00	0.00	0.00	0.00	2.62	12	0.58
N-9Q	0.00	0.0	0	1	1.8	75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
N-13A	0.00	0.0	0	7	1.0	375	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
	2.00	3.5	7	53	0.8	1077	301.17	4.88	7.61	19.55	18.79	5.00	2.62	12	1.58

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS STATE/COUNTY	WILD AND SCENIC RIVERS EXISTING/ELIGIBLE	NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
N-7ALT1(A)	0	0	0	$173.30	$43.70	0.00	1.44	$0.00	$0.00	0.15	4.00	0	0
N-7ALT1(B)	0	0	0	$47.80	$12.00	0.00	2.62	$0.00	$0.00	0.05	4.00	0	0
NORTH 3J	0	0	1	$602.90	$151.90	0.00	2.12	$0.00	$0.00	0.49	4.00	0	13
N-8A(3)	.	.	.	$336.10	$84.70	1.03	2.05	$0.00	$0.00	0.44	2.00	0	29
N-8C	.	.	.	$144.84	$36.50	0.00	1.30	$0.00	$0.00	0.20	2.50	0	6
NORTH 4	0	0	0	$318.80	$80.30	4.13	1.76	$0.00	$0.00	0.43	3.50	1	22
N-8 ALT2(A)	.	.	.	$311.90	$78.60	0.00	0.00	$0.00	$0.00	0.27	1.00	0	17
N-9A	.	.	.	$121.28	$30.56	12.00	1.50	$0.00	$0.00	0.16	1.50	0	17
N-9C	1	.	.	$185.72	$46.80	11.94	2.00	$0.00	$0.00	0.20	2.00	0	15
N-9D	.	.	.	$458.80	$115.60	14.80	0.33	$0.00	$0.00	0.16	1.50	0	2
N-9G	.	.	.	$135.83	$34.23	14.80	1.28	$0.00	$0.00	0.06	3.00	0	1
N-9J	1	.	.	$1,012.47	$255.14	4.24	0.24	$0.00	$0.00	0.02	3.00	0	8
N-9N	.	.	.	$104.64	$26.37	8.61	0.20	$0.00	$0.00	0.00	3.00	0	1
N-9O	.	1	.	$307.00	$77.36	78.56	0.00	$0.97	$0.40	0.00	3.50	0	1
N-9Q	.	.	.	$39.50	$9.95	131.58	1.60	$0.00	$0.00	0.00	1.00	0	0
N-13A	1	.	.	$476.09	$119.97	54.59	0.25	$0.00	$0.00	0.00	2.00	0	0
	3	1	1	$4,776.97	$1,203.70	15.62	1.08	$0.06	$0.03	2.63	2.60	1	132

(a) Variations in summation of totals due to rounding of column numbers
N/A Not applicable
* Total agricultural acreage includes rangeland in addition to cultivated agricultural land

TABLE 1.1.4-6

SUMMARY FOR ALTERNATIVE SOUTH A (a)

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
S-8B	Delta	1.12	0	0.00	0.00	0.00	$408	0.00	0.00	0.00	0.00	1	11	1.20
S-8C	Delta	4.53	110	0.00	0.00	0.00	$3,945	0.00	0.00	0.00	0.00	19	11	4.20
S-8E1	Delta	6.51	157	0.00	0.00	0.00	$4,118	0.00	0.00	0.00	0.00	28	24	6.50
S-8 ALT2	Delta	12.75	308	0.00	0.00	0.00	$8,065	0.00	0.00	0.00	0.00	56	19	5.20
S-9D	Tesla	1.29	27	0.00	0.00	0.00	$765	0.00	0.00	0.01	0.00	0	4	0.00
S-9F	Tesla	4.92	119	0.00	0.00	0.00	$2,623	0.00	0.00	0.60	0.00	0	12	0.00
S-9H	Tesla	0.26	6	0.00	0.00	0.00	$225	0.00	0.00	0.04	0.00	0	7	0.00
		31.38	728	0.00	0.00	0.00	$20,149	0.00	0.00	0.64	0.00	104	N/A	17.10

NUMBER	MILES OF DEER, ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000'	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
S-8B	0.00	0.0	0	1	0.9	31	0.00	0.00	0.00	0.00	0.00	0.56	0.10	0	0.08
S-8C	0.00	0.0	0	0	0.0	10	0.00	0.00	0.00	0.00	0.00	3.19	3.82	17	0.53
S-8E1	0.00	0.0	1	50	7.6	286 (b)	0.00	0.00	0.00	0.00	0.00	0.11	4.20	18	0.86
S-8ALT2	0.00	0.0	3	20	2.8	171 (b)	0.00	0.00	0.00	0.00	0.00	1.10	10.25	45	1.72
S-9D	0.00	0.0	0	0	0.0	13	0.00	0.00	0.00	0.00	0.00	0.29	1.00	4	0.15
S-9F	0.00	0.0	3	7	1.4	79	0.00	0.00	0.00	0.00	0.00	1.60	0.09	0	0.63
S-9H	0.00	0.0	0	1	3.8	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.04
	0.00	0.0	7	79	2.5	591	0.00	0.00	0.00	0.00	0.00	6.85	19.46	84	4.01

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS STATE/COUNTY	WILD AND SCENIC RIVERS EXISTING/ELIGIBLE	NATIONAL TRAILS	TRANSMISSION LINE PATROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
S-8B	1	-	-	$41.33	$9.26	27.68	0.00	$0.48	$0.10	0.00	5.00	0	1
S-8C	2	-	-	$155.35	$34.80	2.38	0.00	$2.50	$0.74	0.00	4.50	0	1
S-8E1	-	-	-	$240.22	$53.81	33.92	0.00	$2.10	$0.50	0.00	4.70	0	1
S-8 ALT2	-	-	-	$470.48	$105.39	13.63	0.00	$2.50	$0.70	0.00	4.10	0	1
S-9D	-	-	-	$47.60	$10.66	10.08	0.00	$2.40	$0.68	0.00	3.00	0	0
S-9F	3	-	1	$181.55	$40.67	16.06	0.00	$0.06	$0.00	0.00	2.30	0	2
S-9H	-	-	-	$9.59	$2.15	3.85	0.00	$0.00	$0.00	0.00	0.00	0	1
	6	0	1	$1,146.11	$256.73	18.83	0.00	$1.94	$0.53	0.00	3.37	0	7

(a) Variations in summation of totals due to rounding of column numbers
(b) Plus Discovery Bay
N/A Not applicable
* Total agricultural acreage includes rangeland in addition to cultivated agricultural land

TABLE 1.1.4-7

SUMMARY FOR ALTERNATIVE SOUTH B [a]

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
S-8B	Delta	1.12	0	0.00	0.00	0.00	$408	0.00	0.00	0.00	0.00	1	11	1.20
S-8C	Delta	4.53	110	0.00	0.00	0.00	$3,945	0.00	0.00	0.00	0.00	19	11	4.20
S-8E1(A)	Delta	3.51	84	0.00	0.00	0.00	$2,268	0.00	0.00	0.00	0.00	15	24	3.50
SOUTH 1	Delta	9.50	230	0.00	0.00	0.00	$6,737	0.00	0.00	0.00	0.00	36	24	6.75
S-8K	Delta	5.65	137	0.00	0.00	0.00	$3,552	0.00	0.00	0.00	0.00	27	11	5.65
S-8 ALT3	Delta	2.95	72	0.00	0.00	0.00	$1,855	0.00	0.00	0.00	0.00	14	11	2.95
S-9D	Tesla	1.29	27	0.00	0.00	0.00	$765	0.00	0.00	0.01	0.00	0	4	0.00
S-9G	Tesla	1.60	39	0.00	0.00	0.00	$2,648	0.00	0.00	0.15	0.00	0	12	0.00
SOUTH 2	Tesla	4.15	101	0.00	0.00	0.00	$2,720	0.00	0.00	0.48	0.00	0	12	0.00
		34.30	800	0.00	0.00	0.00	$24,898	0.00	0.00	0.64	0.00	112	N/A	24.25

NUMBER	MILES OF DEER,ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000 FEET	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
S-8B	0.00	0.0	0	1	0.9	31	0.00	0.00	0.00	0.00	0.00	0.56	0.10	0	0.08
S-8C	0.00	0.0	0	0	0.0	10	0.00	0.00	0.00	0.00	0.00	3.19	3.82	17	0.53
S-8E1(A)	0.00	0.0	0	44	12.5	47	0.00	0.00	0.00	0.00	0.00	0.11	1.60	6	0.50
SOUTH 1	0.00	0.0	0	11	1.2	224 (b)	0.00	0.00	0.00	0.00	0.00	2.55	8.20	36	1.01
S-8K	0.00	0.0	1	12	2.0	101	0.00	0.00	0.00	0.00	0.00	3.90	5.25	27	5.25
S-8 ALT3	0.00	0.0	0	3	1.0	14	0.00	0.00	0.00	0.00	0.00	2.95	2.95	14	2.95
S-9D	0.00	0.0	0	0	0.0	13	0.00	0.00	0.00	0.00	0.00	0.29	1.00	4	0.15
S-9G	0.00	0.0	0	2	1.3	11	0.00	0.00	0.00	0.00	0.00	0.90	0.25	1	0.68
SOUTH 2	0.00	0.0	0	4	1.0	86	0.00	0.00	0.00	0.00	0.00	0.45	0.00	1	0.58
	0.00	0.0	1	77	2.2	537	0.00	0.00	0.00	0.00	0.00	14.90	23.17	106	11.73

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS (STATE/COUNTY)	WILD AND SCENIC RIVERS (EXISTING/ELIGIBLE)	NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
S-8B	1	.	.	$41.33	$9.26	27.68	0.00	$0.48	$0.10	0.00	5.00	0	1
S-8C	2	.	.	$155.35	$34.80	2.38	0.00	$2.50	$0.74	0.00	4.50	0	1
S-8E1(A)	.	.	.	$32.30	$1.40	13.39	0.00	$2.10	$0.50	0.00	4.70	0	1
SOUTH 1	0	0	0	$648.00	$163.30	23.58	0.00	$2.49	$1.20	0.00	3.80	0	1
S-8K	0	0	0	$208.49	$46.70	18.00	0.00	$2.87	$0.81	0.00	4.00	0	0
S-8 ALT3	0	0	0	$108.86	$24.38	5.00	0.00	$3.09	$0.87	0.00	4.00	0	0
S-9D	.	.	.	$47.60	$10.66	10.08	0.00	$2.40	$0.68	0.00	3.00	0	0
S-9G	1	0	0	$341.00	$85.90	6.88	0.00	$1.35	$0.49	0.00	1.50	0	1
SOUTH 2	2	0	0	$343.00	$86.40	20.72	0.00	$0.16	$0.08	0.00	1.30	0	1
	6	0	0	$1,925.93	$462.80	15.66	0.00	$1.69	$0.62	0.00	3.50	0	6

(a) Variations in summation of totals due to rounding of column numbers.
(b) Plus Bethel Island.
N/A Not applicable
* Total agricultural acreage includes rangeland in addition to cultivated agricultural land

TABLE 1.1.4-8

SUMMARY FOR ALTERNATIVE SOUTH C (a)

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
S-8B	Delta	1.12	0	0.00	0.00	0.00	$408	0.00	0.00	0.00	0.00	1	11	1.20
S-8C	Delta	4.53	110	0.00	0.00	0.00	$3,945	0.00	0.00	0.00	0.00	19	11	4.20
S-8D	Delta	11.93	289	0.00	0.00	0.00	$10,055	0.00	0.00	0.00	0.00	57	11	5.40
S-8I	Delta	2.35	57	0.00	0.00	0.00	$1,598	0.00	0.00	0.00	0.00	8	11	2.40
S-8J	Delta	8.20	198	0.00	0.00	0.00	$6,414	0.00	0.00	0.00	0.00	23	11	8.20
S-9D	Tesla	1.29	27	0.00	0.00	0.00	$765	0.00	0.00	0.01	0.00	0	4	0.00
S-9F	Tesla	4.92	119	0.00	0.00	0.00	$2,623	0.00	0.00	0.60	0.00	0	12	0.00
S-9H	Tesla	0.26	6	0.00	0.00	0.00	$225	0.00	0.00	0.04	0.00	0	7	0.00
		34.60	806	0.00	0.00	0.00	$26,031	0.00	0.00	0.64	0.00	108	N/A	21.40

NUMBER	MILES OF DEER,ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000 FEET	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
S-8B	0.00	0.0	0	1	0.9	31	0.00	0.00	0.00	0.00	0.00	0.56	0.10	0	0.08
S-8C	0.00	0.0	0	0	0.0	10	0.00	0.00	0.00	0.00	0.00	3.19	3.82	17	0.53
S-8D	0.00	0.0	8	65	5.4	226 [b]	0.00	0.00	0.00	0.00	0.00	3.36	9.66	43	1.35
S-8I	0.00	0.0	0	0	0.0	7	0.00	0.00	0.00	0.00	0.00	2.35	2.13	9	0.30
S-8J	0.00	0.0	0	11	1.3	91	0.00	0.00	0.00	0.00	0.00	5.98	7.30	32	1.02
S-9D	0.00	0.0	0	0	0.0	13	0.00	0.00	0.00	0.00	0.00	0.29	1.00	4	0.15
S-9F	0.00	0.0	3	7	1.4	79	0.00	0.00	0.00	0.00	0.00	1.60	0.09	0	0.63
S-9H	0.00	0.0	0	1	3.8	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.04
	0.00	0.0	11	85	2.5	458	0.00	0.00	0.00	0.00	0.00	17.33	24.10	105	4.10

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS STATE/COUNTY	WILD AND SCENIC RIVERS EXISTING/ELIGIBLE	NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
S-8B	1	-	-	$41.33	$9.26	27.68	0.00	$0.48	$0.10	0.00	5.00	0	1
S-8C	2	-	-	$155.35	$34.80	2.38	0.00	$2.50	$0.74	0.00	4.50	0	1
S-8D	-	-	-	$440.22	$98.61	18.94	0.00	$2.28	$0.63	0.00	3.70	0	1
S-8I	-	-	-	$86.72	$19.42	2.98	0.00	$2.80	$0.79	0.00	3.50	0	1
S-8J	-	-	-	$243.54	$54.55	11.10	0.00	$0.41	$0.12	0.00	4.30	0	0
S-9D	-	-	-	$47.60	$10.66	10.08	0.00	$2.40	$0.68	0.00	3.00	0	0
S-9F	3	-	1	$181.55	$40.67	16.06	0.00	$0.06	$0.00	0.00	2.30	0	2
S-9H	-	-	-	$9.59	$2.15	3.85	0.00	$0.00	$0.00	0.00	4.00	0	1
	6	0	1	$1,205.89	$270.12	13.24	0.00	$1.52	$0.42	0.00	3.82	0	7

(a) Variations in summation of totals due to rounding of column numbers
(b) Plus Bethel Island
N/A Not applicable
* Total agricultural acreage includes rangeland in addition to cultivated agricultural land

TABLE 1.1.4-9

PROPOSED PROJECTS IN PRELIMINARY PLANNING STAGES 1/
COTP PREFERRED ALTERNATIVE ROUTE

ROUTE	COUNTY	DESCRIPTION OF PROPOSED DEVELOPMENT
North 1	Klamath	Residential development in Loveness Road area
North 1	Klamath	Bryant Mountain Pumped Storage Project - pumped storage hydroelectric project.
East of N-10 routes	Modoc	U. S. Air Force (USAF) Communications facility planned for a site four miles east of existing interties
N-10 Alt. 5	Modoc	Wendell-Amedee Known Geothermal Resource Area (KGRA)
N-10 Alt. 5	Siskiyou	Glass Mountain KGRA
West of S-1A	Solano	Redevelopment area for future water-dependent industrial uses along Sacramento River
S-8E1(A)/South 1	Contra Costa	Dal Porto Project-development of a waterfront residential community in the Dutch Slough Gas Fields area
South 1	Contra Costa	Mass Project - residential development on Veale Tract.
S-8K	Contra Costa	Expansion of Department of Water Resources Clifton Court Forebay (expansion is one of several options under consideration)
S-9G	Alameda	Residential project in Mountain House area.

1/ Proposals involving a general plan amendment; or a tentative subdivision of parcel map that have not been approved by the responsible government entity.

TABLE 1.1.4-10

APPROVED PROJECTS

S-8 H	Contra Costa	Discovery Bay residential uses
S-8El	Contra Costa	Sand Mound Woods residential uses
S-8El	Contra Costa	Byron Highway-Bixler residential uses
N-9C, N-9D N-9G, N-9"O"	Shasta	Rural residential subdivisions crossed by routes. (Note: the lengths of crossing in miles are indicated in Table 3.6-20 of Volume 2A, and are presented as "Rural Transitional (RT) area on Figure 4-2, Volume 4A).

TABLE 1.1.4-11

PROPOSED TRANSMISSION LINE PROJECTS
1982-1986

Year:	1986
Lead Agency:	California Public Utilities Commission (CPUC)
Community:	Monterey Park
County:	Los Angeles
Description:	Gould to Mesa 220 kV transmission line. Removal of an idle 220 kV transmission line on an 18 mile right-of-way between Gould and Mesa Substations, and reconstruction of the 220 kV AC transmission line double circuit towers with only one circuit installed.
Year:	1986
Lead Agency:	U. S. D.O.E., Bonneville Power Administration
Community:	Sylmar
County:	Los Angeles
Description:	DC Terminal Expansion. Bonneville Power Administration and Los Angeles Department of Water and Power propose to increase the capacity of the DC intertie between converter stations near The Dalles, Oregon, and Sylmar, California.
Year:	1985
Lead Agency:	Sacramento Municipal Utility District (SMUD)
Community:	Folsom
County:	Sacramento
Description:	New bulk substation. Involves removal of existing 115 kV AC transmission line and construction of a 230 kV AC transmission line in the existing right-of-way.
Year:	1985
Lead Agency:	Sacramento Municipal Utility District (SMUD)
Community:	Reno-Roseville
County:	Sacramento, Placer, Nevada
Description:	SMUD-Sierra Pacific Intertie Project. Project involves construction of a 345 kV AC single circuit transmission line in the I-80 corridor between Roseville and Reno to provide 400 MW of transfer capability between the two participating utilities.
Year:	1985
Lead Agency:	Western Area Power Administration
Community:	Livermore, Tracy
County:	Alameda
Description:	Lawrence Livermore National Laboratory (LLNL) Direct Interconnection. Environmental Assessment prepared for a proposed 12-mile 230 kV AC transmission line between LLNL and Western's Tracy Substation.
Year:	1985
Lead Agency:	U.S. D.O.E., Bonneville Power Administration
Community:	Various
County:	Various
Description:	BPA is preparing an Intertie Development and Use Environmental Impact Statement (EIS). BPA has also prepared a Draft EIS on its long-term intertie access policy.
Year:	1985
Lead Agency:	Bureau of Land Management (BLM)
Community:	Benton-Bishop
County:	Inyo-Mono
Description:	Application by Oxbow Geothermal Company to BLM for a right-of-way to construct and operate a 230 kV AC electrical transmission line from Dixie Valley, Nevada, south to Bishop, California. The approved action included two substations approximately 1/2 acre each in size to be located at the northern and southern ends of the line.

Year:	1985
Lead Agency:	City of Redding
Community:	Redding
County:	Shasta
Description:	Redding Direct Interconnection Project. Construction of an interconnection with Western through a tap structure at one of the existing Western 230 kV transmission lines. Construction of a 230 kV/115 kV AC substation to transform the source transmission voltage to the 115 kV transmission voltage used by the City of Redding.
Year:	1987
Lead Agency:	Imperial Irrigation District (IID)
Community:	El Centro, Imperial
County:	Imperial
Description:	IID proposes to build a 230 kV AC transmission line from IDD's Imperial Substation to the Coachella Valley Substation.
Year:	1984
Lead Agency:	California Energy Commission
Community:	Various
County:	Sacramento-Lake
Description:	Geothermal Public Power Line Project. Transmission line system from the Geysers Known Geothermal Resource Area (KGRA) to one of two terminal points in the Sacramento Valley.
Year:	1984
Lead Agency:	Imperial Irrigation District (IID)
Community:	Thousand Palms Coachella
County:	Imperial County
Description:	IID proposes to build a 230 kV AC transmission line from the new Southern California Edison Mirage Substation to proposed IID Coachella Valley Substation, approximately 18 miles.
Year:	1987
Lead Agency:	Sacramento Municipal Utility District (SMUD)
Community:	Folsom
County:	Sacramento
Description:	City of Folsom annexed lands east of boundaries. Will contribute to additional load on SMUD facilities. SMUD is constructing a new bulk substation and associated two mile transmission line. Project to be on line mid-1988.
Year:	1984
Lead Agency:	Los Angeles Department of Water and Power
Community:	Victorville/Adelanto
County:	San Bernardino
Description:	Project involves the construction of a 500 kV DC transmission line including expanded station facilities. The line will be located between Mead/ McCullough, Nevada, and Victorville Adelanto, California. DC converter stations will be constructed at each terminal.
Year:	1983
Lead Agency:	California Public Utilities Commission (CPUC) and the U. S. Forest Service (USFS)
Community:	Orange and Riverside Counties
County:	Orange and Riverside Counties
Description:	Devers-Valley-Serrano Transmission Line. Project involves construction of a 500 kV AC transmission line (82 miles) from Devers Substation near Desert Hot Springs, Riverside County, to the Serrano Substation near Villa Park, in Orange County; construction of a 220 kV AC transmission line (4 miles) inside Villa Park; construction of a telecommunications system for the transmission line; substation work at Devers and Serrano substations and New Valley Substation near Perris.

Year:	1983
Lead Agency:	California Public Utilities Commission (CPUC), Sierra National Forest
Community:	Fresno County
County:	Fresno County
Description:	Balsam Meadows Hydroelectric Project. Would be located between Huntington Lake and Shaver Lake, approximately 45 miles northeast of Fresno. The project consists of a 200 MW underground hydroelectric powerhouse and related facilities including 4.5 miles of 220 kV AC overhead transmission lines.
Year:	1982
Lead Agency:	California Public Utilities Commission (CPUC)
Community:	Palm Springs, Anaheim areas
County:	Orange, Riverside
Description:	Southern California Edison proposes to construct two 500 kV lines in a system from Devers Substation, located approximately 10 miles northwest of Palm Springs, to Villa Park Substation near Anaheim. Also proposed are a 220 kV transmission line between Serrano and Villa Park Substations, and telecommunication facilities.
Year:	1983
Lead Agency:	California Public Utilities Commission (CPUC)
Community:	El Centro
County:	Imperial
Description:	San Diego Gas and Electric Company (SDG&E) constructed a 230 kV AC interconnection with the Mexican Government's system. SDG&E sited a 120-foot right-of-way along the preferred route. The route begins at Imperial Valley Substation and terminates at the U. S./Mexican border. Mexico constructed the remaining portion of the line into its country.
Year:	1985
Lead Agency:	Siskiyou County
Community:	Mt. Shasta
County:	Siskiyou
Description:	The project involves development of a right-of-way and construction of a 69 kV AC powerline from Lake Siskiyou to a grid of Pacific Power and Light in Siskiyou County.
Year:	1985
Lead Agency:	City of Redding
Community:	Redding
County:	Shasta
Description:	Design and construction of a 12-14 mile 115 kV AC transmission line and identification of 5 sites for substations.
Year:	1983
Lead Agency:	City of Redding
Community:	Redding
County:	Shasta
Description:	Construction of a 17-mile 115 kV AC power transmission line from the existing Moore Road Substation to the existing Canby Substation. Transmission line is required to complete the 115 kV AC transmission loop to the city. The line will be built along Churn Creek Road, between Industrial and Cypress Avenue, east along Cypress to Airport Road, south to the airport, and west to Highway 273.
Year:	1982
Lead Agency:	Shasta County Planning Department
Community:	Millville
County:	Shasta
Description:	Project proposed to use existing water from PG&E's South Cow Creek Powerhouse Tail Race, on Poulton Ranch, approximately 21 miles east of Redding. Project works include a diversion structure, penstock, powerhouse, a turbine and generator, and a transmission line.

TABLE 1.1.4-12

EXISTING TRANSMISSION LINES WITHIN
THREE MILES OF PROJECT PREFERRED ALTERNATIVE

	UTILITY	RATING (kV)	NAME
North:			
	BPA	230	Malin - Warner
	BPA	500	Grizzly-Malin No. 1
	PGE	500	Grizzly-Malin No. 2
	PP&L	500	Summer Lake-Malin
	Western	230	Shasta-Cottonwood, Cottonwood-Tracy
	Western	230	Cottonwood-Elverta No. 3
	Western	230	Keswick-Cottonwood No. 2 Cottonwood-Elverta No. 2
	Western	230	Shasta-Tracy, Cottonwood-Tracy
	Western	230	Keswick-Elverta, Cottonwood-Elverta No. 2
	Western	500	Malin-Round Mountain No. 1
	PGandE	500	Malin-Round Mountain No. 2
	PGandE	230	Pit No. 7-Pit No. 7 Jct.
	PGandE	230	Pit No. 4-Round Mountain
	PGandE	230	Pit No. 5-Round Mountain No. 2
	PGandE	230	Pit No. 5-Round Mountain No. 1
	PGandE	230	Pit No. 6-Pit No. 6 Jct.
	PGandE	230	Pit-Vaca Dixon No. 1 Loop to Pit 3
	PGandE	230	Pit-Vaca Dixon No. 2
	PGandE	230	Round Mountain-Cottonwood No. 2
	PGandE	500	Round Mountain-Table Mountain No. 1
	PGandE	500	Round Mountain-Table Mountain No. 2
	PGandE	230	Cottonwood-Vaca Dixon No.'s 1 and 2
Central:			
	Western	230	Shasta-Tracy, Cottonwood-Tracy
	Western	230	Keswick-Elverta, Cottonwood-Elverta No. 2
	PGandE	230	Halsey Jct.-Neward No. 1
	PGandE	230	Vaca Dixon-Contra Costa Sub
	PGandE	230	Tesla-Lawrence Lab
	PGandE	230	Tesla-Newark No.'s 1 and 2
	PGandE	230	Cottonwood-Vaca Dixon No.'s 1 and 2
	PGandE	230	Tesla-Tracy Pumping Plant No.'s 1 and 2
	PGandE	230	Rio Oso-Tesla, Rancho Seco-Stagg-Tesla
	PGandE	230	Pit-Vaca Dixon No.'s 1 and 2
	PGandE	500	Table Mountain-Tesla
	PGandE	500	Tesla-Los Banos No. 2
	PGandE	500	Tesla-Metcalf
	PGandE	500	Table Mountain-Vaca Dixon
	PGandE	500	Vaca Dixon-Tesla
	PGandE	500	Tesla-Los Banos No. 1
	PGandE	230	Bellota-Tesla No.'s 1 and 2
South:			
	Western	230	Shasta-Tracy, Cottonwood-Tracy
	Western	230	Hurley-Tracy No. 1
	Western	230	Hurley-Tracy No. 2
	PGandE	500	Table Mountain-Tesla
	PGandE	500	Vaca Dixon-Tesla

TABLE 1.1.4-13

CONSTRUCTION EMISSION ESTIMATES

CONSTRUCTION PHASE /EQUIPMENT TYPE	QUANTITY	EMISSION FACTORS (LB/HR) *					EMISSIONS (LB/DAY)				
		NOX	HC	SO2	TSP	CO	NOX	HC	SO2	TSP	CO
SURVEYING											
LIGHT TRUCK	2	0.11	0.24	0.05	0.01	1.69	1.76	3.84	0.8	0.16	27.04
AIRPLANE	1	0.22	0.94	0.01	0	44	1.76	7.52	0.08	0	352
CLEARING											
LIGHT TRUCK	3	0.11	0.24	0.05	0.01	1.69	2.64	5.76	1.2	0.24	40.56
BULLDOZER	2	5.05	0.23	0.35	0.17	0.74	80.8	3.68	5.6	2.72	11.84
HEAVY DUTY TRUCK	3	7.63	0.44	0.45	0.26	1.34	183.12	10.56	10.8	6.24	32.16
TRACTOR	3	0.99	0.15	0.09	0.14	2.17	23.76	3.6	2.16	3.36	52.08
ACCESS ROAD CONST.											
LIGHT TRUCK	3	0.11	0.24	0.05	0.01	1.69	2.64	5.76	1.2	0.24	40.56
BULLDOZER	2	5.05	0.23	0.35	0.17	0.74	80.8	3.68	5.6	2.72	11.84
HAUL TRUCK	4	7.63	0.44	0.45	0.26	1.34	244.16	14.08	14.4	8.32	42.88
GRADER	1	1.05	0.05	0.09	0.06	0.22	8.4	0.4	0.72	0.48	1.76
BACK HOE	1	2.4	0.19	0.18	0.17	0.55	19.2	1.52	1.44	1.36	4.4
FOUNDATION INSTALLATION											
LIGHT TRUCK	2	0.11	0.24	0.05	0.01	1.69	1.76	3.84	0.8	0.16	27.04
DRILL RIG	1	2.27	0.16	0.14	0.14	0.41	18.16	1.28	1.12	1.12	3.28
BACK HOE	1	2.4	0.19	0.18	0.17	0.55	19.2	1.52	1.44	1.36	4.4
HAUL TRUCK	2	7.63	0.44	0.45	0.26	1.34	122.08	7.04	7.2	4.16	21.44
READY MIX TRUCK	4	7.63	0.44	0.45	0.26	1.34	244.16	14.08	14.4	8.32	42.88
GENERATOR	2	2.27	0.16	0.14	0.14	0.41	36.32	2.56	2.24	2.24	6.56
TOWER ERECTION											
LIGHT TRUCK	4	0.11	0.24	0.05	0.01	1.69	3.52	7.68	1.6	0.32	54.08
SEMI TRAILER	2	7.63	0.44	0.45	0.26	1.34	122.08	7.04	7.2	4.16	21.44
CRANE	2	2.27	0.16	0.14	0.14	0.41	36.32	2.56	2.24	2.24	6.56
GENERATOR	2	2.27	0.16	0.14	0.14	0.41	36.32	2.56	2.24	2.24	6.56
COMPRESSOR	2	2.27	0.16	0.14	0.14	0.41	36.32	2.56	2.24	2.24	6.56
HELICOPTER	2	5	0.2	0.68	0	2	80	3.2	10.88	0	32
STRINGING											
LIGHT TRUCK	3	0.11	0.24	0.05	0.01	1.69	2.64	5.76	1.2	0.24	40.56
TRACTOR	1	0.99	0.15	0.09	0.14	2.17	7.92	1.2	0.72	1.12	17.36
HEAVY DUTY TRUCK	4	7.63	0.44	0.45	0.26	1.34	244.16	14.08	14.4	8.32	42.88
HELICOPTER	1	5	0.2	0.68	0	2	40	1.6	5.44	0	16
BACK HOE	1	2.4	0.19	0.18	0.17	0.55	19.2	1.52	1.44	1.36	4.4
GENERATOR	2	2.27	0.16	0.14	0.14	0.41	36.32	2.56	2.24	2.24	6.56
SAGGING											
LIGHT TRUCK	4	0.11	0.24	0.05	0.01	1.69	3.52	7.68	1.6	0.32	54.08
HEAVY DUTY TRUCK	1	7.63	0.44	0.45	0.26	1.34	61.04	3.52	3.6	2.08	10.72
HELICOPTER	1	5	0.2	0.68	0	2	40	1.6	5.44	0	16
GENERATOR	2	2.27	0.16	0.14	0.14	0.41	36.32	2.56	2.24	2.24	6.56
						TOTAL	1896.4	158.4	135.92	72.32	1065.04

* SOURCE: USEPA AP-42

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TABLE 1.1.4-14

EQUIVALENT ROAD ACRES/THRESHOLD OF CONCERN (ERA/TOC)
WATERSHEDS ALONG THE PREFERRED ROUTE

Route Segment	Watershed	Existing ERA (%)	TOC (%)
North 2B	Upper McCloud River	10	18
N-10 Alt.5 (B)	Upper McCloud River	10	18
N-10 Alt.5 (D)	Upper McCloud River	10	18
N-7 Alt.1 (A)	Upper McCloud River	10	18
N-7 Alt.1 (B)	Upper McCloud River	10	18
North 3J	Iron Canyon	6	14
N-8A (3)	Pit River #6	4	14
North 4	Pit River #6	4	14
N-8 Alt.2 (A)	Pit River #6	4	14

TABLE 1.1.4-15

PROJECT PREFERRED ROUTE CUMULATIVE WATERSHED EFFECTS

Watershed	Existing ERA (%)	Project-Induced ERA (%)	Change (%)
Upper McCloud River	10	0.005	0.05
Iron Canyon	6	0.01	0.16
Pit River #6	4	0.005	0.14

TABLE 1.1.4-16

LAND USE IMPACTS FROM NEW TOWER DESIGN

Route Segment	Number of Towers on Irrigated Cropland: Existing Upgrade Lattice Tower Design	Number of Towers on Irrigated Cropland: New H-Frame Tower Design	Total Agricultural Acreage Removed Around Towers: Existing Upgrade Lattice Tower Design	Total Agricultural Acreage Removed Around Towers: New H-Frame Tower Design
S-8B	0	0	0	0
S-8C	17	12	.48	.07
S-8El(A)	6	4	.17	.02
South 1	36	26	1.01	.15
S-8 Alt.3	14	9	.39	.05
S-8K	27	18	.76	.10
S-9D	4	3	.11	.02
S-9G	1	1	.03	.01
South 2	1	1	.03	.01
Totals	106	74	2.98	.43

FIGURE 1.1.4-17

CHARACTERISTICS OF PROJECTS PROPOSED IN THE LOS BANOS-GATES PROJECT VICINITY

Proposed Project	Location	Distance From Preferred Route (Miles/MP)	Type of Development	Size	Average Construction Workforce Employees
Los Banos-Gates Transmission Project	-	-	Utility-Transmission Line	84 miles/ 200 ft. R-O-W	110
Santa Nella Public Utilities District	Santa Nella	2/W0	Water Service Expansion and Commercial/Residential	300 ac	>100
National Cemetery	Santa Nella	5/W0	Cemetery	350 ac	<50
Los Banos Grandes Reservoir	Los Banos Creek	0/W6	Recreation Facility and Reservoir	14,400 ac (60 miles of shoreline)	NA
Apricot Hill Development	Santa Nella	1/W2	Commercial/Residential/ Recreational	1,300 ac	NA
Polvadero Country Club (Planned Unit Development)	East of Coalinga	1/W77	Residential (106 units)	~100 ac	NA

NA - not available

SOURCES: F. Ornelas, Manager, Santa Nella Water District, 1986
UTC Quinto Range Project DEIR, 1986
California Department of Water Resources, 1986
E. Gould, President, Apricot Hill Development Co., 1986
D. Chapen, Fresno County Community Development and Planning Division, 1986
J. Lien, State Lands Commission, 1986

SFR58/064

Mitigation Measures

1.1.5 CHANGES TO DRAFT EIS/EIR VOLUME 1 SECTION 5.0 - MITIGATION MEASURES

This section replaces Section 5.0 of the Draft EIS/EIR.

This mitigation section has been reorganized since the Draft EIS/EIR. Mitigation measures are organized by resource category. Following each mitigation measure, there is a reference showing where it can be found in the Draft EIS/EIR. Changes are as follows: deletions are stricken with a slash through each letter and additions are underlined. If a public comment on the Draft EIS/EIR resulted in a change to a mitigation measure, reference to the comment letter and number follows the mitigation measure.

The COTP Participants or other entities responsible for the operation and maintenance of the transmission line, as part of its construction and operation practices, will employ the following mitigation measures to limit environmental impacts. Table 2A in the Summary lists the significant impacts of the COTP by route segment prior to mitigation, the applicable mitigation measure, the effectiveness of the measure, and whether the residual impact will remain significant. Environmental impacts were assessed under the condition that these practices would be implemented.

Site-specific mitigation measures require site-specific engineering design activities such as tower site locations, access road locations, and access road design. Many of these features will be reviewed by other state and federal agencies during the review of applications for site-specific permits and easements. In addition, further information will result from centerline-specific biological and cultural resources field surveys of the selected route.

With the selection of a preferred alternative, identified in this document, the site-specific engineering activities can proceed and site-specific mitigation measures can be developed.

Many of the site-specific measures to implement the mitigation cannot be developed until tower sites are located, access road design is completed, and biological and cultural resource surveys of the selected route have been completed. The lead agencies have adopted the mitigation measures listed in this Final EIS/EIR as a framework to be augmented with a Compliance Monitoring Plan that will be developed in conjunction with the site-specific engineering design work, prior to construction.

The Compliance Monitoring Plan will be prepared during Project design to address engineering designs and construction plans. It will be developed through consultation with state and federal agencies that will be involved in monitoring its implementation. All adopted mitigation measures will be incorporated into the Compliance Monitoring Plan.

Implementation of the Compliance Monitoring Plan will be assured through several measures. First, the lead agencies will ensure that the applicable mitigation measures are included in the construction contracts for work on the Project. The construction inspectors will verify that the mitigation measures are implemented and will have the authority to redirect activities of the construction contractor to the extent necessary to meet the mitigation requirements included in the construction specifications. Second, both Western and TANC, as lead agencies under NEPA and CEQA, will monitor the implementation of the mitigation measures. Third, cooperating/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.

<u>ADOPTED MITIGATION</u>

Mitigation measures proposed and adopted by the lead agencies and Project Participants are as follows:

I. **CLIMATE AND AIR QUALITY**

A. All requirements of those entities having jurisdiction over air quality matters will be adhered to and any <u>permits</u> for construction activities will be obtained. Burning will not be allowed unless permitted by appropriate authorities. (G.1 p. 5.1-7)

B. <u>The construction specification shall state that</u> equipment and vehicles that show excessive emissions of exhaust gases due to poor engine adjustments or other inefficient operating conditions will have corrective repairs or adjustments made. (G.5 p. 5.1-7)

C. ~~Standard~~ Dust control measures (e.g., water spraying) ~~should~~ will be implemented as needed during transmission line construction. (A.1 p. 5.1-7)

II. EARTH RESOURCES

A. Soil

1. Access roads will be constructed ~~designed~~ to meet the minimum requirements ~~standard~~ necessary for construction and maintenance vehicles. See Appendix A, Volume 3A of Draft EIS/EIR. (A.4 p. 5.1-1)

2. ~~All access roads not required for regular maintenance activities will be closed using the most effective and least environmentally damaging methods.~~ After completion of construction, Project maintenance personnel will conduct a review, coordinated with landowners and appropriate land management and regulatory agencies, to determine future access needs for regular and emergency maintenance. All roads not needed for maintenance will be reclaimed to near original condition, using the most effective and least environmentally damaging methods. (A.5 p. 5.1-1)

3. Existing roads damaged as a direct result of the construction and maintenance activities related to the transmission line will be repaired to a condition equal to or better than their condition prior to the construction or maintenance activities which caused the damage. (A.6 p. 5.1-1)

4. As part of the COTP design procedures, sensitive areas will be identified; tower sites and access roads within sensitive areas will be evaluated. This evaluation will attempt to minimize erosion and sedimentation problems by avoiding the selection of sites in areas with small-scale geologic and soil hazards such as landslides and slumping. In addition, cooperating and responsible agency and county personnel ~~may~~ will be involved in providing information useful to the siting of towers and to the construction of access roads and equipment paths in areas rated as having moderately significant soils impacts, to help ensure that soils impacts are minimized. (A.7 p. 5.1-2)

5. All excavation, bulldozing or smoothing of the road surface done for ease of travel on any easement or for crane landings will be restored to the original contour of the land wherever practical, and will be compacted to a dry density similar to ~~not less than~~ the natural in-place density of the surrounding earth. The use of water may be required to obtain the required density. Excavated topsoil will be stockpiled and spread on cuts where practical prior to completion of work. ~~under these specifications.~~ (A.9 p. 5.1-2)

6. Construction of new roads ~~should~~ would be minimized; existing roads ~~should~~ will be used to the maximum extent possible. (A.12 p. 5.1-2)

7. Standard engineering techniques for controlling water runoff on access roads will be used. Water bars or cross ditches, diversion ditches, berms, straw bales, and energy dissipators will all be used, when necessary, to meet the standards of road construction set by land management or other regulatory agencies. These measures are particularly appropriate in several areas of new construction in the northern section such as in the Kosk Creek, Alder Creek and Grizzly Peak areas, but may be used in other sections as needed. (A.13 p. 5.1-2 and Soils #1 p. 5.1-9)

8. Disturbed soil around tower bases will be rehabilitated and the area reseeded when the topsoil has been replaced. ~~to its original location.~~ (E.2 p. 5.1-5)

9. Run-off control structures, diversion ditches, and erosion control structures will be cleaned, maintained, repaired, and replaced whenever necessary. (Soils #2 p. 5.1-9)

10. Disturbed areas on slopes will be revegetated as soon as ~~practical after construction is completed or as required by land management~~

~~agencies. Measures will be initiated to speed the reestablishment of vegetative cover in sensitive areas where erosion is a problem.~~ possible and as necessary to minimize the potential for erosion. The Project will work closely with land management and regulatory agencies and landowners to establish specific timelines for revegetation activities on a site by site basis. (L-188 D, L-333 S) (Soils #3 p. 5.1-9)

11. On soils that are susceptible to wind erosion, such as those in the Delta, the removal of vegetation will be minimized. The surface will be left rough and cloddy, and during construction when necessary, disturbed areas will be sprinkled with water to suppress fugitive dust. (Soils #4 p. 5.1-9)

12. Helicopter construction will be used in those areas where it has been determined through careful on-the-ground review and in consultation with land management and regulatory agencies, that there would be significant soil erosion or related impacts that cannot be otherwise mitigated. These measures may be appropriate in several watersheds, particularly those having steep slopes (greater than 30 percent) and highly erodible soils. In particular the Pit River, Grizzly Peak, Kosk Creek, and Alder Creek watersheds are potential problem areas. (Soils #5 p. 5.1-9)

13. Precautions will be taken to avoid burying topsoil in all areas. If during site preparation it is determined that the potential exists for damage to or burial of topsoil, it will be stockpiled. ~~off site.~~ After construction, topsoil will be replaced and the site will be restored to ~~as~~ near its natural state. ~~as possible.~~ (Soils #6 p. 5.1-10)

14. Excavated material or other construction materials will not be stockpiled or deposited on or near stream banks, lake shorelines, and other water course perimeters where they could be washed away by high water or storm runoff, or could significantly impact ~~in any way encroach upon~~ the water course. (Soils #7 p. 5.1-10)

15. Precautions will be taken to minimize soil compaction. Construction will be ~~avoided~~ minimized during winter and other wet periods ~~to the extent practical.~~ In agricultural areas to be restored after construction is completed, compacted soils will be subsoiled~~,~~ and disked. ~~and restored.~~ (Soils #8 p. 5.1-10)

16. Helicopters will be used during the conductor-stringing stage of construction, where feasible and where it is expected to substantially reduce ~~needed, to minimize~~ soil compaction between tower sites that cannot otherwise be mitigated. (Ag #4 p. 5.1-15)

17. Construction of new access roads through agricultural lands will be minimized. (Ag #9 p. 5.1-15)

18. In order to minimize potential for erosion and sedimentation into streams, roads will be located as far from stream bottoms as practicable. If practicable, roads will be located on the upper one-third of a slope. Land management and regulatory agencies will be consulted when planning access roads. These measures may be appropriate in several watersheds, particularly those having steep slopes (greater than 30 percent) and highly erodible soils such as the Pit River, Grizzly Peak, Kosk Creek, and Alder Creek areas. (L-321 DD)

19. Construction operations will be conducted to minimize soil erosion. Forest Service's Best Management Practices and Forest Practice Rules of the California Department of Forestry will be implemented where applicable (e.g., National Forest lands or where required by agency permit). (L-360 R, L-321 X6)

20. Soils ~~which~~ possessing a low soil-bearing capacity and that demonstrate, through testing and analysis, the probability of compromising the design of the foundations will be re-compacted and or replaced with high integrity, high density, imported fill in accordance with standard engineering practices. (B. #2 p. 5.1-8)

B. Geologic Hazards

1. Additional measures are needed where ~~slopes are actively sliding~~ high erosion hazards and possible mass wasting are suspected, such as in the Kosk Creek, Alder Creek, and Grizzly Peak areas. Construction of new roads will be carefully planned to avoid undercutting slopes, unnecessary vegetation clearing, and loading of unstable slopes with fill material. Cut and fill operations will be minimized in active slide areas. Spoil material will be disposed of according to methods approved by the appropriate land management or regulatory agencies. Additional mitigation will include avoidance of or helicopter construction in ~~these~~ those cases ~~areas~~ that cannot otherwise be mitigated. (L-295 D2) (B.1 p. 5.1-8)

2. ~~Soils which possess a low soil-bearing capacity will be recompacted and/or replaced with high integrity, high density, imported fill.~~ (B.2 p. 5.1-3)

3. Centerline adjustments ~~will be made to avoid areas where there is~~ and special foundation design will be used to minimize impacts to towers as the result of potential lava tube collapse ~~potential for lava tube collapse~~. (B.3 p. 5.1-5)

C. **Mineral Resources and Paleontology**

1. Road access ~~should~~ will be negotiated with landowners to allow use of roads and rights-of-way for ~~by~~ mining and mineral extraction ~~interests~~ as long as ~~existing current or potential future~~ those activities do not ~~unduly~~ interfere with ~~normal~~ Project operation or create health and safety hazards ~~in the form of~~ such as induced currents ~~from~~ on metallic structures or equipment. (Mineral Resources #1 p. 5.1-8)

2. In those areas which possess a high potential for the discovery of fossil resources, a field study ~~should~~ will be conducted by a qualified paleontologist (or recognized expert with training in paleontology) under the direction and guidance of the lead agencies to help determine final tower and access road siting. In the event that significant fossil resources are found and the location of roads and/or towers cannot be adjusted to avoid fossil disturbance, a qualified paleontologist will be consulted regarding appropriate data recovery procedures ~~the site will be excavated by a certified paleontologist~~. Data recovery procedures will be guided by the precepts established in the Memorandum of Agreement for cultural resources for the COTP and by applicable state and federal regulations. Routes that cross geologic formations with potential for containing significant fossil resources are listed on page 3.2-26, Volume 2A of the Draft EIS/EIR. (Paleontology #1 p. 5.1-10)

3. When feasible, the transmission line facilities will be located so as to avoid the destruction of archaeological, paleontological, or historic values. In the event archaeological, paleontological, or historic evidence is found during ground disturbing activities, ~~such as construction of access roads, tower footings, pulling and erection sites, substation additions, and the material sites, the COTP participants will notify~~ the appropriate officials will be notified and measures will be taken to follow their recommendations as per the steps outlined in the Memorandum of Agreement between the Transmission Agency of Northern California, the Western Area Power Administration, the California and Oregon State Historic Preservation Officers, and the Advisory Council on Historic Preservation. (Paleontology #2 p. 5.1-11)

III. WATER RESOURCES AND FISHERIES

A. A ~~100 foot~~ buffer of undisturbed vegetation shall be maintained along all lakes and streams. At a minimum, the buffer shall extend to the first point of slope break or 100 feet, whichever is greater. Additional needs for buffers will be coordinated with the appropriate land management and regulatory agencies. (L-321, C.2 p. 5.1-11)

B. Stream crossings by the transmission line and ~~their~~ access roads ~~should~~ will be minimized. Where the transmission line parallels a stream, efforts will be made to avoid ~~no~~ more than one new access road stream crossing per mile ~~should be constructed~~. (C.4 p. 5.1-11)

C. All stream crossings ~~should~~ will be constructed such that they permit fish to pass and reduce the potential for stream flows to result in increased scour, washout, or disruption of water supplies. (C.5 p. 5.1-12)

D. New stream crossings ~~should~~ will be built at approximate right angles to streams, wherever possible. (C.6 p. 5.1-12)

E. Project features, access roads, and rights-of-way will ~~shall~~ not be constructed to interfere with currently producing groundwater wells unless compensation is made. (C.7 p. 5.1-12)

F. ~~Prior to construction, a biological resources field survey shall be conducted of tower, access road, and stream crossing locations by a qualified biologist to identify site-specific impacts to water resources and endangered, threatened, or otherwise sensitive aquatic species. Where impacts are identified, appropriate mitigations shall be developed and applied in order to minimize environmental damage.~~

A biological assessment will be prepared pursuant to Section 7 of the Endangered Species Act to identify impacts to federally listed and candidate aquatic, plant and wildlife species. Where impacts are identified, appropriate mitigation will be developed in consultation with the U. S. Fish and Wildlife Service. As soon as practical after locations of access roads and tower sites are known, consult with State Fish and Game Departments to identify site-specific impacts to water resources and state listed endangered, threatened or otherwise sensitive aquatic, plant and wildlife species. Where impacts are identified, appropriate mitigation will be developed in consultation with the Fish and Game Departments. (L-306 L) (C.1 p. 5.1-11)

G. ~~No construction of new access roads should be permitted in stream drainages which support special-status aquatic species.~~

Construction of new access roads will be minimized in stream drainages which support special-status aquatic species. Where access road construction is determined to be necessary in those drainages resource management agencies will be consulted to develop specific mitigation measures. This would apply particularly to streams along the Grizzly Peak option and in the Kosk Creek area. (L-295 F2, L-295 I2) (C.3 p. 5.1-11)

H. Culverts on access roads will be sized to match storms which may occur during the expected or permitted life of the road to minimize the potential for access roads to washout under high intensity storms. (L-321 CC)

I. Where applicable, water supplies for dust abatement will be covered under a Streambed Alteration Agreement with the California Department of Fish and Game as per Section 1603 of the State Fish and Game Code when it is necessary to obtain water from nearby streams or water bodies. (L-333 P)

J. A Streambed Alteration Agreement will be obtained where required for stream and lake crossings on non-federal lands, as per Section 1603 of the California State Fish and Game Code. (L-333 T)

K. Flood-proof structures and design COTP facilities to avoid decreasing the conveyance efficiency of the floodplain.

IV. VEGETATION

A. The boundaries of construction activities will ~~normally~~ be predetermined, with activity confined within those limits. No paint or permanent discoloring agents will be applied to rocks or vegetation to indicate survey or construction activity limits. Surveyors, flagging and/or other suitable material will be used to delineate limits. Any flagging or marking material will be coordinated with landowners and appropriate regulatory agencies. (L-333) (A.2 p. 5.1-1)

B. In construction areas where excavation is not required, vegetation will be left in place whenever possible and the original contours will be maintained in an undisturbed condition whenever possible. The need to retain the vegetation or restore the ground to the original contours will be coordinated with the appropriate land management and/or regulatory agencies. (E.1 p. 5.1-5)

C. Where vegetation of high density or low diversity is encountered (such as in forested areas) in the right-of-way, clearing to a harsh right-of-way edge will be avoided. Instead, it will be done to emulate natural clearings with irregular edges (e.g., feathering). (E.3 p. 5.1-5)

D. Compliance with applicable federal and state laws and regulations regarding protected plant and animal species will be ~~complied with~~ monitored. Construction activities will be conducted in a manner to avoid or minimize disturbance. Actions will not be taken that ~~do not~~ destroy or significantly or adversely modify the habitats of such species. (E.5 p. 5.1-6)

E. ~~"~~Brush blades~~"~~ (instead of dirt blades) will be used on bulldozers in clearing operations where such use will help preserve the cover crop of grass, low growing brush, etc. This activity will be coordinated with the appropriate land management and/or regulatory agencies and would be appropriate for cleared forestland, shrub and brush rangeland, mixed rangeland, mixed forest and juniper woodland. (E.7 p. 5.1-6)

F. The retention or ~~reseeding~~ encouragement of native vegetation as a natural means of ~~landscaping~~ revegetation will be a main goal of the site planning for tower sites, the right of way, substations, and other facilities especially in herbaceous rangeland, shrub and brush rangeland and mixed rangeland. (E.9 p. 5.1-6)

G. ~~Enhance or maintain~~ Vegetation diversity will be maintained on rights-of-way through forested areas. (D.1 p. 5.1-12)

H. ~~Conduct~~ The lead agencies will ensure that detailed surveys will be conducted of potential habitats for special-status plant species to determine occurrence of populations and avoid them during siting and construction. (D.2 p. 5.1-12)

I. ~~Minimize~~ Disturbance of forest vegetation sites ~~if such types~~ that are rare in a regional area will be minimized. (D.3 p. 5.1-12)

J. Avoid siting of transmission line towers, access roads and/or construction work areas in wetlands, riparian zones, and other unique or sensitive plant communities to the maximum extent ~~practical~~ possible. (D.4 p. 5.1-12)

K. A vegetative management plan will be prepared for Forest Service lands in consultation with the Forest Service. The plan will consider clearing requirements for the Project and long term right-of-way management needs. The use of selective clearing will be emphasized, removing only those trees that interfere with conductor clearance. The plan will be incorporated into the Compliance Monitoring Plan. (L-295 L, L-295 O2)

L. The need for off-site mitigation for loss of productive timberland will be determined through consultation with the California Department of Forestry and the USDA Forest Service. If needed, such off-site mitigation may include reforestation of timberland currently occupied by brush or noncommercial hardwoods. This activity will be coordinated with the State Fish and Game Departments and land management agencies to ensure that high value wildlife brushland and hardwood areas are protected. (L-321 EE)

M. Where there are unavoidable adverse impacts to wetland areas, such as at substation sites, mitigation will be developed in accordance with the U. S. Fish and Wildlife Service Mitigation Policy. (L-364 EE)

V. WILDLIFE

A. Avoid siting right-of-way through forest habitat types if such types are rare in a regional area. (E.1 p. 5.1-12)

B. Maintain habitat diversity on rights-of-way through forested areas. (E.2 p. 5.1-12)

C. Avoid siting of transmission line towers, access roads, or construction work sites in riparian zones. (E.3 p. 5.1-12)

D. Site rights-of-way to take advantage of natural or existing flight obstacles ~~(e.g., below ridgelines parallel to existing powerlines)~~ to birds. This would be appropriate, for example, in the Newell/Tulelake area. (E.5 p. 5.1-13)

E. In areas of extremely high collision potential where transmission design or location would not effectively mitigate impact, provide compensation by improving habitat elsewhere or providing other enhancements. (E.6 p. 5.1-13)

F. Conduct detailed surveys along the preferred alternative right of way for special-status wildlife species to more fully assess and avoid impacts and develop ~~adequate~~ mitigation measures during siting and construction. (E.7 p. 5.1-13)

G. ~~Limit access of permanent maintenance roads in critical game winter range during critical periods (e.g., construct and maintain gates or other road obstacles).~~ (E.9 p. 5.1-13)

H. ~~Minimize~~ New road construction ~~of new roads~~ will be minimized in important game winter range. These areas are identified in Table 3.5-6, Volume 2A of the Draft EIS/EIR and in the Supplement to the DEIS/DEIR. (E.8 p. 5.1-13)

I. ~~Design access road entrances so as to discourage off-road vehicle users from driving around gates.~~ Where practical, access road entrances will be located so as to discourage off-road vehicle users from driving around either gates or large earthen barriers. (E.10 p. 5.1-13) (L-333)

J. In areas where rights-of-way clearing would remove snags of important value, ~~from areas identified as deficient in snags by land management agencies~~, create new snags to offset losses. (E.13 p. 5.1-13)

K. A snag component to the vegetation management plan will be prepared for Forest Service lands which will provide~~s~~ for the removal of snags which endanger the transmission line and provide~~s~~ replacement snags for cavity-dependent wildlife species. (L-295 M)

L. ~~Avoid construction of new roads in:~~

~~- Critical game winter range with road closures already in effect.~~

~~- Deer fawning areas.~~

~~- Pronghorn kidding areas.~~

~~- Sensitive Raptor Concentration Areas~~ (E.11 p. 5.1-13)

~~If deer fawning areas, pronghorn kidding areas, and sensitive nesting areas cannot be avoided by siting, efforts will be made to avoid construction activities during the breeding season.~~ (E.12 p. 5.1-13)

Construction and maintenance activities will be limited in critical habitat areas. If construction, operation or maintenance activities must take place within these habitat areas during key breeding and other important activity timeframes, they will be coordinated with the State Fish and Game Departments, the Bureau of Land Management and the USDA Forest Service. The route segments in which each critical habitat can be found are listed in Table 3.5-6, Volume 2A of the Draft EIS/EIR and in the Supplement to the Draft. The species and critical habitat areas are listed below:

Sandhill Crane (breeding)	Antelope (winter range)
Golden Eagle (breeding)	Bald Eagle (breeding & wintering)
Goshawk (breeding)	Prairie Falcon (breeding)
Osprey (breeding)	Spotted Owl (year-round)
Swainson's Hawk (breeding)	Antelope (kidding areas)
Deer (key winter range)	Deer (key fall holding areas)
Sage Grouse (strutting areas)	Deer (key fawning areas)

(L-295 O2, L-333 X)

M. Where the Project would result in significant losses of habitat, mitigation will be developed in accordance with the U. S. Fish and Wildlife Service Mitigation Policy and in accordance with the Endangered Species Act of 1973. The type of mitigation will be determined upon consultation with the State Fish and Game Departments, the U. S. Fish and Wildlife Service, and state and federal land management agencies. (L-295 O2)

N. ~~In areas where potential for collision by birds is high and impacts may be significant, mark or modify design of static wires or conductors as appropriate for site-specific conditions.~~ In areas where there is an extremely high potential for collisions with the shield wire by waterfowl or sensitive raptors, the appropriate wildlife management agencies will be consulted to determine the need for marking or other mitigation. Following those consultations, the shield wire will be marked where appropriate to reduce the hazard. This may be appropriate in the Newell Tulelake area, Pit River, Sacramento River, and in some areas of the Delta. (L-295 O2, L-333, L-332 N, E.4 p. 5.1-13)

O. Prior to construction and after access roads and tower locations are known, discussions will be initiated with the U. S. Fish and Wildlife Service and State Fish and Game Departments to determine the mitigation necessary to reduce unavoidable adverse impacts and irreversible/irretrievable commitments of resources for wetland, riparian, anadromous fish and other wildlife habitats. (L-364 EE)

P. Consider placing raptor nesting platforms on towers at intervals greater than one mile in raptor use areas where nest sites are limited. Place these on the towers in positions least likely to cause operation and maintenance problems. The need for and number of nesting platforms would be determined during the transmission line alignment and in consultation with wildlife management agencies.

Q. If consultation with appropriate fish and wildlife agencies indicates that studies are necessary, preconstruction and post construction surveys will be conducted to determine the extent of avian mortality, if any, caused by the transmission line.

VI. LAND USE AND LAND STATUS

A. General

1. ~~Reasonable~~ Precautions will be taken to protect all public land surveying monuments and property corners. ~~using survey or flagging, portable barricades, or other means.~~ (D.3 p. 5.1-4)

2. Owners will be compensated for homes and other structures removed from proposed rights-of-way as specified in the Uniform Relocation Assistance and Land Acquisition Policies of 1970. (D.4 p. 5.1-4)

3. ~~The COTP participants or entities responsible for the operation and maintenance of the transmission line will minimize~~ Disturbance to existing fences and other improvements will be minimized and ~~will restore~~ any damage will be restored to a condition equal to or better than their preconstruction state if the damage is determined to have been caused by Project-related activities. Functional use of these improvements will be maintained at all times. Adequate bracing will be installed before a fence line is cut. Gates will be kept closed

at all times when not in use if so requested by the landowner. When a road or construction activity breaks or destroys a natural barrier used for livestock control, the gap will be fenced to prevent drift of livestock. When construction has been completed, the landowner ~~manager~~ and the Project will identify the gates that ~~the Project~~ will be needed for maintenance and those to be replaced with a stationary section of fence. (D.5 p. 5.1-4 and 5.1-5)

4. To minimize inconvenience to landowners, directly affected property owners and residents will be contacted to inform them of the planned Project and what may be expected during the construction phase, such as the hours of operation and types of construction equipment that may be used in the area. (D.6 p. 5.1-5)

5. Landowners will be compensated for damage that occurs to property and/or improvements that are a direct result of Project-related activities. (D.7 p. 5.1-5)

6. COTP Participants or other entities responsible for the operation and maintenance of the transmission line will cooperate with landowners and public land managers to limit public use of private access roads and rights of way on private land where so requested. ~~Gates will be constructed when requested by individual landowners. Gates will not be installed on public lands unless specifically requested by the managing agency.~~ (D.8. p. 5.1-5)

7. ~~Field personnel will endeavor to inform landowners and land managers of safety practices in working with equipment, including transportation and handling of irrigation pipes~~ During the acquisition of easements, the land services agent will provide landowners with general information on electrical effects and safety practices close to and under high voltage transmission lines. (D.9 p. 5.1-5)

8. The COTP Participants and/or its contractors or other entities responsible for the operation and maintenance of the transmission line will comply with all conditions imposed upon the use of existing roads by managing agencies, including seasonal and/or other limitations or restrictions, the payment of excess size and weight fees, and the posting of bonds conditioned upon repair of road damage. (D.10 p. 5.1-5)

9. Survey stakes will be removed as a part of final ~~surveying~~ cleanup. (A.8 p. 5.1-2)

10. Project contractors will be instructed to salvage and recycle steel from towers and conductors to the extent possible. The Project will dispose of materials which are not recycled in accordance with state and local regulations. (G.2 p. 5.1-7)

11. Construction contractors will be directed to remove construction materials and debris from work sites. (Ag #5 p. 5.1-15)

12. Hauling of such items as wood or steel poles and earth materials, and other Project-related hauling over public highways, roads, and bridges will be in compliance with the applicable federal, state and local regulations. To the extent possible, interference caused by congestion of local traffic will be minimized. If roads subject to interference cannot be kept open without unreasonable delays, suitable detours will be provided and maintained where practical. When necessary during construction, flasher lights, danger signals, flag persons, barricades, and other safety measures will be provided to protect the public from hazards. Barricades and obstructions will be illuminated from sunset to sunrise. (G.3 p. 5.1-7)

13. Construction ~~Contract~~ inspectors will ensure the construction contractor complies with the mitigation measures as specified in the construction contract. (L-364 BB)

14. Implementation of the mitigation measures will be detailed in the Compliance Monitoring Plan on a site-specific basis where impacts have been identified. Applicable mitigation measures will be a part of the construction specifications.

15. Staging areas ~~and parking sites should~~ would be located adjacent to existing roads where practical. Spoil from construction activities ~~should~~ would be disposed of properly. (Ag #6 p. 5.1-15)

B. Forestry

1. Right-of-way timber will be harvested and cleared in accordance with ~~an approved timber harvest plan as required by and in accordance with the~~ state and federal regulations and in accordance with the agreements of the respective landowners and managers. (E.4 p. 5.1-6)

2. Outside the required right-of-way, danger trees (e.g., leaners, or decayed, insect-infested, and/or other unstable trees) which could topple into the transmission line will be removed. ~~Appropriate~~ Easements or proper permissions will be ~~as required~~ obtained where appropriate for this purpose. (E.8 p. 5.1-6)

3. Avoid or minimize subdividing forest land parcels to reduce interference with forest management and planned logging activities. (Forestry #1 p. 5.1-13)

4. Minimize locating rights-of-way on ridgetops and other areas where the potential for windthrow is maximized. (Forestry #2 p. 5.1-14)

5. Use directional felling on the right-of-way so as to minimize damage to trees that are adjacent to the right-of-way. (Forestry #3 p. 5.1-14)

6. Line and tower siting will consider the potential ~~of~~ at the power line for starting a fire and will minimize siting in high risk areas to the extent practical. (Forestry #4 p. 5.1-14)

7. Logging slash will be disposed of either by removal, piling and burning, lopping and scattering, or by other means acceptable to land management agencies. The timing of slash disposal activities will be coordinated with the California Department of Forestry, USDA Forest Service, and other appropriate agencies. (L-321)

C. Planned Land Use

1. ~~The placement of electrically safe (i.e., nonconductive)~~ Land uses within the right-of-way ~~should~~ will be encouraged where they do not interfere with the operation and maintenance of the Project facilities. (PLU #1 p. 5.1-16)

2. Whenever possible, the route will ~~should~~ be moved to avoid ~~approved~~ developments approved by county planning departments or other county regulatory bodies. (PLU #2 p. 5.1-16)

D. Recreation

1. Efforts will be made to ensure safe, uninterrupted passage of hikers along the Pacific Crest Trail during ~~project~~ COTP construction. (Recreation #1 p. 5.1-16)

2. Existing recreation areas will be avoided where possible. In areas where recreation potential is based upon scenic qualities, consideration will be given to measures to reduce visual impacts. (E.6 p. 5.1-6)

E. Agriculture

1. Livestock or wildlife watering facilities will be repaired or replaced if they are damaged or destroyed by construction activities. (D.1 p. 5.1-4)

2. On agricultural lands, efforts will be taken to minimize the impact on farm operations. To the extent ~~practicable~~ practical, towers will be spaced at regular intervals and either set near field boundaries or service roads, or ~~either~~ perpendicular or parallel to the crop rows where it is desirable and feasible to do so. (D.2 p. 5.1-4)

3. Where construction will interrupt normal seasonal activities for both cropland and rangeland, landowners will be compensated for crop and forage losses. (Ag #2 p. 5.1-14)

4. Conifer debris ~~needles should~~ shall be carefully burned or removed from newly cleared rights-of-way on rangeland within conifer areas after consultation with the landowner. (Ag #3 p. 5.1-15)

5. In certified seed crop fields, ~~where required per state or federal regulations.~~ Project vehicles and equipment ~~would~~ will be sterilized or washed ~~before shifting to another work site~~ to prevent weed dispersion or contamination to certified seed crops ~~(such as seed potatoes)~~ upon consultation with the individual landowner. (Ag #7 p. 5.1-15)

6. Structure design and location will be used to ~~Tubular structures will be used where practical to~~ minimize or avoid impacts to agricultural lands. (Agriculture #8 p. 5.1-15)

7. Routing of the transmission lines directly over ~~water or irrigation~~ wells and pumps ~~must~~ will be avoided or compensation will be made to the landowner. (Ag #11 p. 5.1-16)

8. ~~The distance between existing lines and new lines will be maximized whenever possible. At least one half mile of separation is preferable, with a mile providing even more safety. When existing lines and new lines are located less than one half mile from each other, the critical distance depends upon the height, orientation (parallel or diagonal) of the new line, and any other obstacles in the field.~~ The COTP will be located in relation to existing lines where practical so as to minimize creating obstacles to aerial applicators. (A.12 p. 5.1-16)

9. ~~Towers would be spaced at regular intervals in irrigated croplands where the transmission line parallels section lines and field boundaries increasing the visibility of transmission towers and lines in areas worked by aerial applicators~~ (Ag #10 p. 5.1-15)

10. ~~Tower placement for parallel construction on range and farmland will be such that the new and existing towers are placed adjacent to each other when technically or feasibly possible, and the sag of each conductor made to approximately match when feasible.~~ (Ag #1 p. 5.1-14)

VII. VISUAL RESOURCES

A. ~~Use tubular structures in the foreground of sensitive viewpoints where significant visual impacts can be reduced.~~ Structure design, access road, selective vegetation clearing, and tower location will be used to minimize or reduce significant visual impacts in visually sensitive areas, and areas managed for scenic quality. (G.1 p. 5.1-17)

B. Non-specular (non-reflective) conductors will be used in certain areas to reduce the visibility of transmission facilities over great distances. ~~Use nonspecular (nonreflective) conductors.~~ This may be appropriate near Lava Beds National Monument, Forest Service designated scenic areas, and in the Delta. (G.2 p. 5.1-17)

C. In visually sensitive areas, minimize siting towers on ridgelines and hilltops to reduce the incidence of silhouetted or skylined towers ~~in views from sensitive land uses.~~ (G.3 p. 5.1-17)

D. Retain visual buffers by minimizing vegetation clearing along roads and highways, rivers, trails, and near residential areas. (G.4 p. 5.1-17)

E. Minimize the visibility of substation and communication sites from roads, recreation areas, and developed land uses through careful site ~~grading,~~ planning, positioning of equipment, screen planting, and preservation of existing tree cover. (G.5 p. 5.1-17)

F. Select colors for substation and communication structures that are unobtrusive. (G.6 p. 5.1-17)

G. Tower placement, type (design), and span should be coordinated with existing transmission structures in paralleling situations where ~~technically feasible~~ practical. (G.7 p. 5.1-17)

H. ~~Consider using~~ Use opaque porcelain insulators to reduce reflectance and glare in visually sensitive areas where it can be expected to reduce visual impacts, such as in the vicinity of Lava Beds National Monument, Forest Service designated scenic areas and in the Delta. (G.8 p. 5.1-17)

I. ~~In visually sensitive areas, a review of the centerline design (tower placement, tree clearing, and access road location) will be conducted to ensure that visual resources are considered. (G.9 p. 5.1-17)~~

J. Darkened tower steel will be used where it can be expected to reduce visual impacts, such as near the entrance to Lava Beds National Monument, from designated viewpoints along Tionesta and Medicine Lake Roads, near the Pacific Crest Trail, in the Delta, and in other areas managed by federal agencies for visual resources such as in retention areas. (L-295 02)

VIII. SOCIOECONOMICS

A. ~~Mitigation Measure (Property Effects):~~ Ensure compliance with State Employment Development programs. (H.2 p. 5.1-17)

B. ~~Mitigation Measure (Housing): Contractors will be directed to provide lodging facilities for construction workers where temporary housing is insufficient.~~ (H.1 p. 5.1-17)

C. Provide opportunities for logging slash to be utilized to produce biomass power. (L-321 00)

IX. CULTURAL RESOURCES

A. Prior to construction, all supervisory construction personnel will be instructed on the protection of cultural and ecological resources. To assist in this effort, the construction contract will address:

1. Federal and state laws regarding antiquities and plants and wildlife, including collection and removal; and

2. The importance of these resources and the purpose and necessity of protecting them. (F.1 p. 5.1-6)

B. Preconstruction cultural resource ~~surveys~~ studies will be conducted on the preferred route by an appropriately qualified professional to identify specific properties subject to impact from the construction, operation, and maintenance of the Project. ~~Project participants~~ Adverse impacts to cultural resources resulting from the Project will satisfactorily be avoided or mitigated ~~adverse effects to cultural resources resulting from the project~~ in accordance with COTP Memorandum of Agreement and with measures agreed upon by TANC, Western, ~~and~~ the California and Oregon State Historic Preservation Offices, and the Advisory Council on Historic Preservation. (F.2 p. 5.1-6)

C. When feasible, the proposed transmission line facilities ~~COTP Participants~~ will be located ~~the proposed transmission line facilities~~ so as to avoid destruction of archaeological, paleontological, or historic values. In the event archaeological, paleontological, or historic evidence is found during ground-disturbing activities such as construction of access roads, tower footings, pulling and erection sites, substation additions, and material sites, the COTP Participants will take appropriate actions in that area and notify the appropriate officials of land management and other regulatory agencies. (F.3 p. 5.1-6 and 5.1-7)

D. Impacts to cultural resources will be mitigated by avoidance ~~wherever~~ whenever possible. If resources cannot be avoided, the ~~following~~ steps listed in the Memorandum of Agreement between the ~~may be taken in accordance with a plan to be developed by the~~ Lead Agencies, ~~and reviewed by~~ the State Historic Preservation Officers, and the Advisory Council on Historic Preservation will be taken (MOA is contained in Appendix H to Section 1.5.6 of this Final EIS/EIR.

~~1. Monitoring. In sensitive areas, construction activities may be monitored by a qualified archaeologist to ensure avoidance/minimization of impact.~~

~~2. Surface investigation. Surface documentation may include instrument mapping, photography, and the systematic controlled removal of cultural materials from the surface of a site followed by analysis and reporting.~~

~~3. Scientific excavation. Archaeological deposits may be investigated using an explicit data recovery plan that includes controlled subsurface sampling followed by analysis and the preparation of a report on all findings.~~

~~4. Stabilization/Protection. Sites may be preserved through protective covering, soil stabilization, and other measures.~~

~~5. Controlled Destruction. Professional archaeologists may record data during the destruction of a site.~~ (I p. 5.1-17)

X. FIELD CORONA AND SAFETY CONSIDERATIONS

A. Where blasting is required for access roads or tower footings, unacceptable debris that cannot be used for regrading and filling will be recovered and removed ~~where practical~~. (A.3 p. 5.1-1)

B. Blasting in the vicinity of buildings, structures, and other facilities susceptible to vibration or airblast damage will be carefully planned and controlled to minimize the possibility of damage to such facilities and structures. These activities will be conducted in accordance with all state, federal, and local regulations. (A.10 p. 5.1-2)

C. Proper warning signs of adequate number and size stating that blasting operations are taking place in an area will be erected. Only controlled blasting techniques will be used. (A.11 p. 5.1-2)

D. All construction waste, including trash, garbage, petroleum products, and related litter will be disposed of in a manner that is in accordance with federal, state or local requirements after conclusion of construction operations on a site by site basis. Vegetative debris accumulated through land clearing will be disposed of in accordance with federal, state and local regulations. (B.1 p. 5.1-2)

E. The transmission line will be constructed so that it will conform with all applicable federal regulations regarding aircraft safety. (B.2 p. 5.1-3)

F. Open excavations for wood poles or tower footings will be covered or temporarily fenced at the end of each working day for public safety and the protection of livestock. (B.3 p. 5.1-3)

G. ~~The COTP Participants or other entities responsible for the operation and maintenance of the transmission line will conduct all~~ Construction, operation and maintenance activities will be conducted in a manner that will avoid or minimize degradation of air, land, and water quality. Toxic material will not be released in any lake or water drainage. All construction work and subsequent use of the right-of-way will be consistent with applicable federal, state, and local laws and regulations relating to safety, water quality, and public health. (B.4 p. 5.1-3)

H. Fully contained sanitation facilities will be installed in personnel and material staging areas. Construction personnel will be ~~required~~ instructed to use sanitary facilities. All waste from temporary sanitary facilities will be transferred in an appropriate container~~s~~ to an appropriate disposal area. (B.5 p. 5.1-3)

I. Noise control techniques ~~producing equipment~~ will be ~~located~~ utilized to minimize sound radiating to the surrounding areas. If pneumatic tools or equipment used in chipping operations during tree removal or trimming must be used near residential properties, such use will be restricted to daylight hours. (B.6 p. 5.1-3)

J. ~~The COTP Participants or other entities responsible for the operation and maintenance of the transmission line will direct~~ Construction contractors will be directed to comply with the applicable federal, ~~and~~ state, ~~laws~~ and local regulations concerning the use of pesticides ~~(i.e.,~~ ~~insecticides, herbicides, fungicides, rodenticides, and other similar substances) in all activities and operations. (B.7 p. 5.1-3)~~

K. ~~The COTP participants or other entities responsible for the operation and maintenance of the transmission line will direct~~ Construction contractors will be directed to implement and administer a safety and health program and take all reasonable precautions to prevent damage to public and private property. (B.8 p. 5.1-3)

L. ~~The COTP participants or other entities responsible for the operation and maintenance of the transmission line will direct~~ Construction contractors will be directed to develop and implement a workers' health and safety program in compliance with applicable health and safety regulations. (B.9 p. 5.1-3)

M. An accurate record and report will be maintained in all cases of death, occupational disease, or traumatic injury to employees or the public, and in all cases of property damage~~d~~ ~~by~~ or accident. (B.10 p. 5.1-3)

N. ~~The COTP participants or entities responsible for the operation and maintenance of the transmission line will resolve all~~ Radio and television interference complaints will be investigated and ~~make every~~ efforts will be made to correct the cause of ~~the~~ radio and television interference when it has been established the interference ~~is from~~ has been caused by Project facilities. (C.1 p. 5.1-4)

O. ~~The COTP participants or entities responsible for the operation and maintenance of the transmission line will apply~~ Reasonable mitigation will be applied to correct problems of Project-caused induced currents and voltages on objects sharing or adjacent to the right-of-way. (C.2 p. 5.1-4)

P. An ambient noise survey will be conducted at selected sensitive sites along the route prior to construction and operation of the line. These measurements will then be available if complaints are received after the line is placed in operation. (C.3 p. 5.1-4)

Q. To provide a basis for evaluating and correcting any communications interference caused by the transmission line, electrical and magnetic field strength measurements will be made to provide base level information on radio or television reception quality after the selection of the final transmission line alignment, and prior to construction and operation of the transmission line. ~~If complaints are received after operation of the line, corrective measures will be taken to provide satisfactory service.~~ (C.4 p. 5.1-4)

R. Remove all flammable vegetation a minimum distance of 30 feet from ~~equipment~~ towers and conductors or as required by California Public Resources Code, Sections 4292 and 4293. (J.1 p. 5.1-18)

S. Dispose all vegetation cleared from the right-of-way in an appropriate manner subject to federal, state, or local regulations. (J.2 p. 5.1-18)

T. Equip all construction vehicles operating along the right-of-way with spark arresters as required. (J.3 p. 5.1-18)

U. ~~Prohibit vehicles refueling under energized portions of the line.~~ (J.4 p. 5.1-18)

V. Equip all construction vehicles working along the right-of-way with appropriate fire-fighting equipment. Equipment to be used will be determined through consultation with USFS, CDF, and local fire districts requirements, where appropriate. (L-324 C) (J.5 p. 5.1-18)

W. ~~Herbicides are prohibited on public lands and will not be used to maintain the right-of-way. Herbicide use on private lands will be coordinated with landowners.~~ (B.11 p. 5.1-4)

Herbicides will not be used until permission is obtained from landowners or land managing agencies. (L-364 K)

X. There will be no aerial application of herbicides. Herbicides will be used to hand treat those stumps that could potentially resprout and interfere with the conductors. Limited amounts of herbicides will be used to control unwanted plant growth within the substation areas (L-364 L)

Y. All regulations governing the use of herbicides (EPA, California State Department of Food and Agriculture, and California County Agricultural Commissions) will be strictly adhered to including 1) the use of licensed and/or registered herbicide applicators as required; 2) use of herbicides in agricultural or urban areas as specified through the permit system administered by the county agricultural commissioners; 3) proper storage requirements; 4) proper use of registered or classified herbicides in accordance with the most current label of the product. (L-364)

Z. Prepare a comprehensive fire response plan that would ensure prompt and correct action in the event an accidental fire should occur. (J.6 p. 5.1-18)

AA. Project contractors will be instructed to secure motor vehicles and mechanized equipment when not in use to prevent rollaways, unauthorized operation, or movement of accessories and attachments. (G.4 p. 5.1-7)

The following section is an addition to the Draft EIS/EIR.

OTHER MITIGATION CONSIDERED

1. Where feasible, affected timberland owners could be deeded acres equivalent to those lost to transmission lines (L-321 MM in Volume 2B of this Final EIS/EIR). The commentor specifically suggested that PGandE timberlands be used for these land exchanges. This mitigation measure does not reduce impacts on the physical environment and is unnecessary because full compensation is available.

2. Tower placement for parallel construction on range and farmland will be such that the new and existing towers are placed adjacent to each other when technically or feasibly possible and the sag of each conductor made to approximately match when feasible. (Ag #1. p. 5.1-14 in Draft EIS/EIR). This measure is not feasible because the 500 kV COTP conductors will not match the sag and tension characteristics of the 230 kV transmission lines that will potentially be paralleled.

3. In visually sensitive areas, a review of the centerline design (tower placement, tree clearing, and access road location) will be conducted to ensure that visual resources are considered. (G.9 p. 5.1-17 in Draft EIS/EIR). This mitigation measure is covered under mitigation measure VII.A.

4. Towers would be spaced at regular intervals in irrigated croplands where the transmission line parallels section lines and field boundaries increasing the visibility of transmission towers and lines in areas worked by aerial applicators. (Ag #10 p. 5.1-15 in Draft EIS/EIR). This mitigation measure is covered under measure VI.E.2.

5. Instead of a lump sum payment for the easement, compensate forest landowners on an annual basis where the compensation reflects real annual value costs and losses of the land removed from commercial timber production. (L-309 C2 in Volume 2A and L-329 OO in Volume 2B of this Final EIS/EIR.)

   Standard appraisal practices consider the value of improvements to the property and existing land use practices. If a landowner desired annual compensation, it would be possible for the landowner to take the easement payment and invest it so that he or she could receive annual payments.

   Where Western Area Power Administration is the lead agency, for land acquisition, the government cannot make annual or periodic payments for the easements. Government agencies and officials are prohibited from entering into any agreements that commit payments prior to appropriations by Congress. The Act that establishes this is referred to as the "Anti-Deficiency Act", now codified at 31 United States Code, Section 1341, and reads, in part, as follows:

   "(1) An officer or employee of the United States Government or of the District of Columbia Government may not:

(A) make or authorize an expenditure or obligation exceeding an amount available in an appropriation of fund for the expenditure or obligation; or

(B) involve either Government in a contract or obligation for the payment of money before an appropriation is made unless authorized by law."

In the absence of language specifying periodic payments in an appropriation by Congress, agreements cannot be made to that effect.

All land acquisition by the federal government must comply with Department of Justice regulations which are in accordance with provisions of Public Law 91-393. The regulations state "When permanent type improvements or improvements of substantial value are to be erected on lands, a defeasible title to such lands is not acceptable and must not be approved, unless the estate is clearly authorized by Congress." The word defeasible meaning "being able to be annulled or terminated".

In an easement that required periodic payments, if a payment is not made, the easement would terminate. A defeasible title would therefore exist, which is not in compliance with the Department of Justice regulations. This mitigation measure is therefore infeasible.

6. Compensate agricultural landowners on an annual basis so that the compensation reflects the disruption to irrigation, planting, and land use practices by the placement of the transmission line towers and conductors. (L-309 C2 in Volume 2A and L-329 OO in Volume 2B of this Final EIS/EIR.) See answer to number 5 above.

7. Prohibit vehicles refueling under energized portions of the line. (J.4 p. 5.1-18 of the Draft EIS/EIR). An IEEE paper entitled "Probability and Consequence of Gasoline Ignition Under HVAC Transmission Lines" by Deno and Silva, Number 85 WM 224-1 evaluated the probability of exceeding an ignition energy level of 7.5 milijewels under a 500 kV transmission line operating at 525 kV. The results of this study indicate that the probability of gasoline ignition resulting from sparks while refueling under a high voltage transmission line for a trailer truck on dirt is one in 120 billion and the probability of ignition for an automobile is less than one in one trillion or infinitesimal. The study concludes, therefore, that the probability of such an event is extremely small. Additionally, the transmission line will be constructed in accordance with the National Electric Safety Code, which specifically limits clearances from extra high voltage transmission lines to safe levels.

8. Mitigation Measure (Housing): Contractors will be directed to provide lodging facilities for construction workers where temporary housing is insufficient. (H.1 p. 5.1-17) There are a sufficient number of communities in the vicinity of the preferred route to support the expected number of construction workers during peak construction periods. Construction workers are accustomed to driving long distances (30-50 miles or longer) to and from remote jobsites.

9. Limit access on permanent maintenance roads in critical game winter range during critical periods (e.g., construct and maintain gates or other road obstacles). (E.9 p. 5.1-13 of the Draft EIS/EIR). This mitigation measure is covered under mitigation measure V.L.

Compliance with Laws and Regulations

1.1.6 CHANGES TO THE DRAFT EIS/EIR VOLUME 1 SECTION 6.0 - COMPLIANCE WITH LAWS AND REGULATIONS

1. Page 6.1-6

   Table 6.1-2.
   Delete: Item 2 (Department of Forestry), Columns 2, 3, 4, and 5 pertaining to timberland conversion permit.

2. Page 6.1-7

   Table 6.1-2, Item 5 (Office of Historic Preservation).
   Change: entry under Column 4 to "Cultural Resources Memorandum of Agreement"

3. Page 6.1-8

   Table 6.1-2, Item 1 (San Francisco Bay Conservation and Development Commission (BCDC)
   Delete: entire entry.

4. Page 6.1-8

   Table 6.1-2, Item 2, Column 2.
   Add: "or waiver to waste discharge requirements" after "(Permit)".

5. Page 6.1-9

   Table 6.1-2, Item 1 (Oregon Department of Energy)
   Delete: entire entry.

6. Page 6.1-12

   Paragraph 4, Line 7.
   Add: "." after "E".
   Delete: "and are as follows:" and the five bulleted items that follow.

7. Page 6.1-13

   Paragraph 2, Line 8.
   Delete latter half of paragraph, starting with "Wetlands exceeding..." and replace with the following: "All wetlands crossed by the proposed route are tabulated in Appendix E. Wetlands exceeding approximately 500 feet in width along the reference centerline of the proposed route are also mapped in Appendix E. These are located on route segments N-10K, North 2A, N-7A1(A), N-8A(3), N-9J, N-90, S-1A (upgrade) and S-8E1 (A)".

8. Page 6.1-13

   Paragraph 3, Line 2
   Add: "and plant species" after wildlife"

9. Page 6.1-13

   Paragraph 4, Lines 2, 5, and 8.
   Add: ""construction" after "temporary"
   Add: "newly constructed transmission line segments of" after "by"
   Add: "newly constructed segments of" after "of"

10. Page 6.1-13

    Paragraph 4, Number 1.
    Add: "remaining unsurveyed portions of the" after "the"
    Change: "Spring of 1987" to "1988".

11. Page 6.1-13

    Paragraph 4, Number 2.
    Add the following paragraphs after Number 2:

"Nearly all wetlands along the upgrade segment (S-1A) will be unaffected by transmission tower relocations or placement of fill, but could be significantly impacted by temporary construction activities. The COTP will perform the following to minimize any adverse impacts of upgrading on the existing wetland values.

1. Where transmission towers will be relocated or fill placed at their bases, a qualified biologist will participate in the site selection process to ensure the avoidance of any wetland encroachment.

2. Encroachment by construction vehicles into seasonal wetlands (intermittent creeks, vernal pools) will be limited to the dry season. Where access requires traversing undisturbed portions of wetland, the COTP will select the narrowest path across the wetland and restore the natural grade of any disturbed sites after completion of construction.

Along the upgrade portion of the proposed route (S-1A), seven wetlands will be impacted by relocating towers (Appendix E). Six of these wetlands are wide, intermittent creeks, composed primarily of relatively low value gravel/cobble expanses. To mitigate potentially significant impacts, the COTP will avoid locating towers in depressions with standing water and aquatic life and areas with woody riparian vegetation. At Olcutt Lake on the Nature Conservancy's (TNC) Jepson Prairie Preserve, selection of the new tower site and construction methods will be coordinated fully with TNC to avoid special-status plant species or alterations to the lake's hydrology. In addition, the old tower site will be restored."

12. Page 6.1-15

Add the following paragraphs after paragraph 4:

"**Compliance with FLPMA (6.1.3)**

Sections 503 and 510 of the Federal Land Policy and Management Act (FLPMA) of 1976 require that rights-of-way in common shall be used to the extent practical. Title V, Section 503 of FLPMA is entitled "Right of Way Corridors" and reads as follows:

> In order to minimize adverse environmental impacts and the proliferation of separate rights-of-way, the utilization of rights-of-way in common shall be required to the extent practical and each right-of-way or permit shall reserve to the Secretary concerned the right to grant additional rights-of-way or permits for compatible uses on or adjacent to rights-of-way granted pursuant to this Act. In designating right-of-way corridors and in determining whether to require that rights-of-way be confined to them, the Secretary concerned shall take into consideration national and state land use policies, environmental quality, economic efficiency, national security, safety, and good engineering and technological practices. The Secretary concerned shall issue regulations containing the criteria and procedures he will use in designating such corridors. Any existing transportation and utility corridors may be designated as transportation and utility corridors pursuant to this subsection without further review.

The separation of the proposed COTP 500 kV line from the existing two 500 kV lines is not in conflict with FLPMA. Impacts resulting from the separation of the COTP from the existing 500 kV transmission lines on land use policies and environmental quality are documented in this EIS/EIR. FLPMA states that the Secretary shall take into consideration national security and good engineering practices when determining whether to require that rights-of-way be confined to designated corridors. Because of the problems which would occur if all three of the 500 kV lines (or even if the proposed line and one of the two existing lines) were to become de-energized within a two-to-eight hour time period, siting the new line within a minimum distance of 2,000 feet from the existing lines would not be good engineering and technological practice, nor would it be in the interest of national security. The lead agencies have conducted both systems studies and reliability analyses which document the need for extraordinary measures to prevent a major system collapse in the event of a simultaneous outage of the COTP and one or both of the existing 500 kV Intertie lines (see discussion on System Planning in Appendix A, Volume 3A of the Draft EIS/EIR). The lead agencies have held extensive discussions with the Forest Service regarding this issue and they are in agreement with the lead agencies that separating the corridor for the new line from that of the existing lines is not necessarily in conflict with FLPMA. The Forest Service will make their final determination concerning whether the routing of the COTP is in compliance with FLPMA in their Record of Decision, which will be based on this EIS/EIR."

Summary of Public and Agency Consultation

1.1.7 CHANGES TO THE DRAFT EIS/EIR VOLUME 1 SECTION 7.0 - SUMMARY OF PUBLIC AND AGENCY CONSULTATION

Section 7.0 of the Draft EIS/EIR has been revised in its entirety to present to the reader a more complete description of the COTP environmental process. Also provided is an update on public involvement activities conducted for the COTP, Los Banos-Gates Project, and the PNW Reinforcement Project since the issuance of the Draft EIS/EIR. Tables referenced in this section are located following the text.

California-Oregon Transmission Project (7.1)

An active public involvement program was maintained throughout the environmental review of the California-Oregon Transmission Project (COTP). Figure 1.1.7-1 shows the program began in November 1984 with the scoping process and continued through the completion of the Environmental Impact Statement/Environmental Impact Report (EIS/EIR).

The National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) encourage the public to participate in the planning and environmental review of the COTP. From the beginning of this process, federal, state, and local agencies, as well as governments, interest groups, and individuals were provided up-to-date information on the status of the studies and were given the opportunity to identify issues that should be addressed in the EIS/EIR. Public input ranged from written comments and oral testimony at public meetings to informal personal contacts.

Notice of Preparation/Notice of Intent

The purpose of the scoping process is to determine the scope of the issues to be addressed in the environmental document and to identify those significant issues that should be analyzed during the environmental process. The first step in this process was the notification of agencies that could have a role in reviewing the EIS/EIR. On November 7, 1984, the Western Area Power Administration (Western) announced its intention to prepare an Environmental Impact Statement for the COTP by issuing a Notice of Intent (NOI) in the Federal Register. The Transmission Agency of Northern California (TANC) issued a Notice of Preparation (NOP) on April 8, 1985 to 280 federal, state, and local agencies. The federal NOI was amended and reissued on April 26, 1985 to add the USDA Forest Service as a cooperating agency, to announce Western's intent to prepare a joint environmental document with TANC, and to announce the location and dates for public scoping meetings. The NOI was amended a second time and a Supplemental NOP was issued on February 4, 1986 and February 21, 1986, respectively, to announce that the Los Banos-Gates Transmission Project would be addressed in the same EIS/EIR as the COTP.

Responses to the notices were received from the following agencies:

Local Agencies - California

- City of Vacaville
- City of Woodland
- City of Anderson

County Agencies - California

- Yolo County Community Development Agency
- Stanislaus County Health Department of Planning and Community Development
- Placer County Health Department
- Fresno County Planning Department
- Siskiyou County Air Pollution Control District
- Sutter County Planning Department
- Sutter County Department of Agriculture

Regional Agencies

- Regional Water Quality Control Board, North Coast Region
- Native American Heritage Commission

State Agencies - California

- Public Utilities Commission
- Department of Transportation
- Department of Fish and Game
- Department of Conservation

- Department of Boating and Waterways
- Department of Parks and Recreation
- Department of Forestry
- Business Transportation and Housing Agency
- Office of Planning and Research

State Agencies - Oregon

- Department of Transportation
- Office of the State Forester
- State Clearing House

Federal Agencies

- U. S. Department of Transportation, Federal Aviation Administration
- U. S. Department of the Interior, Bureau of Land Management
- U. S. Department of the Interior, Fish and Wildlife Service
- U. S. Department of the Interior, Geological Survey
- Department of the Army, Sacramento District Corps of Engineers
- U. S. Department of Agriculture, Forest Service

Special Interest Groups - California

- Sacramento Area Council of Governments
- Stanislaus Area Council of Governments

Scoping Meetings

Following the issuance of the NOIs, a series of scoping meetings were scheduled to identify issues of public and agency concern early in the process. Thirty-four agency and public scoping meetings were held throughout the COTP study area in California and Oregon from May 13 to May 23.

The media were used extensively to publicize the scoping meetings. A news release was sent on April 25, 1985 to approximately 400 advertising media, including newspapers, radio stations, and television stations throughout the study area and to other locations where scoping meetings were planned. In addition, public service announcements were sent to these same media on May 3, 1985. Display advertisements were also placed in 17 newspapers throughout northern and central California and southern Oregon. Each advertisement announced a specific scoping meeting being held in that local area.

Letters announcing the meetings and inviting participation were sent on April 30, 1985 to the recipients of the NOP. Over 300 federal, state, and county agencies, local governments, and interest groups were contacted by telephone. Each was notified of the agency and public meetings that were to be held in their area. In addition, individuals were asked whether there were other organizations or people that should be contacted about the public scoping meetings.

Table 1.1.7-1 lists the agencies and individuals contacted about the public scoping meetings. Approximately 194 representatives of public agencies and members of the public attended the scoping meetings. Table 1.1.7-2 lists the scoping meeting locations and the individual attendance at each meeting.

Alternative Corridor Workshops

The information received from the scoping meetings was utilized by COTP planners to identify preliminary alternative corridors. The process utilized to identify the preliminary corridors is described in the Phase 1 Report for the COTP. A summary of the report is presented in Volume 2A of the Draft EIS/EIR. To obtain public and agency ideas and concerns on the preliminary corridors, nine workshops were scheduled between July 15 and July 23, 1985. An extensive effort was again made to notify agencies and the public about the workshops. On July 2, 1985, a news release and a map indicating preliminary alternative corridors were sent to over 400 advertising media, including newspapers, radio stations, and television stations. The news release mailing also included a brief public service announcement. Display advertisements were placed in 21 newspapers that were selected to reach the broad geographic region of the study area as well as readers in the vicinity of the preliminary corridors. Each advertisement announced the specific workshop being held in that area. Table 1.1.7-3 lists the newspapers that were used for the display advertising. Letters announcing the corridor workshops were sent on June 28, 1985 to the 280 agencies that received the NOP. Telephone networking was used to reach approximately 200 federal, state, and local agencies, local governments, and interest groups. Each was notified of the workshops and invited to participate. Table 1.1.7-1 lists the corridor workshop agency and individual contacts. The dates, locations, and public and agency participation of the corridor workshops are detailed in Table 1.1.7-4. Approximately 267 individuals attended the corridor workshops.

While refining the corridors based on information received at the workshops, preliminary routes were being identified within the alternative corridors. Information meetings were conducted with county and city planning departments, city councils, and newspaper editorial boards between September and November 1985 to: (1) discuss the progress of the environmental analysis and preliminary route investigations, (2) review preliminary information on county land use plans and ordinances, and (3) answer questions about the COTP and study process. Information obtained from the meetings was integrated into the process to identify preliminary routes within the corridors. Some corridors were eliminated altogether.

Alternative Route Workshops

Thirteen workshops were held in the COTP study area between November 20 and December 4, 1985 to allow agencies and the public to examine the preliminary routes on detailed maps, express concerns or identify issues on the alternative routes presented, and provide environmental data not already considered.

- To help announce the workshops, a news release and a map identifying preliminary alternative routes were sent on November 7, 1985 to over 400 advertising media, including newspapers, radio stations and television stations. In addition, a brief public service announcement was sent to the media. The news releases and announcements included a schedule for all of the route workshops. Press conferences were also held in Klamath Falls, Oregon, and in Redding, Chico, and Sacramento, California between November 4 and November 6, 1985. Display advertisements were placed in 33 newspapers prior to the workshops. The quarter-page advertisements were tailored for a specific circulation area and included a detailed map showing preliminary route alternatives. Each advertisement also provided information on the public workshops scheduled in that area. Table 1.1.7-3 provides a list of the newspapers in which the ads were placed.

- Letters announcing the workshops were sent on November 15, 1985 to the 280 agencies that received the initial NOP.

- Briefings were held for county planners and members of county Boards of Supervisors on November 4 and November 5, 1985 in Siskiyou, Modoc, Shasta, Alameda, Contra Costa and Solano Counties.

- Telephone networking was used to reach approximately 200 federal, state, and local agencies, local governments, and interest groups. The dates, locations, and public and agency participation of the route workshops are detailed in Table 1.1.7-4. Approximately 530 individuals attended the route workshops.

Additional Scoping Activities

Southern Oregon

In January 1986 the lead agencies and the Oregon Department of Energy sponsored a series of public meetings in southern Oregon in the vicinity of the three alternative corridors. The purpose of the meetings was to obtain opinions and additional environmental information that would be used in the environmental analyses. The meetings were held on January 27, 28 and 29, 1986 in Pinehurst, Oregon; Malin, Oregon; and Keno, Oregon. Approximately 300 people attended these meetings.

Public Information Meetings

In late 1985 and early 1986, some of the letters from the public and other public contacts indicated that some individuals would benefit from a presentation of background information on the COTP. A series of briefings was conducted for California state legislators in the COTP study area to ensure that they were acquainted with the scope of the COTP and environmental review process. Further, the lead agencies planned another series of meetings throughout the study area during May and June of 1986. These meetings were geared toward those individuals who had had little or no prior exposure to the plan for the COTP or to the environmental planning process. To expand the COTP's base of contacts and to supplement the media announcements and advertisements that had been used previously, approximately 40,000 fliers were mailed to publicize the meetings. Selected zip code areas in the COTP study area were targeted for these mailings. In addition, local citizens and public officials were called upon to notify their neighbors of the public meetings.

Nine public meetings were held between May 6 and June 5, 1986 in the communities of Malin, Oregon; Keno, Oregon; Pinehurst, Oregon; Yreka, California; Dorris, California; Newell, California; Tracy, California; Bethel Island, California; and Round Mountain, California. From these public meetings and media, public interest escalated. Several local citizen groups were formed to provide input to the COTP environmental process and to provide a forum for local citizens to express their views about the COTP. In some instances public meetings were requested by local citizens or local citizen groups in an effort to inform their constituents about the COTP. COTP planners participated in these meetings to become better informed about local citizen views and to exchange information with the public about the COTP environmental process.

Oregon Review Committee

Transmission lines greater than ten miles in length, rated at 230 kV or above, and across two or more political subdivisions are regulated by the State of Oregon Energy Facility Siting Counsel (EFSC). The COTP does not meet this set of criteria. For that reason, Governor Victor Atiyeh of Oregon directed the Oregon Department of Energy in January 1986 to coordinate Oregon state and local agency review of the COTP and to allow for public participation in that review process. The Department of Energy formed an ad hoc organization, the Oregon Review Committee (ORC), to executive the Governor's directive.

Representatives from various Oregon state agencies and citizen representatives from Pinehurst, Keno, and Malin, Oregon serve on the Committee. Representatives from TANC, Western, the Bonneville Power Administration (BPA), and the Northwest investor-owned utilities -- Portland General Electric Company (PGE) and Pacific Power & Light Company (PP&L) -- serve as liaisons to ORC. The liaisons actively participated in the meetings, providing information on COTP planning activities and receiving comments that are integrated into the environmental process. ORC meetings were open to the public, were held every one to three months on average, and provided an additional forum for the public to participate in the environmental process.

Additional legislation has been passed in Oregon regarding transmission lines in excess of 230 kV that are not otherwise under the jurisdiction of the EFSC. The lead agencies are currently evaluating how, if at all, this legislation may affect the COTP.

Newsletters

From the start of the planning process, an extensive COTP mailing list was gradually compiled from media directories, registration forms collected at the public meetings, government agency contacts, correspondence and newsletter mail-in forms submitted during the environmental review, requests to the COTP information telephone number, and from mailing lists provided by such utilities as Western, BPA, PP&L, and Pacific Gas and Electric Company. In addition, landowners along the route alternatives identified in the Draft EIS/EIR were integrated into the mailing list. Each individual, organization, and agency on this extensive mailing list receives copies of newsletters that are periodically prepared by the lead agencies to keep the public informed of the COTP planning process. The mailing list had approximately 8,100 names of agencies and individuals as of June 30, 1987.

The first issue of the COTP newsletter was mailed in May 1985 to over 1,200 organizations and people on the COTP mailing list. The newsletter provided an introduction to the COTP, a list of COTP Participants, a schedule of the scoping meetings, and a review of the environmental process.

The second issue of the newsletter was mailed in July 1985 to over 1,700 organizations and people. This issue presented a map of preliminary alternative corridors, announced the corridor workshops and provided further background on the COTP.

The third issue of the newsletter was released in September 1985 and mailed to approximately 2,000 individuals and entities. The newsletter discussed the corridor workshops and the COTP decision-making process.

The fourth issue of the newsletter was mailed in November 1985 to approximately 3,000 organizations and individuals. This issue described the route identification process, presented a two-color map of the preliminary route alternatives, and announced the route workshops.

A fifth issue of the newsletter was mailed in February 1986. The newsletter discussed the results of the route workshops and announced that the Los Banos-Gates Transmission Project would be addressed in the Final EIS/EIR as the COTP.

Issue number six was released in June 1986 to over 6,000 agencies and individuals. It provided information on the May and June 1986 public information meetings, updated the public on the route selection process, and highlighted some of the environmental and engineering guidelines used to help identify route alternatives for the COTP.

Issue number seven of the newsletter was mailed in August 1986 and discussed the alternative routes that had been identified for analysis and discussion in the Draft EIS/EIR. The newsletter also provided a map that indicated new route segments that were being studied. Many of these route segments were a direct result of public information received during the May and June 1986 public meetings.

Newsletter eight was released in December 1986 to over 6,000 people. The newsletter announced the public release of the Draft EIS/EIR, provided information on the location of the public repositories for the Draft EIS/EIR, and listed the public hearing times and locations where people could make their concerns known to the COTP decision makers.

Newsletter nine was issued in June 1987 to over 8,000 people. The newsletter announced the availability of the Supplement to the Draft EIS/EIR for public review and comment, provided information on the location of the public repositories for the Supplement, and posted the public hearing times and locations. The newsletter also provided a map which showed new routing options under study for portions of the preferred route for the COTP, as well as a third alternative site for the Southern Oregon Switching Station.

Newsletters were provided as hand-outs at all public meetings on the COTP.

Draft EIS/EIR

An extensive effort was made to notify interested persons, landowners, and government agencies of the availability of the Draft EIS/EIR. A Notice of Availability was sent to the 280 agencies that received the NOP. A Federal Register notice announcing the filing of the Draft EIS/EIR was published on December 2, 1986. Each individual, organization, and agency on the COTP mailing list received a copy of Newsletter No. 8, which announced the release of the Draft EIS/EIR, the public comment period, the location of the public repositories for the document, and the public hearing times and locations. In addition, those parties received a supplement to Newsletter No. 8. That supplement provided more detailed maps of the northern and southern sections of the COTP study area that showed the preferred routes, alternative routes, and the optional route segments upon which the transmission line might be built.

During the week of December 5, 1986, quarter-page newspaper display advertisements were also placed in 41 newspapers in the COTP and Los Banos-Gates study areas. Each TANC Member's service area was covered by the advertisements. These advertisements announced the availability of the Draft EIS/EIR for public review and posted the location and dates for the public hearings. Each advertisement also presented a schematic map of the study area for the COTP and Los Banos-Gates Project. Table 1.1.7-3 provides a list of the newspapers in which the ads were placed.

The Draft EIS/EIR was made available for public review at 109 locations throughout the study areas for the COTP and Los Banos-Gates Project and in major cities on the west coast. 181 copies were sent separately to federal, state, and local agencies. 186 copies were also sent to individuals and interest groups who had requested the Draft EIS/EIR. Table 1.1.7-5 identifies the locations where the public could review the Draft EIS/EIR.

All the public repositories listed in Table 1.1.7-5 received copies of the Supplement to the Draft EIS/EIR and the Final EIS/EIR. In addition, all agencies, landowners, and other interested individuals who requested and received copies of the Draft EIS/EIR received copies of the Supplement to the Draft EIS/EIR and the Final EIS/EIR.

Public Hearings

During the public review of the Draft EIS/EIR, twelve public hearings were held in the COTP and Los Banos-Gates study areas, and more than 350 letters were received containing comments on the Draft. The hearings were held between January 5 and January 15, 1987. Approximately 550 people attended the hearings, with 108 presenting testimony. Table 1.1.7-6 lists the locations of the public hearings.

To further publicize the public hearings, another set of quarter-page display advertisements was placed in 41 newspapers in the COTP and Los Banos-Gates study areas, in the City of Portland, and in each TANC Member's service area. The advertisements ran during the week of December 17, 1986. These ads provided a list of the public hearings and their locations and dates. Table 1.1.7-3 provides a list of the newspapers in which the ads were placed.

Extension of Comment Period

The period for receiving comments on the Draft EIS/EIR was to end February 3, 1987, providing the public with 60 days to review the document. Due to the degree of public interest in the projects, the lead agencies extended the public comment period on the Draft EIS/EIR to March 2, 1987.

One-eighth page newspaper display advertisements were used to publicize the extension of the comment period. The advertisements were placed during the week of January 26, 1987 in 42 newspapers in the COTP and Los Banos-Gates study areas, in the City of Portland, and in each TANC Member's service area. Table 1.1.7-3 lists the newspapers in which the ads ran.

Supplement to the Draft EIS/EIR

An extensive program was implemented to notify interested persons, landowners, governments, and government agencies of the availability of the Supplement to the Draft EIS/EIR. A Notice of Availability was sent to the 280 agencies that received the NOP. A Federal Register notice announcing the filing of the Supplement to the Draft EIS/EIR was published on July 3, 1987. Each individual, organization, and agency on the COTP mailing list was sent a copy of Newsletter No. 9, which announced the release of the Supplement to the Draft EIS/EIR, the public comment period, the location of the public repositories for the Supplement, and the public hearing times and locations. The newsletter contained maps showing the new routing options under study for portions of the COTP and a third alternative site for the Southern Oregon Switching Station.

During the week of June 30, 1987, quarter-page newspaper display advertisements were placed in 42 newspapers in the COTP and Los Banos-Gates study areas, in the City of Portland, and in each TANC Member's service area. Table 1.1.7-3 lists the newspapers in which the ads ran.

The Supplement to the Draft EIS/EIR was made available for public review at 119 locations in California, Oregon, and Washington. The repositories are identified in Table 1.1.7-5. Additional repositories for the Supplement to the Draft EIS/EIR were: Central Library, Sacramento, California; Deschutes County Library, Bend, Oregon; Boardman City Library, Boardman, Oregon; Eugene Public Library, Eugene, Oregon: Lebanon Public Library, Lebanon, Oregon; Jefferson County Library, Madras, Oregon; Crook County Library, Prineville, Oregon; Douglas City Library, Roseburg, Oregon; Silverton Public Library, Silverton, Oregon; Springfield Public Library, Springfield, Oregon; Stayton Public Library, Stayton, Oregon; Sweet Home Public Library, Sweet Home, Oregon; The Dalles City/Wasco County Library, The Dalles, Oregon; Richland Public Library, Richland, Washington. Over 280 copies of the Supplement to the Draft EIS/EIR were sent separately to federal, state, and local agencies. Copies were also sent to individuals and interest groups who had received the Draft EIS/EIR.

Public Hearings

The 45-day comment period on the Supplement to the Draft EIS/EIR ended August 17, 1987. During the comment period, three public hearings were held in the COTP study area. The hearings were held in Burney, California, on August 4, in Newell, California, on August 5, and in Tracy, California, on August 6.

To further publicize the public hearings, one-eighth page display advertisements were placed in 42 newspapers in the COTP and Los Banos Gates study areas, in the City of Portland, and in each TANC Member's service area. The ads ran during the week of July 20, 1987 and provided a list of the public hearings and the locations and dates. Table 1.1.7-3 lists the newspapers in which the ads ran.

Ongoing Activities

Table 1.1.7-7 summarizes the public notification dates related to the NEPA and CEQA process for the COTP and Los Banos-Gates Project. From the beginning of the comment period on the Draft EIS/EIR and through the preparation of the Final EIS/EIR, the lead agencies have met with agency representatives, affected individuals, and landowners to discuss their routing concerns and proposed mitigation measures. To the extent practicable, those concerns have been incorporated into various modifications of the preferred route.

Los Banos-Gates Transmission Project (7.2)

Since the public distribution of the Draft EIS/EIR, PGandE has continued to respond to ongoing informational requests from agencies and the general public. Table 1.1.7-8 summarizes the concerns received since release of the Draft EIS/EIR. In addition, PGandE representatives attended hearings on the Draft EIS/EIR in Los Banos and Coalinga on January 14 and 15, 1987. These hearings were officiated by TANC and Western. At the hearings, PGandE representatives provided answers to questions posed by individuals and agencies during the informal discussion session.

Pacific Northwest Reinforcement Project (7.3)

Public involvement activities for the Pacific Northwest Reinforcement Project included contacts with agencies, information bulletins, and discussion of the facilities at scoping meetings. BPA and other PNW utilities were represented at scoping and other meetings for the COTP held in several Oregon communities including Ashland, Medford, Keno, Malin, Klamath Falls, and Portland. These utilities were also represented at the public hearings held by TANC and Western to receive comments on the Draft EIS/EIR and Supplement to the Draft EIS/EIR.

FIGURE 1.1.7-1

COTP ENVIRONMENTAL SCHEDULE

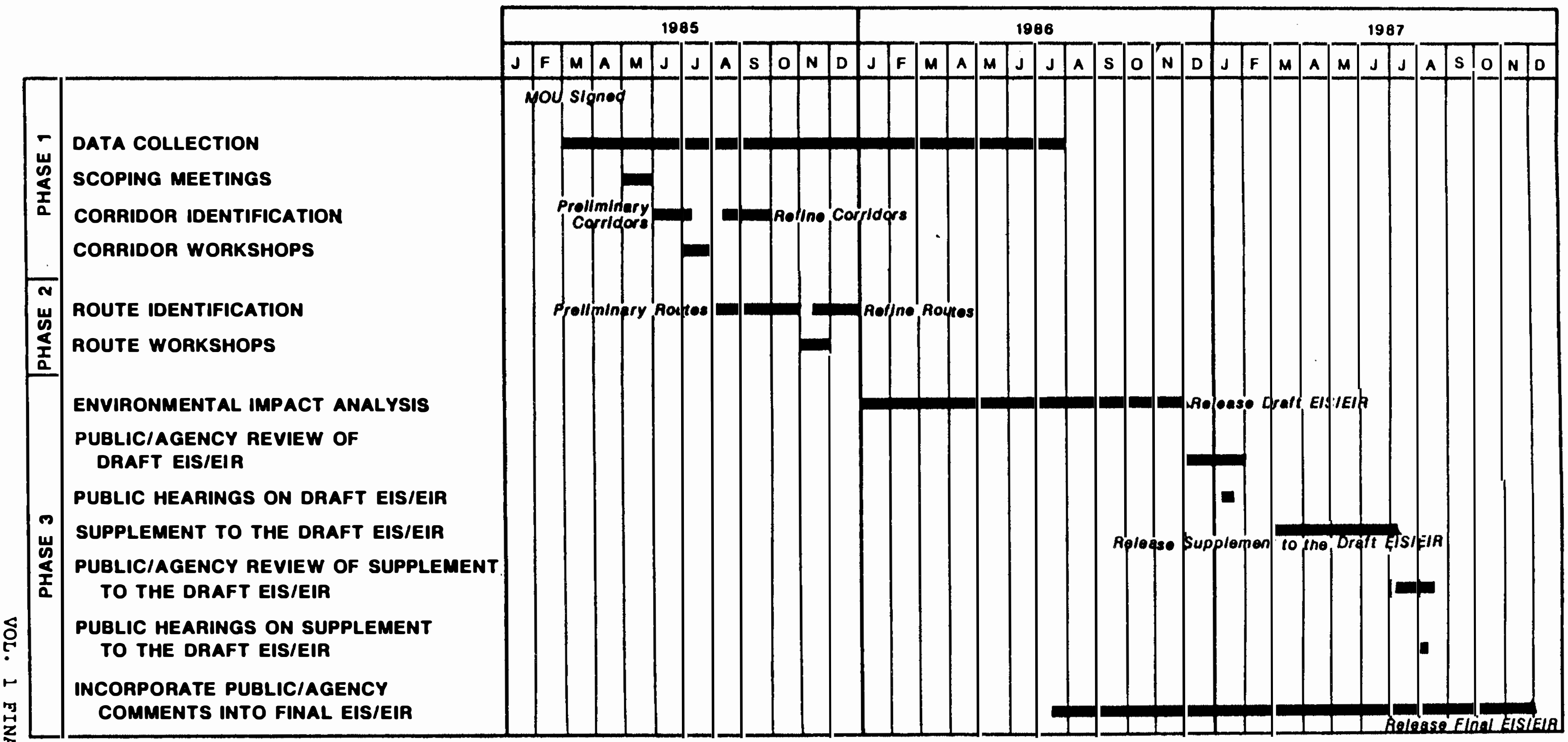

TABLE 1.1.7-1

CALIFORNIA-OREGON
TRANSMISSION PROJECT
AGENCY MEETING CONTACTS FOR
SCOPING MEETINGS AND CORRIDOR WORKSHOPS

S = Scoping Meetings
C = Corridor Workshops

CALIFORNIA

California Department of Fish
and Game
Alturas, CA (S,C)

Modoc County Board of Supervisors
Alturas, CA (S,C)

Modoc County Planning Department
Alturas, CA (C)

Modoc County Public Works
Alturas, CA (S)

Pacific Power and Light
Alturas, CA (S)

Sunrise Valley Electrification
Corporation
Alturas, CA (S)

USDA Forest Service
Modoc National Forest
Alturas, CA (S,C)

Southern California Public
Agencies, City of Anaheim
Utility Department
Anaheim, CA (S)

California Native Plant Society
Anderson, CA (S,C)

City of Antioch
Planning Department
Antioch, CA (S,C)

Director of Public Utilities
Banning, CA (S)

City of Biggs Planning Department
Biggs, CA (S)

Jones Flying Service
Biggs, CA (S,C)

Brentwood City Council
Brentwood, CA (S,C)

City of Brentwood
Planning Department
Brentwood, CA (S,C)

Pit River Tribal Council
Burney, CA (S,C)

California Department of Parks
and Recreation
Castle Crags State Park
Castella, CA (S,C)

Audubon Society ALTICAL Chapter
Chico, CA (S,C)

Bidwell Nature Center
Chico, CA (S,C)

Butte Environmental Council
Chico, CA (S,C)

California Native Plant Society
Mt. Lassen Chapter
Chico, CA (S,C)

Chico Creek Nature Center
Chico, CA (S,C)

Chico Zoo
Chico, CA (S)

City of Chico Planning Department
Chico, CA (S)

Environmental Advocates
Chico, CA (S,C)

Friends of the Foothills
Chico, CA (S,C)

Northeast Archaeological
Information Center
Chico, CA (S,C)

Northstate Wilderness Committee
Chico, CA (S,C)

Pacific Gas and Electric Company
Chico, CA (S,C)

Sierra Club Yahi Chapter
Chico, CA (S,C)

Colton Chamber of Commerce
Colton, CA (S)

Electrical Utility Director
City of Colton
Colton, CA (S)

Utility Director
City of Azusa
Colton, CA (S)

Colusa City Council
Colusa, CA (S,C)

Colusa County
Agriculture Department
Agricultural Commissioner
Colusa, CA (S,C)

Colusa County Air Pollution
Control Officer
Colusa, CA (S)

Colusa County
Board of Supervisors
Colusa, CA (S,C)

Colusa County
Environmental Health Officer
Colusa, CA (S,C)

Colusa County
Planning Commission
Colusa, CA (S,C)

Colusa Rural Fire Department
Colusa, CA (S,C)

Director of Planning and Building
Administration
Colusa, CA (S,C)

Director of Public Works
Colusa, CA (S,C)

Miller's Flying Service
Colusa, CA (S,C)

Moore's Flying Service
Colusa, CA (S)

City of Davis
Community Development Department
Davis, CA (C)

City Manager
City of Davis
Davis, CA (S,C)

Sierra Club
Davis, CA (S)

City of Dixon Planning Department
Dixon, CA (S,C)

Maine-Praire Water District
Dixon, CA (S,C)

USDA Soil Conservation Service
Dixon, CA (S,C)

City Manager
City of Dorris
Dorris, CA (S,C)

Dunnigan Citizen's Advisory
General Plan Review Committee (S)

Audubon Society
Dunsmuir, CA (S)

City Manager
City of Dunsmuir
Dunsmuir, CA (S)

City of Dunsmuir
Dunsmuir, CA (S,C)

Dunsmuir Chamber of Commerce
Dunsmuir, CA (S,C)

Town Chairperson
Town of Esparto
Esparto, CA (S,C)

Solano County
Cooperative Extension Service
Fairfield, CA (S,C)

Solano County Farm Bureau
Fairfield, CA (S,C)

Alameda County Water District
Fremont, CA (S)

City of Gridley
Planning Department
Gridley, CA (S,C)

Happy Camp Community Services
District
Happy Camp, CA (S,C)

Karuk Indian Tribe
Happy Camp, CA (S,C)

Alameda County Fire
Fire Protection District
Hayward, CA (S,C)

Alameda County Public Works
Hayward, CA (S,C)

League of Women Voters
Hayward, CA (S)

Fruit Growers Supply Company
Hilt, CA (S)

Alameda County Farm Bureau
Livermore, CA (S,C)

City Manager
City of Livermore
Livermore, CA (S,C)

Livermore Planning Department
Livermore, CA (S,C)

Livermore Recreation District
Livermore, CA (S,C)

USDA Soil Conservation Service
Livermore,CA (S,C)

City of Lodi
Department of Community
Development and Planning
Lodi, CA (S,C)

Building Industry Association of
Southern California
Los Angeles, CA (S)

Central City Association
of Los Angeles
Los Angeles, CA (S)

City Administrator
City of Vernon
Los Angeles, CA (S)

Los Angeles Chamber of Commerce
Los Angeles, CA (S)

Los Angeles Department of
Water and Power
Los Angeles, CA (S)

Southern California
Association of Governments
Los Angeles, CA (S)

Contra Costa County Resource
Conservation District
Martinez, CA (S)

Caltrans
Planning Division District 3
Marysville, CA (S,C)

Pacific Gas and Electric Company
Electrical Superintendent
Marysville, CA (S)

Sutter County Planning Department
Marysville, CA (S)

Yuba County Community Services
Marysville, CA (S,C)

Yuba County Planning Department
Marysville, CA (C)

Champion International Corporation
McCloud, CA (S)

City of McCloud
McCloud, CA (S,C)

McCloud Chamber of Commerce
McCloud, CA (S,C)

McCloud Community Service District
McCloud, CA (S)

McCloud River Preserve
McCloud, CA (S)

McCloud River Railroad Company
McCloud, CA (S,C)

McCloud Service District
McCloud, CA (S)

Montague Water Conservation
District
Montague, CA (S)

City Manager
City of Mt. Shasta
Mt. Shasta, CA (S)

City of Mt. Shasta
Mt. Shasta, CA (S,C)

Dunsmuir News
Mt. Shasta Herald
Weed Press
Mt. Shasta, CA (S)

Lake Shastina Community Services
District
Mt. Shasta, CA (S,C)

Mt. Shasta Chamber of Commerce
Mt. Shasta, CA (S,C)

Mt. Shasta Resources Council
Mt. Shasta, CA (S,C)

Pit River Tribal Council
Mt. Shasta, CA (S)

Southern Pacific Land Company
Mt. Shasta, CA (S)

USDA Forest Service
Mt. Shasta Ranger District
Mt. Shasta, CA (S,C)

East Bay Regional Park District
Oakland, CA (S)

Department of Energy Development
Oceanside, CA (S)

Orange County Planning Department
Orange, CA (S)

Glenn County Cooperative Extension
Orland, CA (S,C)

Glenn County Farm Bureau
Orland, CA (S)

Orland-Artois Water District
Orland, CA (S)

Orland Water Users Association
Orland, CA (S)

Butte County Air Pollution
Control District
Oroville, CA (S,C)

Butte County Board of Supervisors
Oroville, CA (S,C)

Butte County Farm Bureau
Oroville, CA (S,C)

Butte County Planning Department
Oroville, CA (S,C)

Butte County Public Works
Oroville, CA (S,C)

California Department of Forestry
Oroville, CA (S,C)

City of Oroville
Planning Department
Oroville, CA (S,C)

USDA Forest Service
Oroville, CA (C)

City of Paradise
Planning Department
Paradise, CA (S,C)

California Agriculture
Aviation Association
Pleasant Grove, CA (S)

Plumas National Forest
Quincy, CA (S,C)

California Department of Fish
and Game
Rancho Cordova, CA (S,C)

California Department of Fish
and Game
Red Bluff, CA (C)

California Department of Forestry
Red Bluff, CA (S,C)

Federal Aviation Administration
Red Bluff, CA (S,C)

Tehama County Planning Department
Red Bluff, CA (C)

Big Bend Rancheria
Redding, CA (S)

California Department of Fish
and Game
Redding, CA (S,C)

California Department of Forestry
Shasta-Trinity Ranger Unit
Redding, CA (S,C)

California Water Quality Control
Board, Central Valley Region
Redding, CA (S,C)

City of Redding
Planning Department
Redding, CA (S)

Shasta-Cascade Wonderland
Redding, CA (S,C)

Shasta County
Agricultural Commissioner
Redding, CA (S,C)

Shasta County Board of Supervisors
Redding, CA (S,C)

Shasta County Commissioners
Redding, CA (S,C)

Shasta County Farm Advisor
Redding, CA (S,C)

Shasta County Planning Department
Redding, CA (S,C)

Shasta County Public Works
Redding, CA (S,C)

Shasta Fourwheelers
Redding, CA (S)

Sierra Club
Redding, CA (S,C)

USDA Forest Service
Shasta Lake Ranger District
Redding, CA (S,C)

USDA Forest Service
Tehama-Glenn Ranger District
Redding, CA (S,C)

USDI Bureau of Land Management
Redding, CA (S,C)

General Manager
City of Riverside
Riverside, CA (S)

Riverside Chamber of Commerce
Riverside, CA (S)

Riverside City Council
Riverside, CA (S)

Sierra Club San Gorgonio Chapter
Riverside, CA (S)

Northwest Archaeological
Information Center
Rohnert Park, CA (S)

California Agriculture Aviation
Administration
Sacramento, CA (S,C)

California Air Pollution Control
Board
Sacramento, CA (S)

California Air Resources Board
Sacramento, CA (S,C)

California Department of Boating
and Waterways
Sacramento, CA (S)

California Department of
Conservation
Sacramento, CA (S,C)

California Department of Forestry
Sacramento, CA (S,C)

California Department of Health
Sacramento, CA (S,C)

California Department of Housing
and Community Development
Sacramento, CA (S,C)

California Department of Planning
and Research
Office of Permit Assistance
Sacramento, CA (S,C)

California Department of
Recreation Resources
Sacramento, CA (S,C)

California Department of Resource
Conservation
Sacramento, CA (S)

California Department of
Water Resources
Sacramento, CA (S,C)

California Farm Bureau
Sacramento, CA (S,C)

California Office of Historic Preservation
Sacramento, CA (S,C)

California Parks and Recreation Department
Office of Historic Preservation
Sacramento, CA (S)

California Public Utilities Commission
Sacramento, CA (S)

California State Lands Commission
Sacramento, CA (S,C)

California State Water Resources Control Board
Sacramento, CA (S,C)

California Water Quality Control Board (Region V)
Sacramento, CA (S)

California Water Quality Control Board
Central Valley Region
Sacramento, CA (S)

Caltrans Aeronautics Division
Sacramento, CA (S,C)

Caltrans Environmental Affairs Division
Sacramento, CA (S)

League of Women Voters of California
Sacramento, CA (S)

Northern Central Archeological Information Center
Sacramento, CA (S,C)

Sacramento Area Council of Governments (S)

Sacramento Municipal Utility District
Sacramento, CA (S)

Sacramento River Preservation Trust (S)

Solano County Department of Environmental Management
Sacramento, CA (S,C)

Chief of Construction Operations
U. S. Department of the Army
Corps of Engineers
Sacramento, CA (S)

Chief of Engineering Division
U. S. Department of the Army
Corps of Engineers
Sacramento, CA (S)

U. S. Department of the Army
Corps of Engineers
Regulatory Division
Sacramento, CA (S)

USDA Soil Conservation Service
Sacramento, CA (S,C)

USDI Fish and Wildlife Service
Division of Ecological Services
Sacramento, CA (S,C)

Western Regional Audubon Society Office
Sacramento, CA (S,C)

San Diego Association of Governments
San Diego, CA (S)

San Diego County
Office of Planning
San Diego, CA (S)

San Diego Gas and Electric Company
San Diego, CA (S)

San Diego League of Women Voters
San Diego, CA (S)

San Diego State University
Center of Energy Studies
San Diego, CA (S)

Sierra Club
San Diego Chapter
San Diego, CA (S)

United Consumer Action Network (UCAN)
San Diego, CA (S)

Defenders of Wildlife
San Francisco, CA (S)

Sierra Club National Office
San Francisco, CA (S,C)

Alameda County Mayor's Conference
San Leandro, CA (S)

Southern California Businessman's Association
Southern California (S)

California Department of Parks and Recreation
Stockton, CA (S)

City of Stockton
Planning Department
Stockton, CA (S,C)

Port of Stockton
Stockton, CA (S)

San Joaquin Council of Governments
Stockton, CA (S,C)

San Joaquin County and Building Department
Stockton, CA (S,C)

San Joaquin County Farm Bureau
Stockton, CA (S,C)

Sierra Club Delta Chapter
Stockton, CA (S)

Ulatis Resource Conservation District
Suisun, CA (S,C)

Lassen National Forst
Susanville, CA (S,C)

USDI Bureau of Land Management
Susanville, CA (S,C)

City of Tracy
Department of Community Development
Tracy, CA (S,C)

California Department of Fish and Game
Tulelake, CA (S)
Klamath Basin National Wildlife Refuges
Tulelake, CA (S,C)

Lava Beds National Monument
Tulelake, CA (S,C)

Tulelake Irrigation District
Tulelake, CA (S,C)

USDA Forest Service
Double Head Ranger District
Tulelake, CA (S,C)

USDI Bureau of Land Management
Ukiah, CA (S,C)

City of Vacaville
Department of Community Development
Vacaville, CA (S,C)

Solano Irrigation District
Vacaville, CA (S,C)

City Manager
City of Weed
Weed, CA (S)

City of Weed
Weed, CA (S,C)

Weed Chamber of Commerce
Weed, CA (S,C)

Western Timber Association
West Sacramento, CA (S,C)

Colusa County Farm Bureau
Williams, CA (S,C)

Williams City Council
Williams, CA (S)

Williams Department of Public Works
Williams, CA (S,C)

Williams Fire Protection District
Williams, CA (S)

Williams Planning Commission
Williams, CA (S,C)

Williams Superintendent of Public Works
Williams, CA (S)

California Department of Fish and Game
Willows, CA (S)

California Department of Forestry
Tehama-Glenn Ranger District
Willows, CA (S,C)

Glenn-Colusa Water Irrigation District
Willows, CA (S,C)

Glenn County
Agriculture Department
Willows, CA (S,C)

Glenn County
Firechiefs Association
Willows, CA (S)

Glenn County Public Works
Willows, CA (S,C)

Kanwha and Glide Irrigation
Willows, CA (S)

Sacramento National Wildlife Refuge
Willows, CA (S,C)

USDA Agriculture Stabilization and Conservation Service
Willows, CA (S,C)

USDA Forest Service
Mendocino National Forest
Willows, CA (S,C)

USDA Soil Conservation Service
Willows, CA (S,C)

USDI Bureau of Reclamation
Willows, CA (S,C)

USDI Fish and Wildlife Service
Willows, CA (S,C)

City Manager
City of Winters
Winters, CA (S)

California Department of Resource Conservation
Division of Oil and Gas
Woodland, CA (S,C)

City of Woodland
Planning Department
Woodland, CA (S,C)

USDA Soil Conservation Service
Woodland, CA (S,C)

Woodland Resource Conservation District
Woodland, CA (S,C)

Yolo County Agriculture Department
Agricultural Commissioner
Woodland, CA (S,C)

Yolo County Agriculture Department
Farm Advisors
Woodland, CA (S,C)

Yolo County Cooperative Extension
Woodland, CA (S)

Yolo County Counsel
Woodland, CA (S)

Yolo County Flood Control and
Water Conservation District
Woodland, CA (S,C)

Yolo County League of Women Voters
Woodland, CA (S,C)

Yolo County
Pacific Gas and Electric Company
Woodland, CA (S)

Yolo County Planning Department
Woodland, CA (S,C)

Yolo Public Works Department
Woodland, CA (S,C)

California Department of Forestry
Yreka, CA (S,C)

City of Yreka Planning Department
Yreka, CA (S,C)

Klamath National Forest
Yreka, CA (S,C)

Mt. Shasta Fire District
Yreka, CA (S)

Pacific Power and Light Company
Yreka, CA (S,C)

Shasta Nation, Inc.
Yreka, CA (S)

Shasta Tribe, Inc.
Yreka, CA (S,C)

Siskiyou Association of Indians
Yreka, CA (S)

Siskiyou County Assessor
Yreka, CA (S)

Siskiyou County
Board of Supervisors
Yreka, CA (S,C)

Siskiyou County
Department of Public Works
Yreka, CA (S,C)

Siskiyou County
Environmental Health
Yreka, CA (S)

Siskiyou County
Planning Department
Yreka, CA (S,C)

USDA Forest Service
Klamath National Forest
Yreka, CA (S)

USDA Soil Conservation Service
Yreka, CA (S,C)

Onstott Dusters
Yuba City, CA (S,C)

Yuba County Farm Bureau
Yuba City, CA (S,C)

OREGON

Oregon Land Conservation and
Development Department
Bend, OR (S,C)

Klamath County Assessor's Office
Klamath Falls, OR (S,C)

Klamath County Parks Department
Klamath Falls, OR (S)

Klamath County Planning Department
Klamath Falls, OR (S,C)

Klamath Falls Planning Department
Klamath Falls, OR (S,C)

Klamath Public Works Department
Klamath Falls, OR (S,C)

Oregon Department of Fish
and Wildlife
Klamath Falls, OR (S,C)

Weyerhauser
Klamath Falls, OR (S,C)

Jackson County Planning and
Development Department
Medford, OR (C)

Medford Planning Department
Medford, OR (S,C)

Medford Public Works Department
Medford, OR (S,C)

USDA Forest Service
Supervisor's Office
Medford, OR (S)

USDI Bureau of Land Management
Medford, OR (S,C)

Oregon Department of Environmental
Quality
Portland, OR (S,C)

Office of the Governor
State of Oregon
Division of Intergovernmental
Relations
Salem, OR (S,C)

Oregon Department of Energy
Salem, OR (S,C)

Oregon Department of Forestry
Salem, OR (S,C)

Oregon Department of Transportation
Aeronautics Division
Salem, OR (S,C)

Oregon Public Utilities Commission
Salem, OR (S,C)

Oregon Water Resources Board
Salem, OR (S)

U. S. Department of Energy
Salem, OR (S,C)

TABLE 1.1.7-2

SCOPING MEETING LOCATIONS

Date (1985)	Location	Attendance 1/
	Northern Schedule	
May 13	Redding, CA	8
May 13	Redding, CA	12
May 14	Medford, OR	4
May 14	Ashland, OR	1
May 15	Macdoel, CA	14
May 15	Klamath Falls, OR	16
May 15	New#*	

1/ Does not include attendance by COTP participants.

TABLE 1.1.7-3

DISPLAY ADVERTISING SUMMARY
RUN DATES

Newspaper	Corridor Workshops	Route Workshops	Draft EIS/EIR Availability	Public Hearings for Draft EIS/EIR	Comment Period Extension	Supplement to the Draft EIS/EIR Availability	Public Hearings for the Supplement to the Draft EIS/EIR
Alameda Times Star			12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Ashland Daily Tidings	7/14/85	11/22/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Bethel Island Beacon			12/3/86	12/17/86	1/28/87	7/1/87	7/22/87
Biggs News			12/4/86	12/18/86	1/29/87	7/2/87	7/23/87
Butte Valley Star, Lost River Star, Keno Star		11/20/85	12/3/86	12/17/86	1/28/87	7/1/87	7/22/87
Brentwood News					1/27/87	7/2/87	7/23/87
Chico Enterprise Record	7/14/85 & 7/17/85	11/17/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Coalinga Record			12/3/86	12/17/86	1/28/87	7/1/87	7/22/87
Colusa Sun Herald	7/15/85 & 7/17/85	11/15/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Contra Costa Times, Antioch Daily Ledger, Pittsburg Post-Dispatch	7/21/85	11/27/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Davis Enterprise		11/18/85					
Fairfield Daily Republic		11/8/85					
Feather River Bulletin			12/3/86	12/17/86	1/28/87	7/1/87	7/22/87
Fresno Bee			12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Gridley Herald			12/5/86	12/17/86	1/28/87	7/1/87	7/22/87
Healdsburg Tribune			12/5/86	12/17/86	1/28/87	7/1/87	7/22/87
Intermountain News	7/10/85	11/13/85	12/3/86	12/17/86	1/28/87	7/1/87	7/22/87
Herald and News	7/12/85	11/17/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Livermore Tri-Valley Herald	7/21/85	11/17/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Lodi News-Sentinal			12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Lompoc Record			12/5/86	12/17/86		7/2/87	7/22/87
Los Banos Enterprise			12/5/86	12/17/86	1/18/87	7/1/87	7/22/87
Marysville Appeal-Democrat	7/17/85 & 7/22/85	11/16/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Modesto Bee	7/21/85	11/17/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Modoc County Record	7/11/85	11/14/85	12/4/86	12/18/86	1/29/87	7/2/87	7/23/87
Mt. Shasta Herald, Weed Press, Dunsmuir News	7/10/85	11/17/85					
Oroville Mercury Register	7/12/85 & 7/16/85	11/16/85					
Palo Alto Tribune			12/5/86	12/17/86	1/28/87	7/2/87	7/22/87
Portola Reporter			12/3/86	12/17/86	1/28/87	7/1/87	7/22/87
Red Bluff Daily News	7/13/85 & 7/16/85	11/15/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Redding Record Searchlight	7/13/85 & 7/16/85	11/17/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Roseville Press-Enterprise			12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Sacramento Bee	7/19/85 & 7/21/85	11/17/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Siskiyou Daily News	7/10/85 & 7/12/85	11/15/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Stockton Record	7/21/85	11/17/85					
The Oregonian		11/15/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
The Santa Clara American			12/5/86	12/19/86	1/30/87	7/1/87	7/22/87
Tracy Press	7/17/85 & 7/19/85	11/15/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Tulelake Reporter		11/21/85					
Turlock Daily Journal			12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Ukiah Daily Journal			12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Vacaville Reporter		11/17/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87
Willows Journal	7/12/85 & 7/16/85	11/15/85	12/5/86	12/19/86	1/27/87	7/3/87	7/21/87
Woodland Daily Democrat	7/21/85 & 7/22/85	11/17/85	12/5/86	12/17/86	1/27/87	7/2/87	7/22/87

TABLE 1.1.7-4

CORRIDOR WORKSHOP
AND ROUTE WORKSHOP ATTENDANCE

Corridor Workshops

Date (1985)	Location	Attendance [1/] Agency	Public	Total
July 15	Oregon Technical Institute, Klamath Falls, Oregon	3	6	9
July 16	Goose Nest Ranger District, Macdoel, California	14	5	19
July 16	Sisson Intermediate School, Mount Shasta, California	3	164	167
July 17	Redding Civic Auditorium Redding, California	2	7	9
July 17	Redding Civic Auditorium Redding, California	8	7	15
July 18	Chico Community Center Chico, California	4	14	18
July 22	Tracy Community Center Tracy, California	1	2	3
July 23	Yolo County Agricultural Building, Woodland, California	1	9	10
July 23	Yolo County Agricultural Building, Woodland, California	13	4	17

Route Workshop

Date (1985)	Location	Attendance [2/] Agency	Public	Total
November 20	Antioch City Council Chamber, Antioch, California	4	0	4
November 20	Holiday Inn, Redding, California	20	4	24
November 20	Alamo School, Vacaville, California	1	14	15
November 20	Red Lion Inn, Redding, California	2	10	12
November 21	Tracy Community Center, Tracy, California	7	4	11
November 21	Sisson Hatchery Museum, Mount Shasta, California	20	148	168
November 21	Bristow Community Theater Brentwood, California	1	6	7
November 21	VFW Hall, Burney, California	0	7	7
November 22	Winema Inn, Klamath Falls, Oregon	27	6	33
November 25	Modoc County Planning Department, Alturas, California	16	0	16
November 25	Newell Elementary School, Newell, California	5	19	24
November 26	Macdoel Elementary School, Macdoel, California	4	23	27
December 4	Yreka Community Theater, Yreka, California Klamath Falls, Oregon	3	179	182

1/ Some workshop participants who attended did not register, so these numbers may not represent the total attendance. This is particularly true for the Mt. Shasta Workshop, where an approximate count of 225 people was taken. Attendance does not include COTP Participants.

2/ Some workshop participants who attended did not register, so these numbers may not represent the total attendance. Does not include COTP Participants.

TABLE 1.1.7-5

CALIFORNIA-OREGON TRANSMISSION PROJECT
LOS BANOS-GATES TRANSMISSION PROJECT
PUBLIC REVIEW LOCATIONS
FOR THE DRAFT EIS/EIR AND THE
SUPPLEMENT TO THE DRAFT EIS/EIR

Lead Agency under CEQA:

Transmission Agency of
Northern California
1010 Hurley Way, Suite 500
Sacramento, CA

Lead Agency under NEPA:

Western Area Power
Administration
1825 Bell Street
Sacramento, CA

LIBRARIES: California

Modoc County Library
212 W Third Street
Alturas, CA

Antioch Branch Library
501 West 18th Street
Antioch, CA

Burney Branch Library
1080 Siskiyou Street
Burney, CA

CSU Chico
Meriam Library
First and Hazel Streets
Chico, CA

Corning Branch Library
740 Third Street
Corning, CA

Cottonwood Branch Library
2341 Front Street
Cottonwood, CA

Dorris Branch Library
325 South Oregon Street
Dorris, CA

Fall River Mills Branch Library
Hwy 299 Main Street
Fall River Mills, CA

West Los Angeles Regional Library
11360 Santa Monica Boulevard
Los Angeles, CA

McCloud Branch Library
300 East Colombero Drive
McCloud, CA

Stanislaus County Free Library
1500 I Street
Modesto, CA

Mt. Shasta Branch Library
515 East Alma Street
Mt. Shasta, CA

Anderson Branch Library
3200 West Center
Anderson, CA

Brentwood Branch Library
750 Third Street
Brentwood, CA

Carmichael Regional Library
5605 Marconi Avenue
Carmichael, CA

Coalinga District Library
305 North 4th Street
Coalinga, CA

Fresno County Free Library
2420 Mariposa Street
Fresno, CA

Dixon Unified School District
Public Library
135 East B Street
Dixon, CA

Fair Oaks Orangevale
Community Library
11601 Fair Oaks Boulevard
Fair Oaks, CA

Huron Branch Library
Corner of Palmer & O Streets
Huron, CA

Los Banos Branch Library
1312 7th Street
Los Banos, CA

Merced County Library
2100 O Street
Merced, CA

Montgomery Creek Branch
Library
Jackson Lane
Montgomery Creek, CA

Oakley Branch Library
118 East Ruby Street
Oakley, CA

Orland Free Library
333 Mill Street
Orland, CA

Central Library
1750 Oak Park Boulevard
Pleasant Hill, CA

Shasta County Library
1855 Shasta Street
Redding, CA

California State Library
914 Capitol Mall
Library and Courts Building
Sacramento, CA

San Francisco Public Library
Documents Department
Civic Center
San Francisco, CA

Stockton-San Joaquin County
Public Library
605 North El Dorado Street
Stockton, CA

Tulelake Branch Library
Main Street
Tulelake, CA

Vacaville Public Library
680 Merchant Street
Vacaville, CA

College of the Siskiyous Library
800 College Avenue
Weed, CA

Willows Public Library
201 North Lassen
Willows, CA

Woodland Public Library
250 First Street
Woodland, CA

Sutter County Free Library
750 Forbes Avenue
Yuba City, CA

Pittsburg Branch Library
80 Power Avenue
Pittsburgh, CA

Tehama County Library
645 Madison Street
Red Bluff, CA

Rio Vista Library
44 South Second Street
Rio Vista, CA

McKinley Branch Library
601 Alhambra Boulevard
Sacramento, CA

San Jose Public Library
180 West San Carlos Street
San Jose, CA

Tracy Branch Library
520 Tracy Boulevard
Tracy, CA

California State University
Stanislaus Library
801 West Monte Vista Avenue
Turlock, CA

Sacramento County Library
14177 Market Street
Walnut Grove, CA

Weed Branch Library
780 South Davis Street
Weed, CA

Winters Branch Library
201 First Street
Winters, CA

Siskiyou County Public
Library
719 Fourth Street
Yreka, CA

Central Library *
828 I Street
Sacramento, CA

LIBRARIES: Oregon

Ashland Public Library
Siskiyou and Gresham
Ashland, OR

Deschutes County Library *
507 NW Wall Street
Bend, OR

Boardman City Library *
Town Square
Boardman, OR

Southern Oregon State College
Library
1250 Siskiyou Boulevard
Ashland, OR

Bly Branch Library
366 Edler Street
Bly, OR

Eugene Public Library *
100 West 13th Avenue
Eugene, OR

* Public review locations added for the Supplement to the Draft EIS/EIR.

Keno Branch Library
Keno Worden Road
Keno, OR

Lebanon Public Library *
626 Second Street
Lebanon, OR

Malin Branch Library
4 Front Street
Malin, OR

Merrill Branch Library
Front Street and Garfield
Merrill, OR

Crook County Library *
200 East Second Street
Prineville, OR

Silverton Public Library *
Gladys Hoyt Memorial Library
410 S. Water Street
Silverton, OR

Stayton Public Library *
260 N. 2nd Avenue
Stayton, OR

The Dalles City/Wasco
County Library *
722 Court Street
The Dalles, OR

Klamath County Library
126 South Third Street
Klamath Falls, OR

Jefferson County Library *
637 D Street
Madres, OR

Jackson County Library
413 West Main Street
Medford, OR

Multnomah County Library
801 SW Tenth Avenue
Portland, OR

Douglas County Library *
Courthouse, Douglas Avenue
Roseburg, OR

Springfield Public Library *
225 N. Fifth Street
Springfield, OR

Sweet Home Public Library *
13th & Kalmia Street
Sweet Home, OR

LIBRARIES: WASHINGTON

Richland Public Library *
Swift and Northgate
Richland, WA

PLANNING DEPARTMENTS: California

Modoc County Planning Department
202 West Fourth Street
Alturas, CA

Colusa County Planning Department
220 12th Street
Colusa, CA

Fresno County Public
Works Development
Services Department
4499 East Kings Canyon Road
Fresno, CA

Contra Costa County
Community Development Department
651 Pine Street, North Wing
Martinez, CA

Merced County Planning Department
County Administration Building
2222 M Street, 2nd Floor
Merced, CA

Chico Planning Office
441 Main Street
Chico, CA

Solano County Department of
Environmental Management
644 C Missouri Street
Fairfield, CA

Alameda County Planning
Department
399 Elmhurst Street
Hayward, CA

Yuba County Planning and
Building Service Department
938 14th Street
Marysville, CA

Butte County Planning
Commission
Seven County Center Drive
Oroville, CA

* Public review locations added for the Supplement to the Draft EIS/EIR.

City of Pittsburg Community
Development Department
65 Civic Avenue
Pittsburg, CA

Tehama County Planning
Department
Courthouse Annex Room I
Red Bluff, CA

Shasta County Planning Department
1855 Placer Street
Redding, CA

Sacramento County Planning
Department
Environmental Impact Division
827 Seventh Street Room 101
Sacramento, CA

City of Stockton Planning Division
6 East Lindsay
Stockton, CA

San Joaquin County Planning
Department
1810 East Hazelton
Stockton, CA

Glenn County Planning Office
125 South Murdock Street
Willows, CA

Yolo County Community
Development Agency
292 West Beamer Street
Woodland, CA

Siskiyou County Planning
Department
Courthouse Annex
Corner of Butte & Oregon Streets
Yreka, CA

Sutter County Planning
Planning
204 C Street
Yuba City, CA

PLANNING DEPARTMENTS: Oregon

Klamath County Planning Office
316 Main Street
Klamath Falls, OR

Jackson County Department
of Planning and Development
Jackson County Courthouse
Medford, OR

Multnomah County Planning
Department
2115 Southeast Morrison
Portland, OR

OTHER LOCATIONS: California

Big Valley Ranger District
Hwy 299
Adin, CA

Antioch Chamber of Commerce
212 H Street
Antioch, CA

Bethel Island Chamber of Commerce
6261 Bethel Island Road
Bethel Island, CA

Burney Basin Chamber of
Commerce
Caldwell's Corner
Burney, CA

City of Clayton
1005 Oak Street
Clayton, CA

Coalinga Chamber of Commerce
193 East Elm
Coalinga, CA

Corning City Hall
794 Third Street
Corning, CA

Dixon City Hall
600 East A Street
Dixon, CA

City of Dorris
305 South Main street
Dorris, CA

Fresno Chamber of Commerce
2331 Fresno Street
Fresno, CA

Huron City Hall
16900 5th Street
Huron, CA

Knightsen Elementary School
Delta Road
Knightsen, CA

Knightsen Post Office
Knightsen Avenue
Knightsen, CA

Los Banos Chamber of Commerce
503 J Street
Los Banos, CA

McCloud Ranger District
Forest Road
McCloud, CA

Mt. Shasta City Hall
305 North Mt. Shasta Boulevard
Mt. Shasta, CA

Orland City Hall
815 4th Street
Orland, CA

City of Tracy
325 East 10th Street
Tracy, CA

Williams City Hall
810 E Street
Williams, CA

Winters City Hall
318 First Street
Winters, CA

City Clerk and Auditor
801 11th Street
Modesto, CA

Oakley Union School District
Office
501 Norcross Lane
Oakley, CA

Shasta Lake Ranger District
6543 Holiday Drive
Redding, CA

Modoc National Forest
Doublehead Ranger District
1 Mile South of Tulelake on
Highway 139
Tulelake, CA

Williams Post Office
801 E Street
Williams, CA

OTHER LOCATIONS: Oregon

Keno Elementary School
Hwy 66 and Worden Road
Keno, OR

Malin City Hall
Third Street
Malin, OR

TABLE 1.1.7-6

PUBLIC HEARING LOCATIONS

Monday, January 5 - 1:00 p.m.
Winema Inn, Crater Lake Room
1111 Main Street
Klamath Falls, Oregon

Monday, January 5 - 7:00 p.m.
Newell Elementary School
Multipurpose Room
Highway 139
Newell, California

Tuesday, January 6 - 7:00 p.m.
Yreka Community Theatre
810 North Oregon Street
Yreka, California

Wednesday, January 7 - 1:00 p.m.
Redding Civic Auditorium
700 Auditorium Drive
Room 116
Redding, California

Wednesday, January 7 - 7:00 p.m.
Round Mountain Community Center
Highway 299E
Round Mountain, California

Wednesday, January 7 - 7:00 p.m.
Butte Valley High School
Gymnasium
West Third Street
Dorris, California

Thursday, January 8 - 7:00 p.m.
Williams Elementary School
Multipurpose Room
1404 E Street
Williams, California

Monday, January 12 - 7:00 p.m.
Tracy Community Center
300 East 10th Street
Tracy, California

Tuesday, January 13 - 7:00 p.m.
Edna Hill Elementary School
Bristow Community Theatre
140 Birch Street
Brentwood, California

Wednesday, January 14 - 1:00 p.m.
Vacaville Community Center
Multipurpose Room
1100 Alamo
Vacaville, California

Wednesday, January 14 - 7:00 p.m.
Kecks Park Community Center
Assembly Room B
555 Monroe
Coalinga, California

Thursday, January 15 - 7:00 p.m.
Holiday Inn
Pacheco Main Room
13070 South Highway 33 at I-5
Santa Nella, California

TABLE 1.1.7-7

SUMMARY OF
NEPA/CEQA ENVIRONMENTAL
NOTIFICATION DATES
FOR THE COTP AND LOS BANOS-GATES

° Notice of Intent (Federal)	November 7, 1984
° Notice of Preparation (State)	April 8, 1985
° Amendment to Notice of Intent (Federal)	April 26, 1985
° Amendment to Notice of Intent (Federal)	February 4, 1986
° Supplemental Notice of Preparation (State)	February 21, 1986
° Draft EIS/EIR filed with EPA	November 26, 1986
° Notice of Completion of DEIS/EIR	December 1, 1986
° Notice of Availability of DEIS/EIR Published in Federal Register	December 2, 1986
° Notice of Completion of Supplement to the DEIS/EIR	June 26, 1987
° Notice of Availability of Supplement to the DEIS/EIR Published in Federal Register	July 3, 1987

TABLE 1.1.7-8

LOS BANOS-GATES TRANSMISSION PROJECT
COMMENTS SUMMARY

COMMENT LETTERS RECEIVED

Agency/Organization	Date	Concerns
FEDERAL		
USDI Fish and Wildlife Service USDI Bureau of Land Management	2-26-87	Visual, cultural, Panoche WSA, endangered species, wildlife
STATE		
California Department of Transportation	1-15-87	No comment
California Department of Fish and Game	3-3-87	East Alternative Route preferred Wildlife, text changes, mitigation sections: reword, expand and appoint authority, construction procedures
California Department of Parks and Recreation	1-21-87	Los Banos Creek Reservoir, Prefer East Alternative Route
California Department of Water Resources	1-20-87	Little Panoche Reservoir and Dam Facilities Contracts for Work in the Little Panoche area
COUNTY		
Fresno Public Works and Development Services Dept.	2-24-87	Consistency of proposed actions, Fresno County Zoning
LOCAL		
Westlands Water District	2-23-87	Request for locating the T/L in the western proposed route
PRIVATE		
The Allen Ranch	1-14-87 2-20-87	Interferences with Agricultural Operations; associated problems
J. T. Speiler	1-25-87	Request for Map of Route

PUBLIC HEARING TESTIMONY

Name	Representing	Concerns
Mr. Scott Florence	BLM	Visual resources, wilderness values
Dr. John Mevi	Individual	Alternate western route and potential health effects
Mr. James Hurley	Individual	Construction start date
Mr. John Areias	Individual	No revenues from windmills
Mr. James Allen	The Allen Ranch	Interference with Agricultural Operations

List of Preparers

1.1.8 CHANGES TO THE DRAFT EIS/EIR VOLUME 1 SECTION 8.0 - LIST OF PREPARERS

1. Section 8.0 is amended to include the following individuals who have assisted in the preparation of the EIS/EIR.

California-Oregon Transmission Project (8.1)

James C. Feider, Deputy Area Manager, Sacramento Area Office, Western Area Power Administration. B.S. Electrical Engineering, Washington State University, 1971. Fifteen years experience in power system planning, construction, operations, and maintenance.

William M. Green, Consultant, Editorial/technical review of EIS/EIR. B.S. Electrical Engineering, California Institute of Technology, 1939; M.S. Electrical Engineering, University of Michigan, 1954. Twelve years experience in the utility power field.

J. Marcell Hall, Civil Engineer; B.S. University of the Pacific, M.S. Stanford University; 13 years experience in resources planning, project management, preparation of initial environmental studies, public involvement, and EIS/EIR preparation. Prepared responses to agency and pubic comments on the Draft EIS/EIR for land and environmental issues.

Wendy E. Haydon, Research Assistant; assisted in editing and overall coordination of the preparation of the EIS/EIR. Coordinated with Public Affairs Director in the preparation of the public hearings for Draft EIS/EIR and Supplement to the Draft EIS/EIR. B.A. Environmental Studies, California State University, Sacramento, 1987.

John T. Mead, Electrical Engineer; Engineering/technical review. B.S. Electrical Engineering, South Dakota School of Mines and Technology, 1981. Six years experience in the planning and design of power transmission and distribution systems. Prepared responses to agency and public comments on the Draft EIS/EIR for engineering issues.

Bruce E. Mizer, Executive Consultant. Review of COTP economic and resource operation assumptions and Pacific Northwest resource policy. B.A. Mathematics, Washington State University, 1970; M.B.A. City University, Bellevue, Washington, 1983. Seventeen years experience in electric utility resource economics, planning and policies, especially the Pacific Northwest.

South of Tesla Reinforcements for Deferral of the Los Banos-Gates Transmission Project (8.2)

Pacific Gas And Electric Company

Sheila Byrne, Vegetation, Wildlife
Department of Engineering Research

Glenn Caruso, Cultural and Paleontological Resources
Building and Land Services Department

William D. Chilson, Environmental and Regulatory Planning
Building and Land Services Department

Korbin D. Creek, Water Resources
Department of Engineering Research

Jody Kaldahl, Line Construction Department

Tak Kojima, Visual Resources
Civil Engineering Department

Kenneth E. Lewis, Electrical Engineering Department

Larry G. Patzkowski, Earth Resources
Department of Engineering Research

William H. Polsley, Building and Land Services Department

Dennis W. Reisinger, Electric Transmission and Distribution
Department

Pradeep Saxeena, Department of Engineering Research

Louise M. Young, Land Use
Building and Land Services Department

Environmental Consultants

Mark Pepple, Resource International

Individuals and Organizations Receiving a Copy of the Final EIS/EIR

1.1.9 CHANGES TO THE DRAFT EIS/EIR VOLUME 1 SECTION 9.0 - INDIVIDUALS AND ORGANIZATIONS RECEIVING A COPY OF THE FINAL EIS/EIR

Federal Agencies

Advisory Council on Historic Preservation
Bonneville Power Administration, Portland
Bonneville Power Administration Library, Portland
Environmental Protection Agency, Region IX, San Francisco
Environmental Protection Agency, Washington, D.C.
Federal Aviation Administration
Federal Energy Regulatory Commission
Federal Trade Commission
U.S. Department of the Army, Corps of Engineers, Sacramento
U.S. Department of the Army, Corps of Engineers, San Francisco
USDA Forest Service, Adin
USDA Forest Service, Alturas
USDA Forest Service, Fall River Mills
USDA Forest Service, McCloud
USDA Forest Service, Macdoel
USDA Forest Service, Mt. Shasta
USDA Forest Service, Redding
USDA Forest Service, San Francisco
USDA Forest Service, Susanville
USDA Forest Service, Tulelake
U.S. Department of Energy
U.S. Department of the Air Force
USDI Bureau of Indian Affairs
USDI Bureau of Land Management, Alturas
USDI Bureau of Land Management, Bakersfield
USDI Bureau of Land Management, Hollister
USDI Bureau of Land Management, Klamath Falls
USDI Bureau of Land Management, Medford
USDI Bureau of Land Management, Portland
USDI Bureau of Land Management, Redding
USDI Bureau of Land Management, Sacramento
USDI Bureau of Land Management, Susanville
USDI Bureau of Mines
USDI Bureau of Reclamation, Klamath Falls
USDI Bureau of Reclamation, Sacramento
USDI Bureau of Reclamation, Tracy
USDI Office of Environmental Project Review
USDI Park Service, Lava Beds National Monument
USDI Park Service, San Francisco
USDI Fish and Wildlife Service, Division of Ecological Services
USDI Fish and Wildlife Service, Portland

California State Agencies

California Energy Commission
California Regional Water Quality Control Board, Fresno
California Regional Water Quality Control Board, Oakland
California Regional Water Quality Control Board, Redding
California Regional Water Quality Control Board, Sacramento
California Regional Water Quality Control Board, Santa Rosa
Department of Fish and Game, Fresno
Department of Fish and Game, Napa
Department of Fish and Game, Rancho Cordova
Department of Fish and Game, Redding
Department of Fish and Game, Yountville
Department of Forestry
Department of Parks and Recreation
Department of Transportation, Fresno
Department of Transportation, Marysville
Department of Transportation, Redding
Department of Transportation, Sacramento
Department of Transportation, San Francisco
Department of Transportation, Stockton
Department of Water Resources
Office of Historic Preservation
Public Utilities Commission, Sacramento
Public Utilities Commission, San Francisco
State Clearinghouse, Office of Planning and Research
State Lands Commission
State Reclamation Board
Water Resources Control Board

Oregon State Agencies

Clearinghouse Coordinator, State of Oregon
Department of Energy
Department of Environmental Quality
Department of Fish and Wildlife, Klamath Falls
Department of Fish and Wildlife, Portland
Department of Land Conservation and Development
Department of Transportation
Division of State Lands
Forestry Department
Office of Historic Preservation
Public Utility Commissioner's Office

Planning Departments - California

Alameda County Planning Department
Butte County Planning Commission
Chico Planning Office
City of Davis Community Development Department
City of Pittsburg Community Development Department
City of Stockton Planning Division

Planning Departments - California (Continued)

City of Vacaville Department of Community Development
Colusa County Planning Department
Contra Costa County Community Development Department
Fresno County Public Works Development Services Department
Glenn County Planning Office
Kern County Planning Department
Kings County Planning Department
Mendocino County Planning Department
Merced County Planning Department
Modoc County Planning Department
Placer County Planning Department
Plumas County Planning Department
Sacramento County Planning Department
San Joaquin County Planning Department
Santa Barbara County Planning Department
Santa Clara County Planning Department
Shasta County Planning Department
Sierra County Planning Department
Siskiyou County Planning Department
Solano County Department of Environmental Management
Sonoma County Planning Department
Stanislaus County Planning Department
Sutter County Planning Department
Tehama County Planning Department
Tulare County Planning Department
Yolo County Community Development Agency
Yuba County Planning and Building Services Department

Planning Departments - Oregon

Deschutes County Courthouse Annex
Douglas County Courthouse Annex 2
Gilliam County Planning Department
Jackson County Department of Planning and Development
Jefferson County Planning Department
Josephine County Planning Department
Klamath County Planning Office
Lake County Planning Department
Lane County Commission
Marion County Planning Department
Multnomah County Planning Department
Sherman County Planning Department
Wasco County Courthouse

Planning Departments - Washington

Benton County Planning Department

Libraries - California

Anderson Branch Library
Antioch Branch Library
Brentwood Branch Library
Burney Branch Library
CSU, Chico Meriam Library
California State Library, Sacramento
California State University, Stanislaus Library, Turlock

Libraries - California (Continued)

California State University, Sacramento, Science Library
Carmichael Regional Library
Central Library, Pleasant Hill
Central Library, Sacramento
Coalinga District Library
College of the Siskiyous Library
Colorado State University, The Librarian
Corning Branch Library
Cottonwood Branch Library
Dixon Unified School District Public Library
Dorris Branch Library
Fair Oaks-Orangevale Community Library
Fall River Mills Branch Library
Fresno County Free Library
Humboldt State University Library
Huron Branch Library
Lodi Public Library
Los Banos Branch Library
McCloud Branch Library
Merced County Library
Modoc County Library
Mt. Shasta Branch Library
Oakley Branch Library
Orland Free Library
Pittsburg Branch Library
Rio Vista Branch Library
Sacramento County Library
San Francisco Public Library
San Jose Public Library
Shasta County Library
Siskiyou County Public Library
Stanislaus County Free Library
Stockton-San Joaquin County Public Library
Sutter County Free Library
Tehama County Library
Tracy Branch Library
Tulelake Branch Library
Weed Branch Library
West Los Angeles Regional Library
Willows Public Library
Winters Branch Library
Woodland Public Library
Vacaville Public Library

Libraries - Oregon

Ashland Public Library
Bly Branch Library
Boardman City Library
Crook County Library
Deschutes County Library
Douglas County Library System
Eugene Public Library
Jackson County Library System
Jefferson County Library
Keno Branch Library
Klamath County Library
Lebanon Public Library
Library Association of Portland, Multnomah County Library
Malin Branch Library
Merrill Branch Library
Silverton Public Library
Southern Oregon State College Library
Springfield Public Library
Stayton Public Library
Sweet Home Public Library
The Dalles City/Wasco County Library

Libraries - Washington

Richland Public Library
Seattle Public Library

Local Organizations

Adkins Consulting Engineers
Anderson Chamber of Commerce
Antioch Chamber of Commerce
Antioch Daily Ledger
Arnold and Porter
Basin Research Associates
BCL Associates, Inc.
Benton County Public Utility District
Bethel Island Chamber of Commerce
Bethel Island Municipal Improvement District
Bethel Marina, Inc.
Big Valley Lumber Company, Inc.
BioSystems Analysis, Inc., Santa Cruz
BioSystems Analysis, Inc., Sausalito
Blaydes and Associates
British Columbia Hydro and Power Authority
Bryant Mountain Hydroelectric Company
Burney Basin Chamber of Commerce
Burns & McDonnell
Byron Chamber of Commerce
Byron School District
California Aviation Council
California Energy Company
California Farm Bureau
California Indian Legal Services
California Municipal Utilities Association
Central Valley Wintus Inc.
Champion International Corporation
Citizens Utilities Company of California
City Clerk and Auditor, Modesto
City of Ashland
City of Brentwood
City of Clayton
City of Coalinga
City of Dorris
City of Dos Palos
City of Firebaugh
City of Glendale
City of Huron
City of Los Banos
City of Mendota
City of Mt. Shasta
City of Tracy
City of Vacaville
Coalinga Chamber of Commerce
Columbia River Intertribal Fish Commission
Corning City Hall
Cottonwood Chamber of Commerce
Dames & Moore, Phoenix
Dames & Moore, San Diego
Dames & Moore, Santa Barbara
Decision Focus Inc.
Delta Coves
Dillon Reed
Dixon City Hall
Driscoll Strawberry Associates, Inc.
EBASCO Services, Inc.
EDAW Inc.
ERT
East Bay Municipal Utility District
East Bay Regional Park District
Eastern Washington University, Archaeological and Historic Services

Local Organizations (Continued)

Environmental Advocates
Environmental Science Associates
Exeter Associates
Fluor Technology, Inc.
Fresno Chamber of Commerce
Fresno County Farm Bureau, Fresno
Fresno County Farm Bureau, Kerman
Friends of the Greensprings
G. H. Bowers Engineering
General Electric Company
Germino, Layne, Brodie, Runte and Maguire
Goldberg, Fieldman and Letham
Gregory Thatch Law Office
Henwood Energy Services
Hoffman Company
Humbolt Research Associates, Inc.
Huron City Hall
Idaho Power Company
Jackson County Commission
J. B. Engineering
J. F. Kennedy School of Government
Jepson Preserve
Kaiser Engineers
Keno Elementary School
KIXE TV
Klamath County Courthouse Annex
Klamath Falls Herald and News
Knightsen Community Council
Knightsen Elementary School
Knightsen Post Office
Lane Electric Coop
League of Oregon Cities
Leedshill-Herkenhoff, Inc.
Leisure Landing
Los Angeles Department of Water & Power
Los Banos Chamber of Commerce
Los Banos Gravel
McDonough, Holland & Allen
Macy's Flying Service
Madesi Band, Legitimate Pit River Indian Tribe
Malin City Hall
Marron, Reid & Sheehy
Michael Brandman Associates
Michael Clayton and Associates
Mintier and Associates
Modoc County Courthouse
Modoc County Powerline Committee
Morrison-Knudsen
Morse, Richard, Weisenmiller and Associates
Mt. Shasta City Hall
NUS Corporation
National Wildlife Federation, Portland
National Wildlife Federation, Washington, D.C.
Natural Resources Defense Council
Neumiller and Beardslee
Northern California Power Agency
Northwest Conservation Act Coalition
Northwest Power Planning Council
Oakley Union School District Office
Office of the Attorney General of Idaho
Orland City Hall
Pacific Power & Light Company
Packard & Pugh
Paul Bunyan Lumber Company
Pit River Tribal Council
Portland General Electric Company
Positive Resolution of Powerline Problems
Public Service Company of New Mexico

Local Organizations (Continued)

Public Power Council-Portland
Puget Sound Power and Light
R. W. Beck, Sacramento
R. W. Beck, Seattle
Reclamation District 799
Reclamation District 2065
Red Bluff County Courthouse
Resource Assessment, Inc.
Rourke and Woodruff
Salt River Project
San Francisco Clean Water Program
Sargent & Lundy Engineers
Save Our Streams
Shapiro and Associates, Inc.
Shasta Cascade Wonderland Association
Shasta County Sheriff's Department, Burney Substation
Shasta County Sheriff's Department, Cottonwood Substation
Shasta County Sheriff's Department, Redding
Sierra Club
Sierra Energy and Risk Assessment, Inc.
Siskiyou Resource Awareness Council
Snohomish County Public Utility District No. 1
Soil Conservation Service
Spiegel and McDiarmid
Stanford University, Plant Engineering
State of Montana, Dept. of Natural Resources and Conservation
Stathem-Shaw & Associates
Stone and Webster, Inc.
Subcommittee on Mining and Forest Management
The Nature Conservancy
The Wyntoon Tree Farm/The Hearst Corporation
Touche Ross and Company
Town of Paradise
Transmission Pipeline Company
Transwestern Pipeline Company
Tulelake Growers Association
University of Idaho
University of Oregon, School of Law
Utility Data Institute
Valley View Packing Company
Victoria Island Farms
W. M. Beaty and Associates
Western Power, Inc.
Westinghouse Electric
Westlands Water District
Whitfield Russell Associates
Will and Muys
Williams City Hall
Williams Post Office
Winters City Hall

COTP Participants

Transmission Agency of Northern California
- City of Alameda
- City of Biggs
- City of Gridley
- City of Healdsburg
- City of Lodi
- City of Lompoc
- City of Palo Alto
- City of Redding

COTP Participation (Continued)

- City of Roseville
- City of Santa Clara
- City of Ukiah
- Modesto Irrigation District
- Plumas-Sierra Rural Electric Cooperative
- Sacramento Municipal Utility District
- Turlock Irrigation District

City of Anaheim
City of Azusa
City of Banning
City of Colton
City of Riverside
City of Vernon
Carmichael Water District
El Dorado Hills Community Services District
San Juan Suburban Water District
Shasta Dam Area Public Utility District
Southern San Joaquin Valley Power Authority
Trinity County Public Utility District
Pacific Gas and Electric Company, Fresno
Pacific Gas and Electric Company, San Francisco
San Diego Gas and Electric Company
Southern California Edison Company
California Department of Water Resources
Western Area Power Administration, Golden, Colorado
Western Area Power Administration, Sacramento, California
Western Area Power Administration, Washington, D.C.

Individuals

Agrons, Honorable Bernie
Archon, Mark
Auslen, Richard
Bacigalupi, Jerry
Baraglia, Theodore and Gloria
Beebe, Richard D.
Beers, Roger
Bever, Amos S.
Boatwright, Honorable Dan
Bradbury, Honorable Bill
Bradford, David F.
Briden, Laura
Broddrick, Loris
Bross, Dr. Seymour
Brown, Lt.
Brown, Nancy
Buckingham, Richard A.
Burroughs, Ben
Caffrey, Paul
Caldwell, Harold W.
Calone, Richard
Castello, Anthony J.
Cecchini, Joseph
Cecchini, Robert
Chase, Alvin
Cook, Ann and James
Cowan, Zach
Craig, Bill
Dalton, Wm. C.
Dal Porto, Robert
Dobbins, Gerald L.
Dunlop, Gary

Individuals (Continued)

Dunn, David
Dykstra, R. L.
Edwards, Honorable Don
Ensminger, Norman D.
Fazio, Honorable Vic
Fiock, Norman E.
Francis, Lori
Ganger, William
Gigler, Andrew R.
Gore, Guy M.
Graham, Beardsley
Graham, Bill
Griffith, Gordon
Halvusek, Richard
Hannon, Honorable Len
Hawkins, Honorable Gus
Holck, Donald and Thelma
Hoshovsky, Marc
Isenberg, Honorable Phillip
Johnson, Karen
Johnson, Ray
Johnson, Stanley
Jones, Michael S.
Keehn, Robin
Kennett, William E.
Kerns, Steven
Kilian, Carol J.
Krauska, Terri A.
Leight, Mr. and Mrs. William
Lequieu, Leslie
Loveness, Loren
Lupine, Mr.
Matzen, B. J.
McAuliffe, Eddie
McCarroll, Jim Jr.
McCleskey, Dale L.
McCormic, Mavis
McCracken, Honorable Mike
McDaniel, Bob
McNamara, Jack
Mattia, M. A.
Matzen, B. J.
Miller, Honorable George
Mitchell, Hannelore
Moorhead, Honorable Carlos
Parkinson, Bert
Peterson, Doug
Peterson, Honorable Nancy
Pettis, Margaret
Randall, Mark
Rechtin, Julie
Reynolds, Wes L.
Schooley, Wayne
Seymour, Tina
Shumway, Honorable Norman D.
Smith, Honorable Bob
Speckman, Joyce
Statham, Honorable Stan
Thomas, Greg
Tschirky, Paul
Tokmakin, Ross
Trapnell, H. W.
Varosh, Pam
Vidisky, Priscilla
Vonk, Gean
Wilcox, Cynthia
Wood, Wayne
Zech, Bill

Glossary and Abbreviations

1.1.10 CHANGES TO THE DRAFT EIS/EIR VOLUME 1 SECTION 10.0 - GLOSSARY AND ABBREVIATIONS

1. Page 10.1-1

   Add: "Allowable cut - the maximum quantity of timber to be harvested from a particular forest management unit in a year.

   Allowable sale quantity - the maximum quantity of timber to be sold from a particular forest management unit in a year." after glossary item entitled "Adverse hydro".

2. Page 10.1-8

   Add: "Long Term Sustained Yield (LTSY) - the volume of wood that can be harvested from a forest management unit annually in perpetuity. The concept requires that annual harvest (or harvest every few years) be limited to net wood growth in the same period." after glossary item entitled "Load shedding".

3. Page 10.1-8

   Add: "MMBF - Million board feet" after glossary item entitled "MBF".

References

1.1.11 CHANGES TO THE DRAFT EIS/EIR VOLUME 1 SECTION 11.0 - REFERENCES

1. Section 11.0 of Volume 1 is amended to incorporate the following references:

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1.1.12 ADDITIONS TO THE DRAFT EIS/EIR VOLUME 1 SECTION 12.0 - INDEX

Volume 2A - COTP Supporting Environmental Report

1.2 CHANGES TO VOLUME 2A OF THE DRAFT EIS/EIR

There have been a number of changes to the data and analyses presented in Volume 2A of the Draft EIS/EIR. This section of the Final EIS/EIR documents those changes.

The sections of Volume 2A updated by information in Section 1.2 are listed below:

Volume 2A Section		Final EIS/EIR Section	
Phase I	Regional Study and Corridor Identification Report Summary	1.2.1	Regional Study and Corridor Identification Report Summary
Phase II	Routing Investigations Report	1.2.2	Routing Investigations Report
Phase III	Data and Impact Analysis Report	1.2.3	Data and Impact Analysis Report

1.2.1 CHANGES TO THE DRAFT EIS/EIR VOLUME 2A - PHASE 1 REGIONAL STUDY AND CORRIDOR IDENTIFICATION REPORT SUMMARY

1. Page 1.0-1

   Paragraph 1, Line 4.
   Delete: "at the repositories listed in Section 9.0 of Volume 1, and"

2. Page 1.0-2

   Paragraph 3, Line 4.
   Change: "can" to "could"

3. Page 1.0-5

   Paragraph 4, Line 6.
   Add "prepared by a multi-utility work group." after "Report."

1.2.2 CHANGES TO THE DRAFT EIS/EIR VOLUME 2A - PHASE II ROUTING INVESTIGATIONS REPORT

1. Page 2.3-1, Paragraph 2

   Delete: second sentence
   Add: "During early routing studies, all apparent residences and buildings were avoided. In the subsequent adjustment of routes, some additional houses were identified. Selection of a 200-foot easement within the route will, in most cases, avoid these homes."

2. The following Section 4.4 is added to the Phase II Report in Volume 2A of the Draft EIS/EIR:

ROUTE OPTIONS SUGGESTED SINCE ISSUANCE OF THE DRAFT EIS/EIR

Numerous suggestions from the public provided for new routes or modifications to existing routes since the release of the Draft EIS/EIR. All suggestions were considered, with many resulting in detailed investigations that led to preparation of the Supplement to the Draft EIS/EIR. Route suggestions not addressed in the Supplement to the Draft EIS/EIR can be grouped as follows:

- within the existing 1,500-foot wide routes,
- outside the existing 1,500-foot wide routes.

Suggestions that are located within the 1,500-foot wide routes will be considered during the final design of the COTP. These suggestions came largely from landowners concerned about how a specific alignment within the preferred route might affect structures, planned land uses, farming operations or other current land uses. Examples would be changes in the alignment in the Tulelake/Newell area and the Coney Island area within the preferred route to reduce agricultural impacts.

In Section 4.4.1 below, route suggestions are described that were outside of the existing 1,500-foot wide routes and are basically the same as routes previously considered in the Draft EIS/EIR. Other suggestions listed in Section 4.4.1 were not previously considered. These were evaluated for feasibility based on environmental, engineering, and economic considerations.

Route suggestions that were carried forward and evaluated against the original preferred route are addressed in Sections 4.4.2 and 4.4.3. These sections also contain results of these evaluations in the environmentally superior route meeting and the Project preferred route meeting.

Proposed Routes and Centerline Alignments suggested Since the Draft EIS/EIR and Not Adopted (4.4.1)

These route suggestions can be grouped into two categories: 1) routes that have been previously considered as part of the routing process for the COTP, and 2) routes that have not been previously considered.

Suggestions Previously Considered (4.4.1.1)

Some of the suggested routes are either basically the same or would accomplish the same objectives as routes previously considered in the Draft EIS/EIR. These suggestions are listed below with a reference to the pertinent discussion in the Draft EIS/EIR.

The John Cross Alternative

The John Cross Alternative, as originally drawn by Mr. Cross, is a proposal to relocate one of the existing Intertie lines in the Tulelake Basin one to two miles to the east. The new COTP line would then be located adjacent to the remaining Intertie line in a common right-of-way. The John Cross Alternative, as originally drawn, places the new line adjacent to an existing Intertie line. The problems resulting from an outage of these two adjacent lines are detailed in the Power Systems Study Committee - Comparison of Northern Corridors Report, dated April 1986. As originally proposed, the John Cross Alternative is not feasible because it makes the simultaneous outage of the COTP and one of the existing Intertie lines a credible event. Loss of the COTP and one of the existing Intertie lines in this area would cause overloading of the remaining Intertie line resulting in a catastrophic three-line outage.

An alternative identified in the Draft EIS/EIR as the "Copic Bay Option" (Volume 1, pg. 4.1-41) is similar to the concept of the John Cross Alternative and is acceptable from a system reliability perspective. However, the lead agencies found this option to have prohibitively high costs compared to slight environmental benefits and it is therefore not feasible from an economic standpoint. The environmental impacts can be reduced to acceptable levels through implementation of mitigation measures. It was studied in equal detail to the preferred route. It would relocate both lines of the existing Intertie to the east on two new rights-of-way and locate the new COTP line down the existing right-of-way for a short distance to avoid farmland in Copic Bay.

As a result of comments on the Draft EIS/EIR, the concept of combining the two relocated existing lines on a common right-of-way was also considered. The lead agencies have interpreted the great amount of public support for the John Cross Alternative as support for this concept, and it is also referred to in the Final EIS/EIR as the John Cross Alternative. A wider right-of-way would be required for the two existing (relocated) lines of the Intertie - 350 feet. The environmental comparison for the John Cross Alternative is discussed in Section 1.2.2 (Environmentally Superior Route Meeting, 4.4.2) and Section 2.3 (Supplement to the Draft EIS/EIR North Routing Options) of this volume. An environmental comparison showed the John Cross Alternative to be environmentally superior. However, there would be different construction impacts of building three new lines (with the John Cross Alternative) versus building one new line (with the preferred route). Water resource impacts did not differ between the John Cross Alternative and the preferred route. Earth resource impacts were greater for the John Cross Alternative due to increased soil erosion. Wildlife and vegetation impacts were also greater for the John Cross Alternative. Land use and socioeconomic impacts to irrigated cropland and agricultural practices were reduced for the John Cross Alternative route. Both the John Cross Alternative and the preferred route had significant visual impacts due to passing through highly incompatible landscapes. The John Cross Alternative was slightly preferred over the preferred route for cultural resources. Although it passes within 3.4 miles of eight Native American sites, it does not pass close to any of them.

Site-specific studies have been conducted within the 1,500-foot wide preferred route in the Newell area. The impacts to agricultural lands are substantially less than were characterized in the Draft EIS/EIR. Site-specific centerline routing analyses in this area has determined that only one agricultural field along Route Segment N-10J would be crossed. The amount of irrigated cropland that would be crossed is estimated from aerial photography to be approximately 0.15 miles.

The relocation of the two Intertie lines onto one right-of-way is not economical when compared to the preferred route. Construction costs (excluding land acquisition costs) are approximately $500,000 per mile of transmission line. It would cost $1.0 million per mile to relocate the two lines of the existing Intertie for a total of $15 million. Assuming land values are approximately $1,000 per acre, right-of-way costs for a 350 foot right-of-way would total $637,000. It would also cost $7.5 million to build the COTP line in the right-of-way once occupied by the two Intertie lines. In addition, each of the Intertie lines must be taken out of service for a period of 72 hours each while they are cut over to the relocated lines. Such an outage would cost $2.5 to $4.5 million in lost revenue, depending upon the time of year which could, to some degree, be replaced by other sales. The total cost of this alternative could be as much as $25 million. By comparison, the preferred alternative would cost $8.1 million to construct. In both cases the affected landowners would be fully compensated for land acquisition and damages.

California Department of Fish and Game Proposal

In a meeting during May of 1987, a representative of the California Department of Fish and Game suggested a route that would be located on the west side of the Pit River. The intent of the suggestion was to eliminate two of the three crossings of the Pit River and to reduce potential impacts to threatened and endangered wildlife species such as the bald eagle.

The west side of the Pit River was originally considered in August, September, and October of 1985, prior to the routing workshops in November 1985. This alternative was eliminated from further consideration at that time due to the rugged terrain encountered and because other more feasible alternatives existed on the east side of the Pit River. The draft biological assessment for the COTP does not identify any potential significant impacts to the bald eagle along the preferred route in that area with the implementation of mitigation measures; therefore this suggestion was not considered further.

Underground Crossing of the Intertie

The Forest Landowners of Shasta and Siskiyou Counties (FLSSC) and others suggested an underground crossing of the Intertie for a short distance to route the new transmission line east of the existing Intertie out of forested areas. Underground crossings were considered early in the COTP routing process and were discussed in Volume 1, Section 2.5.1.2 of the Draft EIS/EIR. This section has been updated; the revised discussion can be found in Section 1.1.2 of the Final EIS/EIR. It concludes that underground crossings are not feasible for the COTP due to reliability concerns.

East of the Existing Intertie

The California Board of Forestry and the Positive Resolution of Powerline Problems (PROPP) group suggested a route east of the existing Intertie through Nevada. It was suggested that such a route could connect with the Sacramento Municipal Utility District's Trans-Sierra Transmission Project over Donner Summit and into the Sacramento metropolitan area. From the Sacramento area, the COTP upgrade portion would be used to supply Project Participants to the north and south of Sacramento. A direct current (DC) version of this alternative is discussed in Volume 1, Section 2.5 of the Draft EIS/EIR. The cost for the projects is approximately 50 percent of the cost of a DC transmission line with a Trans-Sierra connection. This route is, therefore, infeasible due to economic considerations.

PG&E Pipeline Route

This alternative would require the crossing of the existing Intertie north of Round Mountain. It was discussed in the Draft EIS/EIR under the heading of the Shasta County Alternative (Volume 2A, Phase II Report, page 2.4-9) and eliminated due to reliability concerns regarding the possibility of a three-line outage at the crossing of the existing Intertie.

Rio Vista to Tracy Alternative

One individual suggested that a route could be located from Rio Vista to Tracy Substation, halfway between Stockton and Brentwood, to avoid populated areas. A route in this general location, known as the Webb Tract Route, was examined but eliminated earlier in the routing process due to concerns on lack of access for construction, waterfowl habitat, and increased construction costs due to the longer line and special foundation requirements. It is discussed in Volume 2A, Phase II Report, page 2.4-3 of the Draft EIS/EIR.

West of Upgrade Alternative

One individual suggested a route in the foothills west of the COTP upgrade portion. This route was one of several alternatives to the upgrade investigated during the early environmental studies for the COTP. It is discussed in Volume 2A, Phase II Report, p. 2.4-1. These route alternatives were eliminated because they would involve much greater environmental impacts and would be more costly than the upgrade.

I-5 Sacramento to Tracy

Several individuals have suggested this route in order to avoid or minimize impacts to prime farm land and the Delta. This route would parallel Interstate 5 from approximately the Sacramento area through the Stockton area and south to Tracy and then proceed north from the Tracy area to the Tracy Substation. This route was considered during the early environmental studies on the COTP (see Phase I Report) and was also eliminated due to greater environmental impacts and higher costs because the use of the upgrade between the Sacramento area and the Sacramento River crossing would be foregone. It is also discussed in the Volume 2A, Phase II Report, p. 2.4-1.

Allen Ranch Route - Los Banos-Gates Project

The Allen Ranch suggested a route for the Los Banos-Gates Project that would combine portions of two routes considered in the Draft EIS/EIR, the northern end of West 9 and the southern end of West 10. This route would avoid cultivated cropland in the southern end of South 9 and oil production areas in the northern end of West 10. These routes are discussed in Volume 2B of the Draft EIS/EIR. The hybrid route was not selected as the preferred route due to higher construction costs. See the response to T-175 I.

Suggestions Not Previously Considered (4.4.1.2)

Some route suggestions were different than the existing 1,500-foot wide routes previously considered.

Modoc National Forest Intertie Relocation

An alternative has been suggested by the Modoc National Forest that proposes the relocation of the existing 500 kV Intertie lines as a means to reduce the impacts to prime timberlands on private lands and on the Modoc National Forest. To accomplish this suggestion, it would be necessary to relocate both 500 kV lines to the east of their existing location to a new 350-foot wide right-of-way for a distance of 15 miles through the Long Bell State Game Refuge. This relocation would allow the COTP to be constructed on the vacated right-of-way. This would place the Round Mountain Fire Lookout between the existing interties and the proposed Modoc Relocation. An analysis was performed utilizing information and existing data as furnished by the Modoc National Forest.

The area to the east of the existing Intertie lines is generally of very low site quality for timber production purposes (Dunnings Site Class 4 and 5; noncommercial). However, the area is managed for timber production and supports scattered stands of juniper, ponderosa pine and white fir. Timber volume, stumpage value, and site productivity data are shown on Tables 1.2.2-1, 1.2.2-2, and 1.2.2-3 at the end of Section 1.2.2 of this volume.

The alternative passes through the Long Bell area which has low value for watershed according to the Modoc National Forest Draft Forest Land and Resource Management Plan, 1985. The area also has low potential for producing deer, but does provide spring and summer mule deer range.

Except for timber productivity, resource impacts are relatively similar for the Modoc Intertie Relocation alternative and the preferred alternative. Both alternatives are located in areas with low watershed value, and both areas provide deer summer range. Both areas receive heavy dispersed recreation use during hunting season. Geothermal, oil, and gas exploration leases are located in the area of the preferred route and the Modoc Intertie Relocation alternative. Fire detection may be enhanced with the Modoc Relocation alternative, since the Round Mountain Fire Lookout would be located between the existing Intertie lines and the relocated lines.

An economic analysis of the preferred alternative (N-10M) and the suggested alternate are shown on Tables 1.2.2-4 and 1.2.2-5 at the end of Section 1.2.2 of this volume. Table 1.2.2-6 at the end of this section shows a direct comparison of the two alternatives. With either alternative, the total impact on the allowable cut of the Modoc National Forest is less than two-tenths of 1 percent. The Modoc National Forest's allowable cut of 62 million board feet (MMBF) contributes approximately three percent to the total volume of timber harvested on National Forest System lands in California. The cost of the foregone timber resources ($2.4 million for the Modoc Intertie Relocation and $4.5 million for N-10M) is substantially less than the construction cost estimated to be $15 million to relocate the two existing Intertie lines, plus the cost of lost revenues while the Intertie is out of service during construction. An outage of each of the two existing Intertie lines for a period of 72 hours each would cost $2.5 to $4.5 million in lost revenue, depending upon the time of year, which could, to some degree, be replaced by other sales. The construction cost of the preferred alternative would be $6 million.

Fuel management costs would likely be lower for the Modoc Intertie Relocation alternative because the timber volumes per acre are lower on the Modoc Intertie Relocation. Specific fuel management strategies and post-treatment fuel loads will be developed in consultation with the Forest Service following their approval of the Project. Therefore, it is not possible to quantitatively compare the costs of fuel management alternatives for the two routes at this time.

The analysis in Tables 1.2.2-1 and 1.2.2-6 show that by constructing the suggested relocation alternative, a savings of $21,000 per annum over the 100-year recycle period can be realized for an investment cost of $15 million. Present yields on investments estimated at 10 percent would be $1.5 million per year.

The relocation of the Intertie is an extreme and costly measure in light of the timber impacts to the Modoc National Forest. The Forest Service will be fully compensated for permanent lost revenues due to the transmission line easement at far less cost than the additional construction cost.

Hearst Alternative and Forest Service Alternative Segments - Grizzly Peak Area

The Hearst Alternative was proposed as an alternative to the preferred route to reduce impacts to prime timberland and private timberlands. The USDA Forest Service also suggested several route segments for analysis purposes in the Grizzly Peak area to reduce impacts to existing and planned timber sales and to reduce the effects on prime timberland.

Portions of both of these suggestions involve steep, unstable slopes susceptible to landslides and surface erosion in the Devils Canyon area. The Devils Canyon area was evaluated by Harlan Miller Tait Associates in the "Constructability Report" dated August 15, 1986. Other portions of the Hearst and Forest Service suggested routes were combined and are analyzed in detail in the Supplement to the Draft EIS/EIR and in Section 2.3 of this Final EIS/EIR.

New Antioch Route

Comment SL-123 K implies that there may be an alternative route through Antioch. The City of Antioch has strongly objected to any further analysis being done on alternative routes that may go through the Antioch planning area. See comment SL-81. The Antioch routes were eliminated early in the routing process as a result of an analysis of routing opportunities in the vicinity of the San Joaquin River. In that area it would be necessary to parallel the existing PG&E 230 kV line across Sherman Island and the San Joaquin River, which would require construction of several towers in water on submerged Donlon Island and in swamp on West Island. The area just south of the San Joaquin River is highly congested, requiring the removal of existing PG&E 230 kV lines or the construction of multiple circuit structures carrying one 500 kV circuit and two 230 kV circuits, which is not considered feasible for the long distances involved.

A second possible river crossing location was evaluated. However, no routing opportunities were available south of the San Joaquin River due to the proximity of the Contra Costa Power Plant, a wood by-products plant and residential development.

In addition, the routes west of the existing Intertie lines have been eliminated because of the requirement to connect the COTP to the Tracy Substation which would require the crossing of the existing lines. In order to provide sufficient reliability to prevent the simultaneous outage of all three lines, it is necessary that the COTP not cross the existing lines where they are adjacent to each other. Because of these requirements and restrictions, the Antioch routes do not meet the needs of the COTP and have been eliminated from further consideration as sections of the preferred route.

Henwood Crossing

Comment SL-121 P suggests the construction of a crossing of the existing 500 kV Intertie in one or two locations, such as near Newell and south of Round Mountain, utilizing a structure or tunnel to enclose or otherwise protect a 500 kV bus erected on supports. The structure would be designed to withstand the failure of the overhead 500 kV Intertie above. In response to the suggestion, the following engineering analysis was undertaken.

A building was considered that would be approximately 3,000 to 4,000 feet long, 100 feet wide, and 75 feet high. Fifteen feet of the building's height would be located below the existing grade to provide clearance, requiring excavation. The earth materials removed could be incorporated in the development of a fenced site, isolating the structure from public access. Any remaining materials would have to be disposed of in an environmentally acceptable manner. The terminal structures on either side of the entrance to the building would require the installation of 500 kV bushings constructed of porcelain at a cost of approximately $500,000 for the bushings and a spare set. If the building were enclosed, approximately 20 million cubic feet of enclosed air would require significant air conditioning services to reduce air temperature increases associated with the operation of 500 kV transmission facility. This may result in undue limitations on thermal capacity. With an enclosed building, a braced roof would be necessary to prevent an outage if the conductors of a crossing line were to fall onto the structure in the area in the immediate vicinity of the crossing. A roof will also be necessary to prevent an outage if a shield wire were to be severed and dragged across the building. Such instances of shield wire failures have been historically documented in California. A conceptual design of such a structure has been developed to consider the suggestion and evaluate its merit. The structure, if enclosed, would require - in addition to air conditioning - power for lighting, sewer, and station security.

A structure of this magnitude would create additional visual impacts for a number of miles around the location. The site requirements are closely related to those of switchyards and stations, for which visual impacts are considered of primary importance. When considering an enclosed structure, a very real concern is the susceptibility to gunshot vandalism of the extremely fragile 500 kV porcelain bushings. It is expected that they will be an inviting target, especially considering the rural nature of this location. These bushings are not as easily replaced as transmission line insulators. Additional measures would have to be taken to protect the 500 kV bushings from such abuse. Approximately 400 bus support insulators within the structure would require regular maintenance and cleaning. In order to accomplish this safely, it may be necessary to take this section of the transmission line out of service periodically.

The Project Architect/Engineer has reviewed the concept of such a structure and reported that it is conceivable that it could be constructed, however, at great cost. A structure requiring a fifteen-foot deep trench would be required if a crossing point outside the tipover range of an existing structure is available that provides 60 feet of clearance. If such a crossing point is not available, the existing lines would require modification. It is estimated that for one particular design, such a structure, 4,000 feet in length, would cost $14,475,000 assuming that only one such structure in non-forested areas would be required and that modifications to the existing lines would not be necessary. In order to cross the line twice, two such structures would be required. Erecting an enclosed building is considered impractical for the reasons cited above.

In order to eliminate the requirement for air conditioning and the installation of the expensive and fragile 500 kV bushings, it is conceivable that a structure could be erected that is not enclosed, but merely roofed. Such a structure, located in a trench of the dimensions previously described, would be expected to attract roosting birds and other wildlife in the area. In addition, the effects of weather would have to be carefully considered. This includes providing proper drainage and removal of snow. Such a structure would also require a fenced-in area to protect the public. Such a fenced area may serve to preclude the entrance of wildlife into the structure, but would not prevent the problems anticipated with birds nesting within the structure.

Many crossing concepts have been suggested since the conceptual stages of the COTP routing process. Suggestions very similar to the commentors' were made by the engineering staffs of the Participants early in the process. The public also provided many suggestions regarding such a crossing including both underground and overhead concepts. The installation of a crossing as suggested by the commentor would result in an overall system that has a significantly reduced level of reliability as compared to an overall system that did not employ a crossing. This fact is illustrated by a simple reliability analysis employing probability factors that must consider all three 500 kV transmission lines crossing at one point.

Representatives of all the major utilities in the western United States have participated in one form or another in conducting studies specifically designed to determine the impact upon the electrical transmission system in the event that all three 500 kV transmission lines fail simultaneously. A simultaneous failure has been determined to be one that occurs within one-half hour of the initial event. The study results clearly reveal that such an outage could cause a catastrophic failure of the electric system of the western United States, with the potential of resulting in widespread blackouts. A concept such as the one suggested reduces the level of reliability which must approach unity when one considers the simultaneous failure of all three lines. The construction of such a suggested facility represents a very substantial increase in cost that would result in a decrease in reliability.

The commentor further suggested that, in order to eliminate the need for a second crossing, the COTP line be connected to the existing Western Area Power Administration line (the western-most of the two Intertie lines) between Malin and Round Mountain. This suggestion has been studied by the Power System Studies Committee of the COTP. The conclusions of those studies indicate that the existing Western Area Power Administration line would be of insufficient capacity to serve as the COTP line. Further considerations were given to reconstructing the Western Area Power Administration line to increase its capacity. However, studies of this alternative revealed that, due to the proximity of the PP&L/PG&E 500 kV line, a failure of the COTP and the PP&L/PG&E line would cause an overload of the remaining line, again resulting in the simultaneous failure of all three lines.

The review of this alternative suggestion has resulted in it not being adopted as part of the preferred route since it does not meet the needs of the COTP.

Beebe Relocation

Comment SL-125 L suggested the relocation of one of the two existing PG&E 500 kV Intertie lines a minimum of 2,000 feet to the west in the vicinity of Brentwood and Discovery Bay. During the early development stage of the Project, a routing alternative was considered for locating the COTP 500 kV transmission line to the west of the existing Intertie along segments S-8A, S-9A, S-9B, and S-9C. This early routing option required a crossing of the two adjacent Intertie lines in order to reach Tracy Substation and was rejected in part because of this crossing.

The alternative suggested by Mr. Beebe would upgrade in place the existing Western Area Power Administration 230 kV transmission line to a 500 kV transmission line (Upgrade - Segment 8F). In addition, it would relocate the western-most of PG&E's 500 kV transmission lines a minimum of 2,000 feet to the west in order to eliminate the requirement for a crossing near Tracy Substation.

The suggested alternative would require the construction of two transmission lines; one along the upgrade, and one to relocate the existing PG&E line. This would result in an increased cost estimated to be approximately $4 million. A total length of 48.8 miles of 500 kV transmission line would be constructed to meet the requirements of this suggestion. Of that distance, 22.5 miles would be along the upgrade and 26.3 miles would be new construction of the PG&E line.

A comparison was made of the impacts of the preferred alternative to the aggregate of line segments S-8A (without the new river crossing), S-9A, S-9B, S-9C, and S-8F (upgrade in place). Results of the comparison are shown on Table 1.2.2-7 and indicate that Mr. Beebe's alternative suggestion would reduce the number of new structures in wetlands or floodplains; reduce the number of miles of transmission line in bird flight zones, thus reducing the potential for bird collisions with the transmission line; reduce the number of miles crossed of agricultural preserve lands; and reduce slightly (over two acres) the number of total agricultural acreage removed. However, the results of the comparison also reveal that Mr. Beebe's suggestion would result in an increase in the number of dwellings located within the right-of-way (200 feet) by approximately 16, an increase in the number of dwellings within 1,000 feet of the reference centerline, and an increase in the miles of irrigated cropland affected during construction and therefore an increase for short-term agricultural losses. An assessment of the visual resources indicates that Mr. Beebe's suggestion would increase the number of dwellings located in the foreground within 1.2 miles of the transmission line routing. Accordingly, the average number of dwellings per mile is also increased.

From an environmental perspective, the impacts analyzed would have effects on Sherman Island on the west side of the existing Intertie similar to the effects on the east side with the COTP preferred route. Also affected would be the areas of Jersey Island Road south of Dutch Slough, and along Cypress, Delta, Orwood, Point of Timber, Marsh Creek, and Bixler Roads. The suggested alternative would also be located near the Dutch Slough gas fields, nearer to the Contra Costa County Boys Ranch, and approximately 1.75 miles from the proposed expansion of the Byron Airpark/East Contra Costa County Airport.

From an overall perspective, to construct the new line on the preferred route would affect 26.4 miles of right-of-way. To build the upgrade and to relocate one of the existing lines could affect up to 48.8 miles of right-of-way, of which 22.5 miles are along the upgrade. Increasing the total overall length of transmission line results in an increase in impacts during construction. Although the suggestion does have some merit in reducing certain impacts, the overall impacts associated with affecting only one right-of-way along the preferred route are less than the impact of the suggestion, even when considering that a portion of the suggested route will be done along the upgrade. Based on the above, this alternative has not been adopted as part of the preferred route.

Environmental Evaluation Between Route Segments Analyzed in the Supplement to the Draft EIS/EIR (4.4.2)

On Friday, August 21, 1987, The Environmental Contractor met to develop a recommendation on an environmentally superior alternative between route options identified in the Supplement to the Draft EIS/EIR and the preferred route identified in the Draft EIS/EIR. There were eleven comparisons in all, nine in the north and two in the south. The Project requested that a comparison incorporating route segment N-10 Alt.4, analyzed in the Draft EIS/EIR, be conducted at the meeting. The right-of-way of this route segment was increased to 350 feet since the intent was to run two existing 500 kV lines along the new right-of-way while placing the proposed line along the old right-of-way of the two 500 kV lines.

A list of the comparisons and a description of the approach for evaluating route options is presented below. Following the list and approach description for each comparison are: 1) the results of the Environmental Contractor's comparisons and 2) the lead agencies' conclusions regarding the Environmental Contractor's results. Figures 1.1.3-1 through 1.1.3-4 in Section 1.1.3 of this volume show the locations of the route segments listed below.

Comparison Number	Comparison
1a 1/	North 1 aka Loveness-Graham Option vs. N-10A, N-10E (See Figure 3.1-1 3/)
1b	North 1 (Oregon only), N-10 Alt.4 (with 350' right-of-way) vs. N-10A, N-10E, N-10G, N-10J (See Figure 1.1.3-1 4/)
1c	North 1 (Calif. only), N-10G, N-10J vs. N-10 Alt.4 (John Cross Alternative) (with 350' right-of-way) (See Figure 1.1.3-1 4/)
2a 2/	North 2A, N-10 Alt.5(A1) aka County Line Option vs. N-10M2(A1) aka N-10M Option (See Figure 3.2-1 3/)
2b 2/	North 2B, N-10 Alt.5(B) aka North of Bear Option vs. North 2C, N-10M2(B) aka South of Bear Option (See Figure 3.2-2 3/)
2c	N-10 Alt.5(A1), N-10 Alt.5(A) vs. N-10M2(A1), N-10M2(A), North 2B aka North 2 Routing Option (See Figure 3.2-3 3/)
2d	N-10 Alt.5(A1), N-10 Alt.5(A), N-10 Alt.5(B) vs. N-10M2(A1), N-10M2(A), N-10M2(B), North 2C (See Figure 1.1.3-1 4/)
2e	N-10 Alt.5(A) vs. North 2A, N-10M2(A), North 2B (See Figure 3.2-3 3/)
2f	N-10 Alt.5(A), N-10 Alt.5(B) vs. North 2A, N-10M2(A), N-10M2(B), North 2C (See Figure 1.1.3-1 4/)
3a 5/	North 3J aka Grizzly Peak Option vs. N-7 Alt.1(C), N-8A (See Figure 3.3-1 3/)
3b 4/	North 3K aka Stump Creek Route Option vs. N-7H2(B), N-8A(1) (See Figure 3.3-2 3/)
3c	North 3A(1) aka Hearst Option, N-7H2(A), North 3K, N-8A(2), N-8A vs. N-10 Alt.5(C), N-7 Alt.1(A), N-7 Alt.1(B), North 3J (See Figure 3.3-3 3/
3d	North 3A(1), N-7H2(A), N-7H2(B), N-8A(1), N-8A(2) vs. N-10 Alt.5(C), N-7 Alt.1(A), N-7 Alt. 1(B), N-7 Alt.1(C) (See Figures 1.1.3-2 and 1.1.3-3 4/)

1/ The outcome of this comparison determined which comparison was made between Nos. 1b and 1c.

2/ The outcome of this comparison determined which comparison was made between Nos. 2c, 2d, 2e, and 2f.

3/ These route options are also shown in the referenced figures in the Supplement to the Draft EIS/EIR, June 1987.

4/ These route options are shown in the referenced figures in Section 1.1.3 of this document.

5/ The outcome of this comparison determined which comparison was made between Nos. 3c, 3d, 3e, and 3f.

3e	North 3A(1), N-7H2(A), N-7H2(B), N-8A(1), N-8A(2), N-8A vs. N-10 Alt.5(C), N-7 Alt.1(A), N-7 Alt.1(B), North 3J (See Figures 1.1.3-2 and 1.1.3-3 [4/])
3f	North 3A(1), N-7H2(A), North 3K, N-8A(2) vs. N-10 Alt.5(C), N-7 Alt.1(A), N-7 Alt.1(B), N-7 Alt.1(C) (See Figures 1.1.3-2 and 1.1.3-3 [4/])
4	North 4 aka McCleskey Option vs. N-8 Alt.1, N-8 Alt.2 (See Figure 3.4-1 [3/])
5	South 1 vs. S-8E1, S-8E2, S-8H, S-8J(1) (See Figure 4.1-1 [3/])
6	S-9G, South 2 vs. S-9F, S-9H (See Figure 4.2-1[3/])

Members attending this meeting included:

Name	Role	Organization
Eileen Allen	Land Use	Envirosphere
John Carrier	Socioeconomics	Envirosphere
Doug Davy	Cultural Resources	Envirosphere
Dave Laney	Soils/Geology	Envirosphere
Ken Lastufka	Facilitator	Envirosphere
John Little	Project Manager	Envirosphere
Scott Wilcox	Water Resources	Envirosphere
Dan Airola	Vegetation/Wildlife	Jones & Stokes
Curt Miller	Visual Resources	Jones & Jones
Cheryl Shields	Public Participation	Project Manager

Observers attending this meeting included:

Nancy Weintraub	Western
Jay Abbott	Project Manager
Rick Lind	Project Manager
Paul Olmstead	TANC/SMUD
Warren Wootton	TANC/MID
Randall Sharp	USFS/Modoc
Debby Stefan	USFS/Regional Office
Kathleen Toner Phelps	USFS/Shasta-Trinity
Doug Wickizer	CDF

The observers were welcome to provide additional environmental information to the specialists during the meeting.

Approach

The procedure for identifying an environmentally superior alternative among each comparison was as follows:

1. Each discipline specialist was asked to give a letter grade to each route option within a comparison based on the definitions below.

   A = High acceptability; no major impact; no extensive mitigation

   B = Moderate acceptability; some potentially major impact but mitigable, or minor impacts with mitigation

   C = Low acceptability; major impacts difficult to mitigate

   D = Very low acceptability; major impacts, mitigation may be impractical

2. Each discipline specialist provided a verbal report indicating the letter grade and the rationale or issues which led to these grades. Discussion/questions of these reports was encouraged. The letter grades were summarized on a flip chart and discipline specialists submitted Discipline Evaluation Forms for each comparison.

3. After hearing the reports from each discipline on the impacts for each route option, specialists were asked to give an overall ranking for each of the comparisons: 1 = the preferred option on a particular comparison. These scores were summarized on a flip chart. The scores were discussed and a group

recommendation was made as to which option was environmentally preferred for each comparison. This decision (and, in the case of close votes, the rationale for the decision) was summarized on the flip chart.

Comparison Results

The comparisons are presented in two parts. The first part presents tables of grades and ranks given to the options according to each discipline. Also presented is a brief description of particular issues which were important to each discipline. This is followed by a conclusion by the lead agencies regarding the recommendations. The second part lists which options were recommended as environmentally superior. These choices take into account the views of all disciplines, not just those of individual specialists.

Summary of Comparisons

Comparison No. 1a - North 1 (Loveness Graham Option) vs. Preferred route

	North 1		N-10A, N-10E	
	Grade	Rank	Grade	Rank
Water	A*	1	A	2
Earth Resources	B	1	B*	2
Biological Resources	B	1	B	2
Land Use	A	1	B	2
Visual Resources	A	1	B	2
Socioeconomics	B*	1	B	2
Cultural Resources	B	1	C	2
Public Involvement	A	1	C	2

1. WATER: The North 1 option parallels fewer miles of streams and crosses no more streams than the N-10A/N-10E option.

2. SOILS/GEOLOGY: Both options will result in an almost identical rate of soil loss. The N-10A/N-10E option will cross less rough terrain, will require less cut and fill, and will generate less sidecast soil than North 1.

3. VEGETATION/WILDLIFE: There will be slightly fewer waterfowl collisions on North 1, but more significant effects on deer habitat. Raptor collision potential is not significantly different between options.

4. LAND USE: North 1 is superior because it avoids agricultural and residential impacts and the Loveness Airport. North 1 has minimal land use impacts since it crosses rangeland.

5. VISUAL: North 1 crosses more BLM VRM Class III lands, but has fewer residences within the foreground and crosses no lands of high incompatibility.

6. SOCIOECONOMICS: North 1 has lower job impacts and affects fewer dwelling units.

7. CULTURAL RESOURCES: N-10A/N-10E runs along a margin of hills and flatlands, and is highly sensitive for prehistoric archaeological sites.

8. PUBLIC INVOLVEMENT: The public suggested the Oregon portion of North 1 because it avoids agricultural land and the Loveness Airport. Comments at the public hearings were against the preferred alternative.

Lead Agency Conclusions

Comparison No. 1a above matches route option North 1 (the Loveness-Graham Option) with the preferred route. The overall comparison, taking into account all resource disciplines, resulted in the lead agencies selecting route option North 1 as the environmentally superior alternative. This was primarily because it avoids a private airstrip and is further removed from agricultural lands on the valley floor. The potentially higher soils and geology impacts on North 1 can be mitigated.

* Indicates a preference between two route segments where the grades were the same.

Comparison No. lc - Preferred Route vs. John Cross Alternative

	North 1 (Calif. Only) N-10G, N-10J Grade	Rank	N-10 Alt.4 Grade	Rank
Water	A	2	A	1
Earth Resources	A	2	C	1
Biological Resources	B*	2	B	1
Land Use	B	2	A	1
Visual Resources	C	2	C*	1
Socioeconomics	B	2	A	1
Cultural Resources	C	2	B	1
Public Involvement	B	2	A	1

1. WATER: Few streams are crossed by either option. Slopes at stream crossings are not excessive. There is no significant difference in water resource impacts with either option.

2. SOILS/GEOLOGY: The N-10 Alt.4 option may exceed an acceptable rate of soil loss. Since the North 1 option may result in a rate of soil loss of less than one ton/acre/year, the North 1 option is preferred.

3. VEGETATION/WILDLIFE: The North 1 option crosses near a Swainson hawk nest site. N-10 Alt.4 crosses less tall growing vegetation, but also crosses more deer habitat. The North 1 option is superior.

4. LAND USE: The N-10 Alt.4 option is superior because it is entirely removed from the Tulelake/Copic Bay agricultural area. It also avoids residences and any aerial application activities originating from the Tulelake Airport.

5. VISUAL: Both have significant impacts due to passing through highly incompatible landscapes. Both are visible to sensitive land uses and viewpoints. N-10 Alt.4 has fewer residences in the foreground.

6. SOCIOECONOMICS: N-10 Alt.4 is preferred because it has less socioeconomic impacts per mile.

7. CULTURAL RESOURCES: North 1 passes near sensitive Native American heritage sites. N-10 Alt.4 is preferred because, although it passes within 3.4 miles of eight Native American sites, it does not pass close to any of them.

8. PUBLIC INVOLVEMENT: Public comments from Modoc/Klamath County residents, legislators, local civic leaders and agencies overwhelmingly endorse the Oregon portion of North 1 and N-10 Alt.4.

Lead Agency Conclusions

Comparison No. lc above matches route segment N-10 Alt.4 (the John Cross Alternative) with the preferred route. Considering the above information, the lead agencies selected N-10 Alt.4 as environmentally superior from a land use and socioeconomics perspective, taking into account impacts to agriculture and related aviation activities and strong local support. N-10G/N-10J was superior from an earth and biological resources perspective. Site-specific right-of-way location has reduced the potential agricultural and socioeconomic impacts along N-10G/N-10J by avoiding the placement of towers on irrigated croplands. Only one irrigated agricultural field would be spanned by the 200-foot wide right-of-way. With the relatively extensive construction requirements for the N-10 Alt.4 option, the lead agencies have found N-10 Alt.4 to have prohibitively high costs compared to slight environmental benefits and conclude that it is not feasible from an economic perspective. N-10G/N-10J has been identified as the preferred route.

* Indicates a preference between two route segments where the grades were the same.

Comparison No. 2a - County Line Option vs. N-10M2(A1)

	North 2A, N-10 Alt.5(A1)		N-10M2(A1)	
	Grade	Rank	Grade	Rank
Water	A	2	A	1
Earth Resources	A	2	A*	1
Biological Resources	B 1/	2	B	1
Land Use	C+	2	C	1
Visual Resources	C	2	B	1
Socioeconomics	B*	1	B	2
Cultural Resources	A	2	A*	1
Public Involvement	A	2	B	1

1. WATER: Although there are fewer streams crossed by N-10M2(A1), differences between this option are not significant.

2. SOILS/GEOLOGY: The N-10M2(A1) option will result in a slower rate of soil loss, will traverse less steep terrain, will require less benching and cutting of side slope areas for access roads, and will generate less sidecast material.

3. VEGETATION/WILDLIFE: There are no significant differences between routes.

4. LAND USE: Both options have equally substantial prime timber impacts. The North 2A option crosses a timber plantation, while N-10M2(A1) crosses a large TPZ area. If the plantation can be avoided, the North 2A option is preferred.

5. VISUAL: N-10M2(A1) is preferred because it is located further east of the Medicine Lake Highlands and the slopes of Black Mountain and Border Mountain.

6. SOCIOECONOMICS: Both options are similar.

7. CULTURAL RESOURCES: Archaeological sensitivity of the North 2A option is slightly higher because it crosses the flanks of Black Mountain.

8. PUBLIC INVOLVEMENT: Public comments have endorsed the use of public lands for public projects.

Lead Agency Conclusions

Comparison No. 2a above matches route segment N-10M2(A1) with route segment North 2A (the County Line Option). The overall comparison, taking into account all resource disciplines, resulted in the lead agencies selecting route segment N-10M2(A1) as the environmentally superior alternative. This was primarily because of the Forest Service position that old-growth timber was limited and of critical concern on public lands in the Black Mountain area and impacts to prime timberlands were slightly less along the North 2A option. Although cultural resources impacts would potentially be greater on N-10M2(A1), it is expected that these impacts can be mitigated by avoidance.

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* Indicates a preference between two route segments where the grades were the same.

1/ A grade of D if option crosses old growth.

Comparison No. 2b - North of Bear Option vs. South of Bear Option

	North 2B, N-10 Alt.5(B)		North 2C N-10M2(B)	
	Grade	Rank	Grade	Rank
Water	A*	2	A	1
Earth Resources	B	2	B*	1
Biological Resources	C	2	B	1
Land Use	C-	2	C	1
Visual Resources	C	2	B	1
Socioeconomics	B	2	B*	1
Cultural Resources	B	2	B-	1
Public Involvement	B	2	B	1

1. WATER: North of Bear crosses fewer streams and is slightly more preferred.

2. SOILS/GEOLOGY: The rate of soil loss for each comparison is almost identical and both cross fault traces at angles less than ninety degrees. However, the North 2B option crosses 1.4 miles of land with greater than thirty degree slopes while North 2C crosses only 0.3 mile of these slopes.

3. VEGETATION/WILDLIFE: North of Bear could have some impacts on goshawk territory, would require more forest clearing, and would remove old growth forest.

4. LAND USE: The North 2C option is preferred because it affects slightly less prime timber.

5. VISUAL: The North 2C option is shorter, does not cross USFS VRM Partial Retention areas, and crosses little moderately incompatible landscapes.

6. SOCIOECONOMICS: Both options are similar.

7. CULTURAL RESOURCES: South of Bear runs closer to a Native American village cluster and crosses more of Whitmore Meadows.

8. PUBLIC INVOLVEMENT: (No comment submitted.)

Lead Agency Conclusions

Comparison No. 2b above matches route segment North 2B (North of Bear) with North 2C (South of Bear). The lead agencies believe that the comparison of the two route segments is so close that one is not clearly environmentally superior to the other. The comparison by the resource specialists resulted in the environmental contractor recommending route segment North 2C as the environmentally superior alternative though the preference was slight. This was primarily because of the potential for impacts to old growth timber and cavity-dependent wildlife species on North 2B, and because North 2C crossed slightly fewer acres of prime timberland and had fewer visual and earth resources impacts. The impacts along North 2B can be substantially mitigated through careful alignment of the centerline to avoid old growth and cavity-dependent wildlife species. However, as discussed in the comparison of North 2B and North 2C in the Supplement to the Draft EIS/EIR, site specific engineering and construction considerations indicate that the North 2C option, although shorter in length, traverses somewhat rougher terrain and would therefore make access road and construction efforts more extensive on a per mile basis. Also as discussed in the Supplement, route segment North 2B is in the immediate vicinity of the Bear Mountain lookout tower, and would be preferable from a reliability standpoint. For these reasons, route segment North 2B was selected as the preferred route.

* Indicates a preference between two route segments where the grades were the same.

Comparison No. 2d - Preferred Route vs. N-10M2(A1) + N-10M2(A) + N-10M2(B) + North 2C

	N-10 Alt.5 (A1, A, and B) Grade	Rank	N-10M2(A1, A, and B), North 2C Grade	Rank
Water	A-	2	A	1
Earth Resources	C	2	B	1
Biological Resources	C	2	B	1
Land Use	C	2	C+	1
Visual Resources	C	2	B	1
Socioeconomics	B	2	B	1
Cultural Resources	B*	2	B	1
Public Involvement	C	2	B	1

1. WATER: Fewer streams are crossed in the eastern option; however, the differences between options are not significant.

2. SOILS/GEOLOGY: The western option crosses the Giant Crater Lava Tube area and therefore will result in some potentially significant unmitigable impacts.

3. VEGETATION/WILDLIFE: The eastern route is preferred because it requires less forest clearing.

4. LAND USE: The eastern option is preferred because it affects less prime timber and avoids the Giant Crater Lava Tube area.

5. VISUAL: The western option is located in the Medicine Lake Highlands, would impact roads used to recreation areas, and would cross 1.1 miles of Retention and 5.9 miles of Partial Retention. The eastern option is preferred.

6. SOCIOECONOMICS: The eastern option would have fewer impacts on jobs.

7. CULTURAL RESOURCES: The western option is slightly preferred because North 2C crosses Atkins Meadow (which is of high predicted sensitivity to prehistoric sites) and a Native American village cluster.

8. PUBLIC INVOLVEMENT: The public favored the eastern option.

Lead Agency Conclusions

Comparison No. 2d above matches route segments N-10M2(A1, A, and B) plus North 2C (N-10M) with the preferred route. The overall comparison, taking into account all resource disciplines, resulted in the lead agencies selecting N-10M as the environmentally superior alternative. This was primarily because of fewer impacts to prime timber, visual resources, biological, and earth resources (lava tube concerns). Potentially higher cultural resources impacts on N-10M can be mitigated. The specialists indicated that the inclusion of North 2B in place of North 2C would not change the preference for N-10M.

* Indicates a preference between two route segments where the grades were the same.

Comparison No. 3a - Grizzly Peak Option vs. Preferred Route

	North 3J		N-7 Alt.1(C) N-8A	
	Grade	Rank	Grade	Rank
Water	C*	1	C	2
Earth Resources	C*	1	C	2
Biological Resources	C*	1	C	2
Land Use	C+	1	C	2
Visual Resources	C	2	C*	1
Socioeconomics	B	1	B	2
Cultural Resources	C	2	B	1
Public Involvement	C	1	C	2

1. WATER: Both options cross McGill Creek in an area considered essential habitat for the Redband trout, a federal candidate endangered fish species.

2. SOILS/GEOLOGY: Both options cross highly erodible, steep slopes of high rainfall with landslide and mass wasting potential. However, since the North 3J option was specifically recommended by the USFS to avoid unstable soils, it is preferred.

3. VEGETATION/WILDLIFE: The options are similar in impact on spotted owl territory. Careful routing could avoid old-growth.

4. LAND USE: North 3J is slightly preferred since it avoids a timber sale area. Impacts to prime timber are very similar. North 3J affects slightly more prime timber, but timber sale outweighs it.

5. VISUAL: Both options are similar except that North 3J is closer to the Grizzly Peak Lookout and Iron Canyon Reservoir.

6. SOCIOECONOMICS: Both options are similar.

7. CULTURAL RESOURCES: North 3J is highly sensitive to prehistoric sites, close to the top of Grizzly Peak, and passes through Little Meadows near Dad Lofton Springs.

8. PUBLIC INVOLVEMENT: (No comment submitted.)

Lead Agency Conclusions

Comparison No. 3a above matches the Grizzly Peak route options, specifically route segment North 3J, with N-7 Alt.1(C)/8A (the preferred route). The overall comparison, taking into account all resource disciplines, resulted in the lead agencies selecting route segment North 3J as the environmentally superior alternative. This was primarily because it avoids current and planned timber sale areas. North 3J did not differ substantially from the preferred route in terms of overall environmental impacts. Cultural resource impacts would be higher with North 3J, but sites can be avoided by careful tower and access road location.

The USDA Forest Service has indicated in November 1987 that the area east of the North 3J corridor (east of Little Meadows) has a feasible route location that will minimize resource impacts while meeting geologic concerns. Should a superior location be found near North 3J during final design, the lead agencies will work with the Forest Service to identify, review, and approve that location.

* Indicates a preference between two route segments where the grades were the same.

Comparison No. 3b - Stump Creek Route Option vs. N-7H2(B) + N-8A1

	North 3K		N-7H2B, N-8A1	
	Grade	Rank	Grade	Rank
Water	A	1	A*	2
Earth Resources	C*	1	C	2
Biological Resources	B	1	B	2
Land Use	A	1	A-	2
Visual Resources	B	1	C	2
Socioeconomics	A	1	A	2
Cultural Resources	B	1	C	2
Public Involvement	B*	1	B	2

1. WATER: The N-7H2(B) option crosses streams that are less steep than those crossed by North 3K and therefore less susceptible to erosion, although impacts are not significantly different between either option.

2. SOILS/GEOLOGY: Both options cross steep slopes, areas of high rainfall, highly erodible soils with landslide and mass wasting potential. There will be 0.2 tons/acre/year less soil loss and less cut and fill using North 3K.

3. VEGETATION/WILDLIFE: Both have equal amounts of forest clearing.

4. LAND USE: Both options have similar impacts, with both affecting non-prime timber. North 3K is slightly preferred since it avoids USFS timber sale areas.

5. VISUAL: North 3K is located further from Kosk Creek and crosses a minimal amount of visual Retention.

6. SOCIOECONOMICS: Both options are similar.

7. CULTURAL RESOURCES: The N-7H2(B) option passes very close to three Native American Heritage sites.

8. PUBLIC INVOLVEMENT: (No comment submitted.)

Lead Agency Conclusions

Comparison No. 3b above matches the Stump Creek Route Options, specifically route segment North 3K, with N-7H2(B) and N-8A1. The overall comparison, taking into account all resource disciplines, resulted in the lead agencies selecting route segment N-7H2(B) as the environmentally superior alternative. This was primarily because a detailed review of this route by the COTP geotechnical consultants subsequent to the environmentally superior meeting with the specialists, indicated that the North 3K route is unacceptable from an engineering and environmental perspective. Tower locations and access roads along 3K would need to be placed on active slide areas which cannot be avoided.

* Indicates a preference between two route segments where the grades were the same.

Comparison No. 3c - Hearst Option vs. West Grizzly Peak Option

	N-3A(1), N-7H2(A), North 3K, N-8A, N-8A(2) Grade	Rank	N-10 Alt.5(C), N-7 Alt.1(A,B), North 3J Grade	Rank
Water	B	1	C 2/	2
Earth Resources	C- 2/	2	C	1
Biological Resources	B	1	C	2
Land Use	B	1	C	2
Visual Resources	C*	1	C	2
Socioeconomics	B*	1	B	2
Cultural Resources	B*	1	B	2
Public Involvement	B*	2	B	1

1. WATER: The western option crosses three streams containing the candidate endangered fish species, the Redband trout. This option also crosses more streams than the eastern option.

2. SOILS/GEOLOGY: Both options cross steep slopes, areas of high rainfall, and highly erodible soils with landslide and mass wasting potential. However, the eastern option traverses the Kosk Creek area and would result in significantly more soil loss (at least twice as much) when compared to the western option. The eastern option is preferred only if the Project agrees to helicopter mitigation (or some equivalent). Otherwise, impacts may prove unmitigable.

3. VEGETATION/WILDLIFE: No old-growth forest/spotted owl conflicts are along the eastern option. Also, there will be less forest clearing with this option.

4. LAND USE: The eastern option is superior since it crosses less prime timber. Recent information on 20 acre residential parcels in the lower section of the option does not change this preference. The eastern option is also further from the Grizzly Peak Lookout.

5. VISUAL: Both affect lands managed for visual resources. Both cross Retention and Partial Retention areas, moderately incompatible landscapes, and high visibility areas. The eastern option affects all these factors to a greater degree than the western option.

6. SOCIOECONOMICS: The eastern option affects fewer jobs, but requires more access roads per mile. This option is preferred.

7. CULTURAL RESOURCES: Prehistoric site sensitivity is high for the eastern option. Although it passes within 3.4 miles of more Native American heritage sites, it does not pass close to significant sites. The western option is of low prehistoric sensitivity.

8. PUBLIC INVOLVEMENT: (No comment submitted.)

Lead Agency Conclusions

Comparison No. 3c above matches the West Grizzly Peak option, route segment North 3J, with the Hearst option. (This Hearst Option included North 3K rather than N-7H2(B) but the results would not be expected to change.) The overall comparison, taking into account all resource disciplines, resulted in the lead agencies selecting route segment North 3J as the environmentally superior alternative. (For discussion, see the List of Options Chosen by Resource Specialists as Environmentally Superior, and the discussion of the Hearst option in Section 2.3 of this document.) Potential impacts to the Redband Trout and old-growth/spotted owl territories along the Grizzly Peak option will be given careful consideration for mitigation. Higher impacts to prime timber also occur along the Grizzly Peak option, but the lead agencies believe the severe soils problems on the Hearst option would be more damaging to the environment.

2/ A grade of D if helicopters are not used during construction.

The USDA Forest Service has indicated in November 1987 that the area east of the North 3J corridor (east of Little Meadows) has a feasible route location that will minimize resource impacts while meeting geologic concerns. Should a superior location be found near North 3J during final design, the lead agencies will work with the Forest Service to identify, review, and approve that location.

Comparison No. 4 - McCleskey Option vs. Preferred Route

	North 4		N-8 Alt. 1, N-8 Alt. 2	
	Grade	Rank	Grade	Rank
Water	A	1	A	2
Earth Resources	B	1	A	2
Biological Resources	C	1	C*	2
Land Use	B-	1	C	2
Visual Resources	C*	1	C	2
Socioeconomics	B*	1	B	2
Cultural Resources	B-*	1	B-	2
Public Involvement	B	1	C-	2

1. WATER: Stream impacts do not vary per option.

2. SOILS/GEOLOGY: North 4 is shorter but crosses steep terrain for a longer distance. This option would also result in greater soil loss.

3. VEGETATION/WILDLIFE: North 4 is 0.5 mile closer to the identified bald eagle concentration area at Devil's Canyon.

4. LAND USE: North 4 is preferred since it avoids the Pit River, affects less prime timber and is further away from the Roaring Creek Rancheria.

5. VISUAL: Differences in impacts are negligible. North 4 is preferred due to fewer homes within the foreground view of this option.

6. SOCIOECONOMICS: North 4 would have less impacts on jobs and fewer dwelling units per mile.

7. CULTURAL RESOURCES: Both options cross very sensitive Native American and prehistoric areas. North 4 is further from the Roaring Creek Rancheria.

8. PUBLIC INVOLVEMENT: (No comment submitted.)

Lead Agency Conclusions

Comparison No. 4 above matches route segment North 4 (McCleskey Option) with the preferred route. The overall comparison, taking into account all resource disciplines, resulted in the lead agencies selecting route segment North 4 as the environmentally superior alternative. This was primarily because it avoids a small rural subdivision in the Flatwoods area, is further from the Roaring Creek Rancheria, and has fewer dwelling units within the foreground view. Potentially higher impacts to earth and biological resources on North 4 can be mitigated.

* Indicates a preference between two route segments where the grades were the same.

Comparison No. 5 - South 1 vs. Preferred Route

	South 1		S-8E1, S-8E2, S-8H, S-8J(1)	
	Grade	Rank	Grade	Rank
Water	A	1	A	2
Earth Resources	A	1	A-	2
Biological Resources	C-*	1	C-	2
Land Use	C*	1	C	2
Visual Resources	C	1	C*	2
Socioeconomics	B*	1	B	2
Cultural Resources	B	1	C	2
Public Involvement				

1. WATER: There are no significant differences between options.

2. SOILS/GEOLOGY: South 1 is superior because it is shorter and because it crosses less organic soil (which is susceptible to subsidence, hydrocompaction, and wind erosion).

3. VEGETATION/WILDLIFE: South 1 crosses less high collision potential area.

4. LAND USE: South 1 is slightly preferred because it affects less irrigated agricultural land and it avoids two houses that are in the right-of-way of route segment S-8E.

5. VISUAL: The preferred route is superior because South 1 would be longer and would be closer to Discovery Bay.

6. SOCIOECONOMICS: South 1 is preferred because there are less dwelling units per mile within the foreground.

7. CULTURAL RESOURCES: South 1 has a lower estimated sensitivity to prehistoric sites. The other option has a higher sensitivity to prehistoric sites because of greater proximity to slough banks.

8. PUBLIC INVOLVEMENT: (No comment submitted.)

Lead Agency Conclusions

Comparison No. 5 above matches route segment South 1 with the preferred route. The overall comparison, taking into account all resource disciplines, resulted in the lead agencies selecting route segment South 1 as the environmentally superior alternative. This was primarily because impacts to irrigated agricultural lands were minimized and it avoided two homes. Potentially greater impacts to visual resources will be mitigated by minor changes to the route within the 1,500-foot right of way.

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* Indicates a preference between two route segments where the grades were the same.

Comparison No. 6 - South 2 vs. Preferred Route

	S-9G, South 2 Grade	Rank	S-9F, S-9H Grade	Rank
Water	A	1	A*	2
Earth Resources	A-	1	A	2
Biological Resources	B	1	B	2
Land Use	B+	1	B	2
Visual Resources	C	2	C*	1
Socioeconomics	B	1	B*	2
Cultural Resources	A*	1	A	2
Public Involvement	A	1	B	2

1. WATER: There are no significant differences between options.

2. SOILS/GEOLOGY: Both options avoid organic soil. However, the South 2 option is significantly longer and crosses more sloping terrain. Therefore, the S-9F option would have less impacts to earth resources.

3. VEGETATION/WILDLIFE: Both pass through potential and probable habitat for the San Joaquin kit fox.

4. LAND USE: South 2 is superior because it affects fewer residences within 1,000 feet of the reference centerline, and it avoids the wind farms and freeway intersection.

5. VISUAL: The S-9F option is shorter in length and has fewer houses in the foreground than the South 2 option. The South 2 option parallels the California Aqueduct and Bikeway for one mile and crosses Interstate 580 at an angle.

6. SOCIOECONOMICS: The South 2 option would have more long-term agricultural impacts than the S-9F option.

7. CULTURAL RESOURCES: Both have low sensitivity to cultural resources. There is a slight preference for the South 2 option based on a lower estimated prehistoric sensitivity.

8. PUBLIC INVOLVEMENT: (No comment submitted.)

Lead Agency Conclusions

Comparison No. 6 above matches route segment South 2 with the preferred route. The overall comparison, taking into account all resource disciplines, resulted in the lead agencies selecting route segment South 2 as the environmentally superior alternative. This was primarily because it avoids wind farm developments and the Interstate 580 and Interstate 205 Interchange. South 2 also affects fewer residences within 1,000 feet of the centerline and also takes advantage of existing rights-of-way for the California Aqueduct and the Delta-Mendota Canal. Potentially higher visual and socioeconomic impacts along South 2 can be mitigated to some degree.

List of Options Chosen by Resource Specialists as Environmentally Superior

North	South
North 1 (Oregon only)	South 1
N-10 Alt.4	S-9G
N-10M2(A1)	South 2
N-10M2(A)	
N-10M2(B)	
North 2C	
N-3A(1)	
N-7H2(A)	
North 3K	
N-8A	
N-8A(2)	
North 4	

* Indicates a preference between two route segments where the grades were the same.

The lead agencies and Environmental Contractor agree on alternative D in the north and alternative B in the south as the environmentally superior alternatives. The lead agencies further agree with all route option recommendations of the resource specialists, with the exception of N-10 Alt.4 and North 2C. The superiority of the N-10 Alt.4 option is very close, and prohibitively high construction costs make this option infeasible. This is further discussed under Comparison No. 1c above. North 2C was found by the resource specialists to be slightly superior to the option but taking into account more extensive access road and construction efforts for North 2C, the lead agencies believe the comparison is so close that one is not clearly environmentally superior to the other. This is further discussed under Comparison No. 2b above.

Although the Hearst Option was recommended by the resource specialists over the North 3J Option, there was considerable discussion and a caveat placed that the Hearst Option would be preferred only if mass soil wasting could be avoided by the use of helicopter construction or similar mitigation. Uncertainty regarding the stability of soils along these options resulted in a detailed review of this route as described in Section 2.3 of this Final EIS/EIR. Considerable concerns over the potential for mass wasting and extensive soil movement along the Hearst Option and North 3K resulted in the lead agencies identifying the North 3J Option as both the environmentally superior and Project preferred route.

Changes to the Project Preferred Route (4.4.3)

A number of comments were received on the Draft EIS/EIR which led to the identification of new routing options to portions of the preferred route for the COTP. In July 1987, the lead agencies distributed a Supplement to the Draft EIS/EIR to obtain public review of the new routing options. In the Supplement, the new routing options were compared to corresponding segments of the preferred route. The public comment period lasted until August 17, 1987, and included three public hearings. The lead agencies reviewed the public comments on the Supplement to the Draft EIS/EIR to help determine which routing options would be incorporated into the final preferred route.

After receiving public input, on August 21, 1987 the environmental contractor conducted an environmental comparison of the new route options to the preferred route. On August 25, 1987, the lead agencies obtained input from the Project Participants representing the engineering/design, system planning, environmental, construction disciplines, and from interested agencies regarding their concerns with the new route options. As a result of those meetings and analyses and the public comments, the lead agencies determined the environmentally superior route options and which new routing options would be incorporated into the Project preferred route. The route options and the rationale for their incorporation into the final preferred route are as follows:

Southern Oregon Switching Station

During the public review period on the Draft EIS/EIR, a third potential site for the Southern Oregon Switching Station was identified. The new switching station site E3 was compared to E2, which had been identified as the preferred site in the Draft EIS/EIR. The new site E3 would have fewer impacts on agricultural lands and is less visible from the town of Malin, Oregon, and for that reason has been identified as the new Project preferred Southern Oregon Switching Station site.

Northern Section Routes

North 1 is a 9.7 mile route option located to the east of the original Project preferred route. The Oregon portion of this route, extending from the Southern Oregon Switching Station Site E3 to the California/Oregon border, was proposed by two local landowners and the Oregon Review Committee. Lead agency staff proposed an extension of that route into California to connect with the original Project preferred route. The North 1 route option has been incorporated into the Project preferred route because it avoids a private air strip and avoids more agricultural land.

In Southern Modoc County and through Siskiyou County, several routes comprising the North 2 area were suggested as options to the original Project preferred route. North 2 is based essentially on existing route segment N-10M, which was dropped from consideration prior to the release of the Draft EIS/EIR due to concerns over the potential for a three-line outage caused by forest fires. The original preferred route (N-10 Alt.5) appeared to offer greater transmission system reliability because it had greater separation from the existing Intertie. In subsequent discussions with the Forest Service, the Forest Service strongly maintained that reliance on centerline separation without consideration for suppression activities would not significantly reduce the risks of an outage caused by forest fires. With the commitment on the part of the Forest Service to help develop a fuels management and fire response plan, the lead agencies reconsidered N-10M as a feasible alternative and have adopted it as part of the Project preferred route.

The fuels management plan will use fuel breaks adjacent to the transmission line rights-of-way on public lands in areas of heavy fuel concentrations or steep topography to reduce fuel volumes and slow the spread of fire. Other fuels management strategies to be employed include timber stand improvement activities such as thinning; prescribed burning; rangeland grazing; and wildlife browse enhancement. The fire response plan would involve notifying the operating agent for the three Intertie lines of forest fires or prescribed burn activities or of hazardous fire conditions in the vicinity of the 500 kV transmission lines. The operating agent might then have additional time to reschedule generation or loads so that if there were an outage, the Intertie would not be fully loaded.

North 2A and N-10M1 are alternatives at the northern end of N-10M. In general, the original total route segment N-10M1 impacts fewer acres of prime timberland than does the original Project preferred route identified in the Draft EIS/EIR. Route segments North 2A and N-10M2 have less impacts to prime timber than route segment N-10M2(A1). North 2A crosses federal timberlands and was identified as an alternative to crossing private timberlands. However, North 2A crosses an area managed by the Forest Service for old growth timber as well as crossing a tree plantation. In meetings with Forest Service officials, the Forest Service stated that old growth habitat was of critical concern in the Black Mountain area. A decision was subsequently made to locate the Project preferred route along N-10M2(A1) rather than across the plantation and through the old growth habitat.

North 2B and North 2C are at the southern end of N-10M, and were developed by the McCloud Ranger District, Shasta-Trinity National Forest, and lead agency staff members. The purpose was to provide two alternative connections between N-10M and the preferred route which would avoid the unstable soils of the Montgomery Creek formation. The lead agencies believe that the two route options are so close that one is not clearly environmentally superior to the other. The lead agencies believe, however, that the reliability of the COTP is somewhat compromised by locating a major portion of the Project preferred route along route segment N-10M, and North 2B represents additional separation from the existing Intertie. Should a forest fire occur, the forested area between North 2B and the existing Intertie can be seen from the Bear Mountain lookout better than can the forested area between North 2C and the existing Intertie.

In the North 3 area, the North 3J option is being incorporated into the final Project preferred route. This route option was also the result of a collaborative effort between the McCloud Ranger District and lead agency staff in an effort to avoid both current and planned timber sale areas and to reduce impacts to spotted owl management areas. Another route in the area, the Hearst option, was found to be unacceptable from both an environmental and an engineering viewpoint since access roads for maintenance would be needed across areas of very unstable soil conditions. Access roads for maintenance of the COTP are necessary as helicopter maintenance is not possible. Most emergency repair or maintenance activities would need to take place during winter or storm weather periods when helicopters may not be able to fly.

During the public comment period on the Draft EIS/EIR, Dale McCleskey and several of his neighbors proposed the option in the North 4 area. They raised concerns that the original Project preferred route identified in the Draft EIS/EIR would cross over or be very near to their small rural residential area near the Flatwoods area along Pit River rim. Lead agency staff subsequently met with Mr. McCleskey and identified a route that would avoid the community and cross the Pit River slightly to the northwest of the original preferred route. This route option has been incorporated into the Project preferred route because it would avoid the small residential community.

Southern Section Routes

The South 1 routing option was identified by the Western Area Power Administration engineering staff in response to concerns identified by landowners along the original Project preferred route. The new route option would reduce the severance of several parcels into unuseable remnants and avoid development along Sand Mound Slough. The southern part of the new route would also avoid crossing Woodward Island where access for construction and maintenance would be difficult.

The incorporation of the South 1 option into the Project preferred route resulted in the identification of a new route segment, S-8 Alt.3. The S-8 Alt.3 route option on Victoria Island is superior to the option of S-8J in conjunction with South 1. In general, the impacts of these options would be very similar; both would parallel irrigation canals through intensively farmed row crop agricultural fields owned by the same landowner.

The preferred route between the Tracy and Tesla Substations was relocated to the South 2 route option to take advantage of more compatible land uses and to avoid an elevated road crossing of the State Highway 580/Interstate 105 interchange. This new route option would also take advantage of two existing public rights of way for part of its length: the Delta Mendota Canal and the California Aqueduct.

The final Project preferred route for the COTP which is shown on Figures 1.1.3-1 through 1.1.3-5 in this document, is as follows:

Northern Section

- Southern Oregon Switching Station Site E3
- North 1
- N-10G
- N-10J
- N-10K
- N-10L
- N-10M1
- N-10M2(A1)
- N-10M2(A)
- North 2B
- N-10 Alt.5(B)
- N-10 Alt.5(C)
- N-10 Alt.5(D)
- N-7 Alt.1(A)
- N-7 Alt.1(B)
- North 3J
- N-8A(3)
- N-8C
- North 4

Grizzly Peak to Redding Section

- N-8 Alt.2(A)
- N-9A
- N-9C
- N-9D
- N-9G
- N-9J
- N-9N
- N-9O
- N-9Q
- N-13A

Olinda Substation Site GP4

Central Section

- S-1A (Upgrade Section)
- Maxwell Series Compensation Station Site SC3

Southern Section

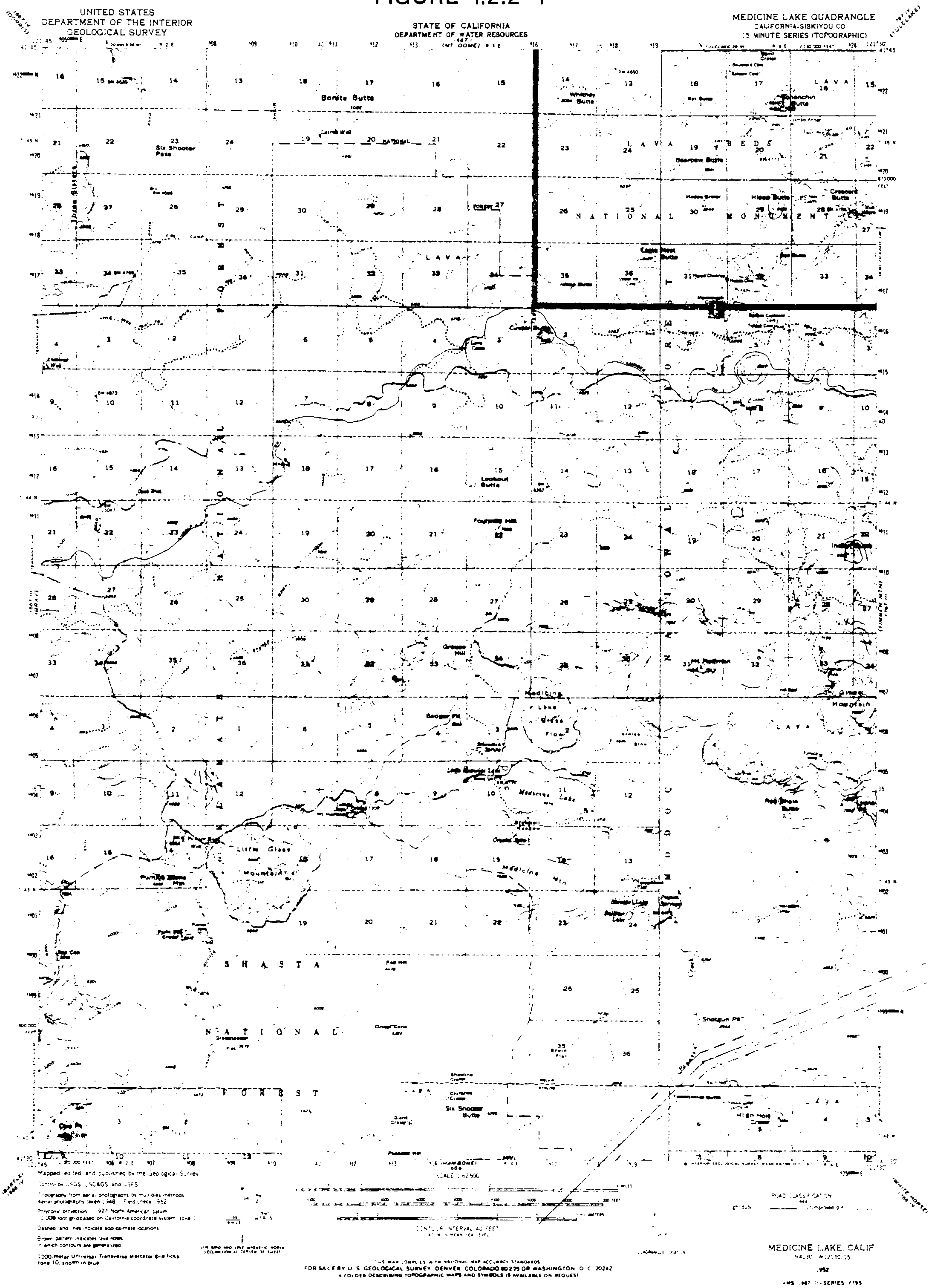
- S-8B
- S-8C
- S-8 Alt.1
- S-8E1(A)
- South 1
- S-8 Alt.3
- S-8K
- Tracy Sub-station Site T1
- S-9D
- S-9G
- South 2

3. Figure 1.2.2-1

   Add: Medicine Lake, California Quadrangle map at the end of this section.

4. Table A-10 (N-10)

   Footnote 1, Line 3.
   add: "most of" after "staying east of"


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
MEDICINE LAKE QUADRANGLE
CALIFORNIA-SISKIYOU CO
15 MINUTE SERIES (TOPOGRAPHIC)
Bonita Butte
Whitney Butte
Six Shooter Pass
LAVA BEDS NATIONAL MONUMENT
Bearpaw Butte
Hippo Butte
Crescent Butte
Eagle Nest Butte
Cinder Butte
Lookout Butte
Fourmile Hill
Grouse Hill
Badger Flat
Medicine Lake Glass Flow
Little Medicine Lake
Medicine Lake
Little Glass Mountain
Pumice Stone Mtn
Medicine Mtn
SHASTA NATIONAL FOREST
Shotgun Flat
Six Shooter Butte
MODOC NATIONAL FOREST
MEDICINE LAKE, CALIF
1952
CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225 OR WASHINGTON, D.C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

VOL. 1 FINAL

TABLE 1.2.2-1

DATA
N-10M

STRATOTYPE	VOLUME MBF	STUMPAGE $/MBF (1982)	STUMPAGE $/MBF (1987)	TOTAL $ (1987)	WEIGHTED AVERAGE STUMPAGE (1987) $/MBF
W3G	115.8	124.75	159.18	18,433.04	
W3P	30.0	137.70	175.71	5,271.30	
W4P	15.0	123.00	156.95	2,354.25	
M4G	610.0	139.00	177.36	108,189.60	
M4P	721.4	138.50	176.73	127,493.02	
P3P	65.3	152.70	194.85	12,723.71	
P4P	210.0	208.00	265.71	55,736.10	
M3P	52.5	129.60	165.37	8,681.93	
	1,820.0 MBF			$338,882.94	$186.20

$(1 \div i)^Y = A$

A = ESCALATION FACTOR
i = ANNUAL INFLATION RATE (5%)
Y = NUMBER OF YEARS TO ESCALATE = 5
A $\star$ 1982 $/MBF = 1987 $/MBF

NOTE: THIS DATA WAS FURNISHED BY RANDY SHARP OF THE MODOC NATIONAL FOREST ON 9/3/87. DATA FROM THIS TABLE WAS USED TO CALCULATE WEIGHTED AVERAGE STUMPAGE VALUES SHOWN ON SUBSEQUENT TABLES. ACRES N-10M = 300 LENGTH 12.4 MILES

TABLE 1.2.2-2

DATA
MODOC OPTION

STRATOTYPE	VOLUME MBF	STUMPAGE $/MBF (1982)	STUMPAGE $/MBF (1987)	TOTAL $ (1987)	WEIGHTED AVERAGE STUMPAGE (1987) $/MBF
P3P	992	152.70	194.89	193,330.88	
P4P	778	208.00	265.47	206,535.66	
P3G	296	199.60	254.75	75,406.00	
P4G	419	186.88	238.51	99,935.69	
	2,485 MBF			$575,208.23	$231.47

$(1 \div i)^{Y} = A$

A = ESCALATION FACTOR
i = ANNUAL INFLATION RATE (5%)
Y = NUMBER OF YEARS TO ESCALATE = 5
A * 1982 $/MBF = 1987 $/MBF

NOTE: DATA SHOWN IN THIS TABLE WAS FURNISHED BY RANDY SHARP OF THE MODOC NATIONAL FOREST ON 9/3/87. VOLUME FIGURES ARE BASED UPON A 15 MILE LONG ROUTE FOR A 350 FOOT WIDE RIGHT OF WAY FOR A TOTAL OF 646 ACRES. DATA SHOWN HERE WAS USED TO CALCULATE WEIGHTED AVERAGE STUMPAGE VALUES USED IN SUBSEQUENT CALCULATIONS.

TABLE 1.2.2-3

TERMS AND FORMULAS USED IN CALCULATIONS

MBF	THOUSAND BOARD FEET
LONGTERM SUSTAINED YIELD (LTSY) N-10M 1/	26.8 MBF/ACRE
LONGTERM SUSTAINED YIELD (LTSY) MODOC OPTION 1/	4.6 MBF/ACRE
LENGTH OF ROTATION 1/	100 YEARS
MEAN ANNUAL INCREMENT (MAI) OR AVERAGE ANNUAL GROWTH IN MBF/YEAR	LTSY ÷ ROTATION
VALUE PER 100 YEAR ROTATION	WEIGHTED AVERAGE STUMPAGE * LTSY * ACRES
EFFECT ON LONG TERM SUSTAINED YIELD	ACRES * MAI
ALLOWABLE CUT ON MODOC NATIONAL FOREST	62 MMBF 2/
% OF ALLOWABLE CUT	(Effect on LTSY Allowable Cut) * 100
VALUE OF NET ANNUAL GROWTH (PMT)	MAI * 1987 $/MBF
NET PRESENT VALUE (NPV) PER ACRE	
PMT = VALUE OF NET ANNUAL GROWTH i = NET DISCOUNT RATE = 1.9% n = PROJECT LIFE = 50 YEARS	$PMT = \frac{(1 \div i)^n - 1}{i(1 \div i)^n}$

1/ THIS INFORMATION WAS PROVIDED BY BILL MERIHEW OF THE MODOC NATIONAL FOREST ON 9/22/87 AND 9/23/87.

2/ THIS INFORMATION WAS PROVIDED BY RANDY SHARP OF THE MODOC NATIONAL FOREST ON 9/1/87.

TABLE 1.2.2-4

MODOC INTERTIE RELOCATION

The Modoc Intertie Relocation Alternative assumes the two existing interties will be relocated to a new 350-foot right-of-way. The COTP will be relocated to the right-of-way currently occupied by the existing interties. Since only a 200-foot right-of-way is required for the COTP, 150 feet of the existing right-of-way would be returned to timber production. All calculations are based on the total acreage removed from timber production (existing right-of-way + new right-of-way).

LENGTH OF NEW 350-FOOT WIDE RIGHT-OF-WAY	15 MILES
ACRES OF NEW RIGHT-OF-WAY	636 ACRES
LENGTH OF RIGHT-OF-WAY OCCUPIED BY EXISTING INTERTIES	14 MILES
ACRES REMOVED FROM TIMBER PRODUCTION BY 200-FOOT RIGHT-OF-WAY (EXISTING INTERTIES)	339 ACRES
TOTAL ACRES INTERTIE RELOCATION	975 ACRES
MEAN ANNUAL INCREMENT	.046 MBF/ACRE/YEAR
VOLUME REMOVED FROM NEW 350 FOOT RIGHT OF WAY (TABLE 1.2.2-2)	2,485 MBF
VOLUME KEPT OUT OF PRODUCTION 200 FEET OF EXISTING RIGHT-OF-WAY (ASSUMES LTSY OF 26.8 MFB/ACRE FROM TABLE 1.2.2-3)	9,085.2 MBF
TOTAL VOLUME REMOVED FROM PRODUCTION	11,570.2 MBF
VALUE PER 100 YEAR ROTATION (NEW ROW + EXISTING ROW)	$2,368,852.90
EFFECT ON LTSY (NEW ROW + EXISTING ROW)	$120.11 MBF/ACRE/YEAR
% OF ALLOWABLE CUT	0.19% (117,800 BOARD FEET)
VALUE OF NET ANNUAL GROWTH (NEW ROW)	$10.65/ACRE
VALUE NET ANNUAL GROWTH (EXISTING ROW)	$49.90/ACRE
NET PRESENT VALUE PER ACRE (NEW ROW)	$341.81
NET PRESENT VALUE PER ACRE (EXISTING ROW)	$1,601.52
NET PRESENT VALUE FOR NEW ROW	$217,391.16
NET PRESENT VALUE FOR EXISTING ROW	$542,914.95
NET PRESENT VALUE FOR ALTERNATIVE	$760,306.11

TABLE 1.2.2-5

N-10M
PREFERRED ALTERNATIVE

In order to compare the preferred alternative on an equal basis with the Modoc Intertie Relocation, the acreage in the existing right-of-way was considered as contributing to the total timber volume removed from production. All calculations are based on the total acreage removed from timber production (existing ROW + N-10M).

LENGTH OF N-10M FOR 200 FOOT WIDE RIGHT OF WAY/ACRE	12.4 MILES
ACRES OF NEW 200 FT WIDE RIGHT OF WAY	300 ACRES
LENGTH OF EXISTING RIGHT OF WAY (350 FEET)	14 MILES
ACRES EXISTING RIGHT OF WAY (350 FEET)	594 ACRES
TOTAL ACRES REMOVED FROM TIMBER PRODUCTION	894 ACRES
MEAN ANNUAL INCREMENT	.268 MBF/ACRE/YR
VOLUME REMOVED FROM N-10M (TABLE 1.2.2-1)	1,820 MBF
VOLUME KEPT OUT OF PRODUCTION ON EXISTING ROW (ASSUMES LTSY OF 26.8 MBF/ACRE TABLE 1.2.2-3)	15,919.2
TOTAL VOLUME REMOVED FROM PRODUCTION	17,739.2 MBF
VALUE PER 100 YEAR ROTATION	$4,461,203.00
EFFECT ON LONG TERM SUSTAINED YIELD	$239.59 MBF/ACRE/YEAR
% OF ALLOWABLE CUT	.38% (235,600 BOARD FEET)
VALUE OF NET ANNUAL GROWTH	$49.90/ACRE
NET PRESENT VALUE PER ACRE	$1,601.52
NET PRESENT VALUE FOR ALTERNATIVE	$1,431,758.90

TABLE 1.2.2-6

DIRECT COMPARISON OF THE MODOC INTERTIE RELOCATION AND THE PREFERRED ALTERNATIVE N-10M

	MODOC INTERTIE RELOCATION	PREFERRED N-10M
TOTAL ACRES REMOVED FROM TIMBER PRODUCTION	975	894
TOTAL TIMBER VOLUME REMOVED FROM PRODUCTION	11,570.2 MBF	17,739.2 MBF
VALUE PER 100 YEAR ROTATION	$2,368,852.90	$4,461,203.00
EFFECT ON LONG TERM SUSTAINED YIELD	$120.11 PER MBF/ACRE/YEAR	$239.59 PER MBF/ACRE/YEAR
% OF FOREST ALLOWABLE CUT	0.19% (117,800 BOARD FEET)	0.38% (235,600 BOARD FEET)

	NEW ROW	EXISTING ROW*	
VALUE OF NET ANNUAL GROWTH	$10.65/ACRE	$49.90/ACRE	$49.90/ACRE
NET PRESENT VALUE PER ACRE	$341.81	$1,601.52	$1,601.52
NET PRESENT VALUE FOR ALTERNATIVE	$217,391.16	$542,914.95	$1,431,758.90
TOTAL	$760,306.11		

* Represents acreage remaining within 200-foot right-of-way of existing Intertie that would not be reforested.

TABLE 1.2.2-7

COMPARISON OF
BEEBE RELOCATION TO PREFERRED ALTERNATIVE

	RELOCATED LINE TO WEST 1/	UPGRADE 2/	PREFERRED ALTERNATIVE
1. Project Requirements			
Length (miles)	26.31	22.46	26.36
New R.O.W. required (acres)	637.75	0.00	610.00
New access roads (miles)	0.00	0.00	0.00
Clearing:			
a. Access roads (acres)	0.00	0.00	0.00
b. Right-of-way (acres)	0.00	0.00	0.00
Estimated construction cost 3/	$16,444	$5,047	$17,983
2. Earth Resources			
Soil loss (tons/year)	0.00	0.00	0.00
Percent of area over which soil loss exceeds tolerances	0.00	0.00	0.00
Average exceedance (tons/acre/year)	0.00	0.00	0.00
3. Vegetation			
Tall-growing vegetation removed, forestland (acres)	0.00	0.00	0.00
Permanent clearing of roads and tower sites (acres):			
a. Rangeland	1.13	0.00	0.00
b. Forest	0.00	0.00	0.00
New structures in wetlands or floodplains	70.00	3.00	92.00
4. Wildlife			
Length of high collision potential for birds (miles)	7.20	13.50	23.35
Miles of deer, elk range crossed	0.00	0.00	0.00
Miles of raptor nesting area crossed	0.00	0.00	0.00
5. Land use and Land Status			
Number of dwellings within R.O.W. (200 feet)	12.00	1.00	0.00
Number of dwellings within 1,000 feet of reference centerline	83.00	26.00	15.90
Dwellings per mile within 1,000 feet of centerline	5.74	1.16	0.60
Forest Service administered land crossed (acres)	0.00	0.00	0.00
Miles crossed of prime timber on Forest Service lands:			
a. Prime timber	0.00	0.00	0.00
b. Nonprime timber	0.00	0.00	0.00
Total prime timber crossed (in miles)	0.00	0.00	0.00

1/ Suggested Alternative is that part of line segment S-8A reduced in length to compensate for that portion of the segment between the San Joaquin River and the North End. Also included are segments S-9A, S-9B, and S-9C.

2/ The upgrade in place is line segment S-8F. When comparing the alternatives, the relocated line and the upgrade should be considered together, although it should be noted that some impacts along the upgrade are already existing and would not be new impacts.

3/ Construction cost estimates were derived utilizing PGandE and Western data.

TABLE 1.2.2-7 (CONTINUED)

	RELOCATED LINE TO WEST 1/	UPGRADE 2/	PREFERRED ALTERNATIVE
Miles crossed of timber production zones	0.00	0.00	0.00
Miles crossed of agricultural preserve lands	6.83	3.57	11.89
Irrigated cropland (miles)	14.21	16.45	20.52
Total agricultural acreage removed	1.92	0.00	3.97
6. Visual Resources			
Number of crossings of recreational travel routes:			
a. Scenic highways (state/county)	4.00	2.00	3.00
b. Wild and scenic rivers (existing/eligible)	0.00	0.00	0.00
c. National trails	0.00	0.00	0.00
Dwelling units in the foreground (1.2 miles)	513.00	322.00	403.81
7. Socioeconomics			
Transmission line payroll	$1,074	$829	$1,085
Non-local workers expenditures	$241	$186	$255
Average number of dwellings per route mile (within 1.2 miles)	32.75	14.34	15.32
New miles of access road per route mile	0.00	0.00	0.00
Average short-term agricultural losses per route mile	$1,800	$2,100	$1,747
Average long-term agricultural losses per route mile	$500	$0	$666
Total lost timber jobs	0.00	0.00	0.00
8. Cultural Resources			
Prehistoric site sensitivity			
Native American sites within 1,000 feet of line	0.00	0.00	0.00
Native American sites within 3.4 miles of line	5.00	3.00	4.00

1.2.3 CHANGES TO THE DRAFT EIS/EIR VOLUME 2A - PHASE III DATA AND IMPACT ANALYSIS REPORT

1. Page 3.2-3

   Add the following paragraph after paragraph 4:
   "Another long-term impact may occur when soil is disturbed by project construction and revegetation efforts fail to re-establish suitable ground cover. These areas are characterized by frost pockets, gopher damage, excessive exposure, and lack of water. The location of these areas and the development of alternative forms of mitigation for them has been (and will continue to be) obtained through field studies and consultation with appropriate land management agencies (i.e., the BLM office in Medford, Oregon)."

2. Pages 3.2-11 to 3.2-14

   Table 3.2-1.
   Add as footnote: "Zone 2 - Moderate Damage. Corresponds to intensity VII of the Modified Mercalli Scale.

   Zone 3 - Major damage. Corresponds to intensities VIII or higher on the Modified Mercalli Scale."

3. Page 3.2-15

   Add the following paragraph after paragraph 2:
   "N-10 Alt.5 impacts five miles of the Giant Crater Lava Tube System (GCLTS). The Forest Service considers this section the most scenic and geologically significant portion of the GCLTS. N-10 Alt.5 will cross over three known lava cave networks, including water caves. A road constructed adjacent to the transmission line would impact the geologic features of this area. N-10M impacts two miles of what the Forest Service considers the least significant portion of the GCLTS. This route intersects one known lava cave network."

4. Page 3.3-3

   Paragraph 5, Line 8.
   Change: "identified" to "considered"

5. Page 3.3-5

   Paragraph 6, Lines 6, 7, and 8.
   Change: "1 and 2" to "A and F"
   Change: "on-site field reviews" to "site-specific impact assessment"
   Add: "on site field reviews" after "stream"
   Add: "with the implementation of the mitigation measures in Section 1.1.5 of Volume 1 of this Final EIS/EIR" after "levels."

6. Page 3.3-5

   Paragraph 7, Lines 4 and 5.
   Change: "1, 2, 4, 5, and 6" to "A, B, C, D, and F"
   Delete: "on-site field reviews"
   Add: "(" before "use"

7. Page 3.3-7

   Table 3.3-2, Line 8 (N-7H1).
   Change "15" to "5"

8. Page 3.3-10

   Lines 1 and 2.
   Delete: "and"
   Add: ", and site-specific impact assessments" after "crossings"
   Add: "if vegetative buffer strips are adequately wide and with the implementation of the mitigation measures in Section 1.1.5 of Volume 1 of this Final EIS/EIR" after "levels."

9. Page 3.3-10

   Paragraph 2, Line 5.
   Change: "4" to "B", "no more than one" to "limited", and change "crossing" to "crossings"

10. Page 3.3-10

   Paragraph 3, Lines 6 and 7.
   Delete: "additional mitigation measure 5"
   Add: "including measure C:" before "stream"

11. Page 3.3-11

   Paragraph 1, Lines 12 and 14.
   Change: "1" to "F", "on-site field reviews" to "site-specific mitigation measures", "3" to "G", and "no" to "limited"
   Add: "The effectiveness of measure F will depend on the site-specific mitigation employed." after "implemented."

12. Page 3.3-11

   Paragraph 2, Line 2.
   Change: "5" to "C"

13. Page 3.3-11

   Paragraph 5, Lines 1, 2, 3, 4, and 5.
   Change: "Standard" to "The following"
   Add a colon after "resources"
   Delete: "(See Volume 1, Section 5.1)."
   Delete the sentence: "However, the following. . ."

14. Pages 3.3-11, 3.3-12, and 3.3-13

   Delete: Paragraphs numbered 1 through 7 and replace with the following:

   1. A buffer of undisturbed vegetation shall be maintained along all lakes and streams. At a minimum, the buffer shall extend to the first point of slope break or 100 feet, whichever is greater. Additional needs for buffers will be coordinated with the appropriate land management and regulatory agencies.

      Rationale: Buffers of uncleared vegetation between areas where herbicides are used and streams will reduce the possibility of accidental introduction of pollutants into the water and minimize the sediment loading of streams which may result from project-induced erosion.

   2. Stream crossings by the transmission line and access roads will be minimized. Where the transmission line parallels a stream, efforts will be made to avoid more than one new access road stream crossing per mile.

      Rationale: Reducing the number of new stream crossings shall minimize impacts to water quality and fisheries.

   3. All stream crossings will be constructed such that they permit fish to pass and reduce the potential for stream flows to result in increased scour, washout, or disruption of water supplies.

      Rationale: Proper construction of stream crossings is required to avoid significant impacts to water resources. Aquatic species must be able to freely move upstream to fully utilize all habitat types, including spawning areas.

   4. New stream crossings will be built at approximate right angles to streams, wherever possible.

      Rationale: Proper construction of stream crossings will help minimize impacts due to erosion, stream blockage, washout, and scour.

   5. Project features, access roads, and rights-of-way will not be constructed to interfere with currently producing groundwater wells unless compensation is made.

Rationale: Construction of project features over recharge areas/groundwater wells may result in groundwater contamination and reduce commercial, agricultural, industrial, and domestic water supplies.

6. A biological assessment will be prepared pursuant to Section 7 of the Endangered Species Act to identify impacts to federally listed and candidate aquatic, plant, and wildlife species. Where impacts are identified, appropriate mitigation will be developed in consultation with the U. S. Fish and Wildlife Service. As soon as practical after locations of access roads and tower sites are known, consult with State Fish and Game Departments to identify site-specific impacts to water resources and state listed endangered, threatened or otherwise sensitive aquatic, plant and wildlife species. Where impacts are identified, appropriate mitigation will be developed in consultation with the Fish and Game Departments.

   Rationale: Many potentially significant impacts to aquatic species can be avoided if site-specific mitigation measures are developed and employed. Without a site-specific evaluation of the productivity of water resources, the exact number and location of significant impacts which may occur is unknown.

7. Construction of new access roads will be minimized in stream drainages which support special-status aquatic species. Where access road construction is determined to be necessary in those drainages resource management agencies will be consulted to develop specific mitigation measures. This would apply particularly to streams along the Grizzly Peak option and in the Kosk Creek area.

   Rationale: Increased erosion and pollutant runoff from new access roads may degrade the habitat of special status species. This is considered a significant effect under the California Environmental Quality Act (CEQA).

8. Culverts on access roads will be sized to match storms which may occur during the expected or permitted life of the road to minimize the potential for access roads to washout under high intensity storms.

   Rationale: Approximately sized culverts will help prevent washouts and subsequent sedimentation.

9. Where applicable, water supplies for dust abatement will be covered under a Streambed Alteration Agreement with the California Department of Fish and Game as per Section 1603 of the State Fish and Game Code when it is necessary to obtain water from nearby streams or water bodies.

   Rationale: Correct methods and locations for obtaining water supplies will insure minimal environmental impact.

10. A Streambed Alteration Agreement will be obtained where required for stream and lake crossings on non-federal lands, as per Section 1603 of the California State Fish and Game Code.

    Rationale: Approximate mitigation measures for work in the streambed will minimize impacts to water quality and fisheries.

11. Flood-proof structures and design COTP facilities to avoid decreasing the conveyance efficiency of the floodplain.

    Rationale: Executive Order 11988 requires agencies proposing actions within the floodplain to consider mitigation that would avoid adverse impacts on and incompatible development in the floodplain.

15. Page 3.3-13

    Paragraph 1, Line 4.
    Add: "(along with effective site-specific measures)" after "implemented"

16. Page 3.4-1

    Paragraph 4, Line 4.
    Add the following paragraph after "significant.":
    "Calculations for temporary construction impacts for tower assembly sites were assumed to be 100' x 100'. Further design indicates that the area needed for

tower assembly is 200' x 200'. The larger area of impact anticipated with the 200' x 200' tower assembly sites will increase the affected area. This amounts to .7 acre per tower assembly site."

17. Page 3.4-27

    Table 3.4-5, Line 4 (N-9S), Column 5.
    Change: "NA" to "34.00"

18. Page 3.4-27

    Table 3.4-5, Line 4 (N-9S), Column 9.
    Change: "NA" to "4"

19. Page 3.4-27

    Table 3.4-5, Line 14 (N-10L), Column 5.
    Change: "-14.22" to "8.80"

20. Page 3.5-1

    Paragraph 4, Line 4.
    Add the following paragraph after "plants.":
    "Calculations for temporary construction impacts for tower assembly sites were assumed to be 100' x 100'. Further design indicates that the area needed for tower assembly is 200' x 200'. The larger area of impact anticipated with the 200' x 200' tower assembly sites will increase the affected area. This amounts to .7 acre per tower assembly site."

21. Page 3.5-17

    Paragraph 7, Line 1.
    Insert: "except for big game impacts," after "impact,"

22. Page 3.5-17

    Paragraph 7, Line 2.
    Add: "Potential impacts to big game ranges would be mitigated to less-than-significant levels by avoiding key areas during selection of the right-of-way and access roads, and by improving habitats within or adjacent to the right-of-way."

23. Page 3.5-21, 3.5-22, and 3.5-23

    Table 3.5-7, Footnote (a).
    Change: "following" to "prior to".

24. Page 3.5-21

    Table 3.5-7, Column 4, Line 12.
    Change: "(12)" to "(11)"

25. Page 3.5-22

    Table 3.5-7, Column 4, Line 13.
    Add: "4" before "(4)"

26. Pages 3.5-29 and 3.5-30

    Delete: Paragraphs numbered 1 through 13, and replace with the following:

    1. Avoid siting right-of-way through forest habitat types if such types are rare in a regional area.

    2. Maintain habitat diversity on rights-of-way through forested areas.

    3. Avoid siting of transmission line towers, access roads, or construction work sites in riparian zones.

    4. Site rights-of-way to take advantage of natural or existing flight obstacles to birds. This would be appropriate, for example, in the Newell/Tulelake area.

5. In areas of extremely high collision potential where transmission design or location would not effectively mitigate impact, provide compensation by improving habitat elsewhere or providing other enhancements.

6. Conduct detailed surveys along the preferred alternative right-of-way for special-status wildlife species to more fully assess and avoid impacts and develop mitigation measures during siting and construction.

7. New road construction will be minimized in important game winter range. These areas are identified in Table 3.5-6, Volume 2A of the Draft EIS/EIR and in the Supplement to the Draft EIS/EIR.

8. Where practical, access road entrances will be located so as to discourage off-road vehicle users from driving around either gates or large earthen barriers.

9. In areas where rights-of-way clearing would remove snags of important value, create new snags to offset losses.

10. A snag component to the vegetation management plan will be prepared for Forest Service lands which will provide for the removal of snags which endanger the transmission line and provide replacement snags for cavity-dependent wildlife species.

11. Construction and maintenance activities will be limited in critical habitat areas. If construction, operation, or maintenance activities must take place within these habitat areas during key breeding and other important activity time frame, they will be coordinated with the State Fish and Game Department, the Bureau of Land Management, and the USDA Forest Service. The route segments in which each critical habitat can be found are listed in Table 3.5-6, Volume 2A of the Draft EIS/EIR and in the Supplement to the Draft. The species and critical habitat areas are listed below:

Sandhill Crane (breeding)	Antelope (winter range)
Golden Eagle (breeding)	Bald Eagle (breeding and wintering)
Goshawk (breeding)	Prairie Falcon (breeding)
Osprey (breeding)	Spotted Owl (year-round)
Swainson's Hawk (breeding)	Antelope (kidding areas)
Deer (key winter range)	Deer (key fawning areas)
Deer (key fall holding areas)	Sage Grouse (strutting areas)

12. Where the Project would result in significant losses of habitat, mitigation will be developed in accordance with the U. S. Fish and Wildlife Service Mitigation Policy. The type of mitigation will be determined upon consultation with the State Fish and Game Departments, the U. S. Fish and Wildlife Service, and the state and federal land management agencies.

13. In areas where there is an extremely high potential for collisions with the shield wire by waterfowl or sensitive raptors, the appropriate wildlife management agencies will be consulted to determine the need for marking or other mitigation. Following those consultations, the shield wire will be marked where appropriate to reduce the hazard. This may be appropriate in the Newell/Tulelake area, Pit River, Sacramento River, and in some areas of the Delta.

14. Prior to construction and after access roads and tower locations are known, discussions will be initiated with the U. S. Fish and Wildlife Service and State Fish and Game Departments to determine the mitigation necessary to reduce unavoidable adverse impacts and irreversible irretrievable commitments of resources for wetland, riparian, anadromous fish and other wildlife habitats.

15. Consider placing raptor nesting platforms on towers at intervals greater than one mile in raptor use areas where nest sites are limited. Place these on the towers in positions least likely to cause operation and maintenance problems. The need for and number of nesting platforms would be determined during the transmission line alignment and in consultation with wildlife management agencies.

16. If consultation with appropriate fish and wildlife agencies indicates that studies are necessary, preconstruction and post-construction surveys will be conducted to determine the extent of avian mortality, if any, caused by the transmission line.

27. Page 3.5-31

Paragraph 1, Line 5.
Add: "Collision impacts with waterfowl in the Delta area could also not be mitigated to less-than-significant levels" after "(Alternative C)."

28. Page 3.5-31

Paragraph 1, Lines 1, 2, and 3.

Delete: "Some" and change: "significant" to Significant".
Add: "in some areas" after "occur".
Delete: "Although" and change: "most" to "Most".
Add: "," after "location" and delete "and".
Add: "and improvement of habitat within or adjacent to the right-of-way" after "closure" and delete: "it is possible that".
Change: "closure" to "Closure".

29. Page 3.6-1

Add after Paragraph 4:
"Construction of the transmission line will result in clearing some recently established tree plantations. The resulting long-term impact to timber productivity and the planned compensation to landowners are discussed below. In the short term, this loss of new plantations may affect forest management decisions, particularly on the national forests. Where forest management plans call for planting a certain number of acres each decade, an additional allocation of personnel, land, and funds may be required to replace the plantations eliminated by the transmission line."

30. Page 3.6-2

Line 3.
Change: "mitigations" to "mitigation measures"

31. Page 3.6-2

Paragraph 1, Line 2.
Add: "and access roads" after "rights-of-way"

32. Page 3.6-2

Paragraph 2, Line 7.
Add: after "in use." the following:
"On national forest lands the amount of timber sold each year, or allowable sale quantity, is legally limited by the net growth of timber on the acres being managed for timber production. By removing some land from this timber producing base, construction of the transmission line will reduce the allowable sale quantity on the national forests which are crossed."

33. Page 3.6-2

Paragraph 2, Line 9.
Change: "These impacts" to "The precise extent of these impacts"

34. Page 3.6-2

Paragraph 3, Line 4.
Change: "USFS" to "national forest"

35. Page 3.6-2

Paragraph 4.
After last line, add new paragraph: "Transmission lines and towers may create hazards for aircraft used in fighting fires near the lines. However, transmission lines generally do not interfere with or preclude the normal range of fire control activities."

36. Page 3.6-3

Paragraph 1, Line 2.
Add the following paragraph after "season.":
"Calculations for temporary construction impacts for tower assembly sites were assumed to be 100' x 100'. Further design indicates that the area needed for tower assembly is 200' x 200'. The larger area of impact anticipated with the 200' x 200' tower assembly sites will increase the affected area. This amounts to .7 acre per tower assembly site."

37. Page 3.6-3

Paragraph 3.
After last bullet add:
"° Increased operational hazards around the towers"

38. Page 3.6-3

Paragraph 4, Line 7.
After "for" add: "agricultural equipment (i.e., tractors, discs, leveling devices)"

39. Page 3.6-4

Paragraph 6, Line 3.
After "costs" add: "and injure the equipment operator"

40. Page 3.6-5

Paragraph 4, Line 1.
Before "The primary" add: "Transmission lines generally have a greater impact to irrigated farmland than to dryland farming primarily because the irrigation lines require additional labor to manipulate around the transmission towers."

41. Page 3.6-5

Paragraph 4, Line 3.
Before "Overall" add: "The problem of weeds is one of the major concerns expressed by farmers and ranchers for dryland and irrigated farms. Weeds compete with crops for water, nutrients, space, and in some cases, pollinators. They also harbor diseases and harmful insects that vectors can transmit to crop plants. In addition, some weeds produce toxic substances in their leaves that wash into the ground and inhibit the germination of competing seeds, including those of range and pasture grasses."

42. Page 3.6-5

Paragraph 5, Line 3.
After "weeds" add: "Less effective weed control in the tower area can lead to reduced crop yields."

43. Page 3.6-6

Paragraph 2.
After 3rd bullet add as concerns expressed by farmers:
"° Equipment operators may not be familiar with the maneuvers required to get around the towers, which can result in collision and injury."

"° Electrical safety problems can occur when sprinklers break and release large amounts of water beneath the conductors."

"° The use of cranes, draglines, and other tall equipment often employed for irrigation canal and ditch maintenance can be restricted."

44. Page 3.6-7

Paragraph 4, Line 3.
Add the following paragraph after "areas.":
"Calculations for temporary construction impacts for tower assembly sites were assumed to be 100' x 100'. Further design indicates that the area needed for tower assembly is 200' x 200'. The larger area of impact anticipated with the 200' x 200' tower assembly sites will increase the affected area. This amounts to .7 acre per tower assembly site."

45. Page 3.6-8

Paragraph 1, Line 3.
Add the following paragraph after "activities.":
"Calculations for temporary construction impacts for tower assembly sites were assumed to be 100' x 100'. Further design indicates that the area needed for tower assembly is 200' x 200'. The larger area of impact anticipated with the 200' x 200' tower assembly sites will increase the affected area. This amounts to .7 acre per tower assembly site."

46. Page 3.6-11

Paragraph 1, Line 3.
Add: "." after "capacity"
Change: "and" to "The"

47. Page 3.6-11

Paragraph 1, Line 6.
Change: "sources" to "sources"

48. Page 3.6-15

Paragraph 4, Line 1.
Change: ";" to ":"

49. Page 3.6-15

Paragraph 5, Lines 5 and 6.
Change: "the Forestry Data Section" to "Table 3.6-3"

50. Page 3.6-15

Paragraph 5, Line 11.
Change: "the Forestry Data Section" to "Table 3.6-2"

51. Page 3.6-16

Paragraph 1, Lines 13 through 17.
Change the sentence: "The assumptions used. . ." to:
"The assumptions used to estimate forestry impacts on tax yields, employment, and income are presented in Table 3.6-4 (see Section 3.8.3.2 for discussion).

The estimate of foregone timber value was based on the assumptions shown in Table 3.6-5. The estimate of average net annual growth for each class of forestland was provided by the USFS Pacific Northwest Forest Range Experiment Station. The estimate of 120 cubic feet per acre for prime timberland is probably high for the areas to be affected by the Project, but was used to make a conservatively high estimate of potential impacts. Average stumpage values (expressed in 1986 dollars) represent the 1985-1987 northern California average for prime and nonprime timber, as recorded by the USFS Pacific Northwest Forest and Range Experiment Station. The value of the net annual growth was estimated as the volume of growth in thousand board feet (MBF) times the price per MBF. The standard discounting formula (Table 3.6-5, Note 4) was used to estimate the present net value of each acre withdrawn from timber production, assuming a 50-year project life, a timber value escalating at 2.1 percent per year, and a discount rate of four percent. The standard annuity formula was used to calculate the annualized net present value of timber values foregone. These values equal $77 per acre of prime timberland, $32 per nonprime acre, and $2.40 per acre of woodland.

The productivity class and timber value associated with forestland affected by each route segment is presented in Section 3.6.4-1, Table 3.6-9.

One long-term forestry impact associated with the removal of timberland from the resource base will be the effect on long-term sustained yield (LTSY) on the national forests, where the maximum allowable sale quantity is linked to the LTSY. When timberland is removed from production, the LTSY will be reduced by an amount equal to the net annual growth on these acres. The national forest's allowable sale quantity will be similarly reduced. The reduction in LTSY and allowable sale quantity was calculated for each alternative on each national forest, and was found to be less than one-half of one percent in each case."

52. Page 3.6-17

Table 3.6-4, Item 4, Column 2.
Change: "3.6-4" to "3.6-3"

53. Page 3.6-17

Table 3.6-4, Item 7, Column 2.
Change "3.6-2" to "3.6-5"

54. Page 3.6-19

Table 3.6-5.
Change: "Product Value in 1986" to "Average Stumpage Value, 1978-1985 (1986 $)"

55. Page 3.6-19

Table 3.6-5.

Change:	"$/MBF 5/	85.76	85.76	--"
to	"$/MBF 5/	85.76	85.76	--
	$/Cord --	--	10"	

Delete: "$/Cord, --, --, and 10" across from "Value of Net Annual"

56. Page 3.6-19

Table 3.6-5.
Delete: Footnote 4/ from "Net Discount Rate"

57. Page 3.6-19

Table 3.6-5.
Add: Footnote 4/ to "Net Present Value"

58. Page 3.6-19

Table 3.6-5, Footnote 1.
Delete: "estimates"
Add after "Service": Pacific Northwest Forest and Range Experiment Station estimates for northern California"

59. Page 3.6-19

Table 3.6-5, Footnote 3.
Change: "Net annual growth X Product value in 1986" to "Net annual growth X Average stumpage value"

60. Page 3.6-20

Paragraph 4, Line 2.
Add the following paragraph after "Table 3.6-6).":
"Calculations for temporary construction impacts for tower assembly sites were assumed to be 100' x 100'. Further design indicates that the area needed for tower assembly is 200' x 200'. The larger area of impact anticipated with the 200' x 200' tower assembly sites will increase the affected area. This amounts to .7 acre per tower assembly site."

61. Page 3.6-25

Paragraph 3, Line 2.
After "December 22, 1981." add: "The purpose of the Act is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses."

62. Page 3.6-25

Paragraph 5.
Add as a new paragraph before California Land Conversion Act: "The transmission line routing guidelines stipulated that the crossing of highly productive agricultural land would be minimized, and these guidelines were adhered to whenever possible. However, in some locations, other factors, such

as engineering considerations and environmental constraints, were such that agricultural lands could not be totally avoided. The routing guidelines are consistent with the Farmland Protection Policy Act."

63. Page 3.6-27

    Paragraph 7, Line 2.
    Change: "either cross a TPZ or" to "cross"

64. Page 3.6-27

    Paragraph 7, Line 3.
    Add new paragraph after "landholdings.": "TPZ impacts are noted for informational purposes in Volume 1, Section 4.1.6, which summarizes the route alternative comparison process; however, prime timber is the key resource involved in the comparison. A route crossing a TPZ area must affect at least 40 acres of prime timber in order for the impact to be considered significant."

65. Page 3.6-28

    Paragraph 4, Line 8.
    After "the impact will be considered significant" add: "The key factor is the impact on irrigated cropland. If the agricultural land is not irrigated, agricultural preserve status will be taken into account as a significant resource in the route alternative comparison process which is summarized in Volume 1, Section 4.1.6"

66. Page 3.6-30

    Paragraph 1, Line 1.
    Delete: "and average annual values"

67. Page 3.6-30

    Paragraph 1, Line 2.
    Add after: "3.6-9." the following:
    "For each segment, Table 3.6-9 indicates the length of right-of-way through prime and nonprime timberland and woodland, and shows the average annual forest resource value foregone (see Table 3.6-5 for source of value per acre estimate). Table 3.6-9 also indicates those segments which cross a timber production zone (TPZ). Significant impacts are indicated for each segment crossing a TPZ and/or affecting more than 40 acres of prime timberland.

    Table 3.6-9 presents only those impacts associated with right-of-way clearing. The clearing associated with permanent access roads would increase these impacts by 0-30 percent, depending on the number of additional access roads required for a particular segment."

68. Page 3.6-32.

    Table 3.6-9.
    Delete the "x" under "Significant Impact" for route segments N-7H2(2), N-7N(2), N-7O(1), N-7O(2), N-7 Alt. 1(1), N-8F, N-8 Alt. 2, and N-8 Alt. 3

69. Page 3.6-33

    Table 3.6-9.
    Add an "x" under "Significant Impacts" for route segments N-10L, N-10M2(2), N-10M2, and N-10 Alt. 5(1)

70. Page 3.6-34, 3.6-35, and 3.6-36

    Footnote 6: Delete "Modoc"

71. Page 3.6-35

    Table 3.6-10, Line 6 (N-10E).
    Delete: "1.03" in 1st ("Row") and 4th ("Total Irrigated") columns
    Change: "0.00" in 6th ("Range") column to "1.33"

72. Page 3.6-35

Table 3.6-10, Line 8 (N-10G).
Add to 1st ("Row") and 4th ("Total Irrigated") columns: ".76"

73. Page 3.6-37

Table 3.6-11, Line 23 (N-10E).
Delete: Entire N-10E line

74. Page 3.6-37

Table 3.6-11, Line 25 (N-10G), Columns 1 and 5.
Change: "$4.2" to "$2.9" and "$4.3" to "$3.0"

75. Page 3.6-38

Table 3.6-12, Line 22.
Delete: Entire N-10E line

76. Page 3.6-38

Table 3.6-12, Segment Numbers S-1A (1), S-1A (2), S-1A (3), S-1A (4), S-1A (5), S-1A, S-8F (1), S-8F (2), S-8F:
Delete: These route segments from the table

77. Page 3.6-38

Table 3.6-12, Line 24 (N-10G), Columns 1 and 6.
Change: "$1.2" to "$0.8" and "$59.0" to "$58.6"

78. Page 3.6-39

Table 3.6-13, Line 19 (N-10E).
Delete: Entire N-10E line

79. Page 3.6-39

Table 3.6-13, Line 20.
After N-10F add:
"N-10G" in 1st ("Number"), "Modoc" in 2nd ("County(ies)"), and "100" in 5th ("Edge of Field, Etc.") columns

80. Page 3.6-41

Table 3.6-14, Item 2 (N-4G).
Add as Bullet 4:
".5 mile NE ° Surprise Lake - swimming, hiking, nature appreciation"

81. Page 3.6-44

Table 3.6-14, Item 1 (N-10M/N-10 Alt. 5).
Bullets 2 and 3.
After "geology" add: "and spelunking (cave exploration)"

82. Page 3.6-44

Table 3.6-14, Corridor/Segment "DELTA".
Before S-8B/8F add:
"S-8A/S-8E1/S-8F Cross ° Jersey Island, Veale Tract, and Hotchkiss Tract - private hunting clubs."

83. Page 3.6-45

Table 3.6-14, Item 1 (S-8D), Bullet 3.
Change: "Bethel Island State Park" to "Big Break Shoreline Regional Park on Jersey Island"

84. Page 3.6-45

Table 3.6-14, Item 3 (S-8F), Bullet 1.
After first bullet add:
"S-8H Cross ° Orwood Tract - boating, fishing, waterfowl hunting."

85. Page 3.6-46

Paragraph 6, Last Line.
Change: "state" to "regional"

86. Page 3.6-47

Paragraph 1, Line 1.
Change: "Bethel" to "Jersey"

87. Page 3.6-47

Paragraph 3, Last Line.
After "Visual Resources." add: "In addition to visual impacts, when new transmission lines increase the number of access roads in a rural area, hunting activity and efficiency can increase. This could conceivably lead to a reduction in the number of hunting permits issued."

88. Page 3.6-47

Paragraph 3, Line 2.
After "would be" add: "primarily"

89. Page 3.6-50

Table 3.6-15, Segment Numbers S-8F, Column 5:
Change: "4.00" to "1.00"

90. Page 3.6-57

Table 3.6-17.
Add: Footnote that states "Comment L-183 on the Draft EIS/EIR identified an airstrip that should be investigated if the preferred route should change to either Northern Alternatives B or C."

91. Page 3.6-57

Table 3.6-17.
Add new entry after Barter Airstrip:

"N-6N/N-6P	Tomaselli Airstrip	Private	Siskiyou County near Antelope Sink	1.0 mile"

92. Page 3.6-58

Table 3.6-18, Number 5 (Modoc).
Change: "Not addressed in General Plan or Zoning ordinance" to "Land Use Element"
After "Use Permit." add: "New transmission lines should be sited away from productive agricultural lands and airports."

93. Page 3.6-61

Table 3.6-19, Item 2 (Klamath), Lines 9 and 10.
Delete: "and residential uses (Loveness Road area)"

94. Page 3.6-62

Table 3.6-19, Item 2 (Modoc), Line 3.
After "for" add: "exclusive"

95. Page 3.6-68

Table 3.6-21.
Before Route "West of N-6J" add:

"West of N-1A	Jackson	Box R Ranch rural residential development
N-6N/N-6P	Siskiyou	Tomaselli Airstrip - planned near Antelope Sink (south of Cedar Mountain and north of Tenant)"

96. Page 3.6-68

Table 3.6-21.
After S-8D add:

"S-8A/S-8E1/S-8F	Contra Costa	Big Break Shoreline Regional Park

97. Page 3.6-77

Before "Agriculture" add:
"5. Logging slash will be disposed of either by removal, piling and burning, lopping and scattering, or by other means acceptable to land management agencies. The timing of slash disposal activities will be coordinated with the California Department of Forestry, the USDA Forest Service and other appropriate agencies.
Rationale: This approach will minimize the spread of timber pests and diseases."

98. Page 3.6-78

Number 7.
Replace with: "In certified seed crop fields, Project vehicles and equipment will be sterilized or washed to prevent weed dispersion or contamination to certified seed crops upon consultation with the individual landowner."

99. Page 3.7-13

Paragraph 1, Lines 5 and 6.
Add: "COTP" after "the"
Delete: "transmission"
Add: "that would be" after "segments"

100. Page 3.7-13

Paragraph 2, Lines 1, 2, 3, and 4.
Change: "general" to "overall"
Change: "Section 5.1 of Volume 1" to "Section 1.1.5 of Volume 1 of this Final EIS/EIR"
Change: "several" to "a number of"
Change: "project" to "COTP"
Add: "assessment identifies the" after "words the"

101. Page 3.7-13

Paragraph 2, Lines 6 and 7.
Add: "Several of the" before "The"
Delete: "tend to"
Add: "are general in nature. The measures include design and coordination procedures prior to construction (including preparation of the "Compliance Monitoring Plan"), after "impacts."
Change: "include guidance for" to "restrictions on"

102. Page 3.7-13

Paragraph 3, Lines 2 and 3.
Delete: "alternative"
Add after "segments": "The Compliance Monitoring Plan would identify the locations where site-specific visual mitigation measures are required and the types of measures that would be employed."

103. Page 3.7-13

Paragraph 3, Line 4.
Add: "surface reflectance and/or color of the" after "and"

104. Page 3.7-13

Paragraph 3, Line 6.
Add: "the" after "in"
Add: "of views seen from urban or suburban" after "middle ground"

105. Page 3.7-13

Paragraph 3, Line 7.
Add: "in open rural landscapes where the structures would be visible in the background or" after "effective"

106. Page 3.7-13

Paragraph 3, Line 9.
Change: "such locations" to "the latter situation,"

107. Page 3.7-13

Paragraph 3, Line 11.
Add: "Dulling and/or darkening the structures by pre-treating the steel or applying a "wash coat" of vinyl paint is often an effective means of reducing the visibility of a transmission line in the middle ground or background, as well as reducing the visual" after "corridors."
Delete: "Such measures would also help to reduce"

108. Page 3.7-13

Paragraph 3, Line 12.
Add: "A related type of mitigation can also be applied to the conductors." after "corridor."

109. Page 3.7-13

Paragraph 5, Line 1.
Change: "project" to "COTP"

110. Page 3.7-14

Line 2.
Change: "." to ";"
Add: "this measure has been incorporated into the routing studies for the COTP. The Compliance Monitoring Plan would also include site-specific measures to mitigate the visual impacts of new"
Delete: "Development of"
Change: "sites" to "facilities"
Change: "could also" to "would"

111. Page 3.7-14

Line 4.
Change: "including" to "by such means as"

112. Page 3.7-14

Paragraph 1, Lines 1 and 2.

Delete: "As part of this project,"
Add: "as part of the COTP" after "adopted"
Add: "and will be incorporated into the Compliance Monitoring Plan as and where appropriate:" after "Resources"

113. Page 3.7-14

Paragraph 1, Number 1.
Change: "Use tubular structures in the foreground of sensitive viewpoints where significant visual impacts can be reduced" to "Structure design, access road and tower location will be used to minimize or reduce significant visual impacts."

114. Page 3.7-14

Paragraph 1, Number 2.
Add: "Where there is a need" before "To"

115. Page 3.7-14

Paragraph 1, Number 3.
Delete: "in views from sensitive land uses."

116. Page 3.7-14

Paragraph 1, Number 5.
Change: "grading" to "planning"

117. Page 3.7-14

Paragraph 1, Number 8.
Change: "Consider using" to "Use"
Add: "where it can be expected to reduce visual impacts." after "areas"

118. Page 3.7-14

Paragraph 1, Number 9.
Delete the entire mitigation measure.
Replace it with the following: "9. Darkened tower steel will be used where it can be expected to reduce visual impacts."

119. Page 3.7-15

Paragraph 1, Lines 1, 3, 4, 5, 6, 7, 8, and 9.
Change: "Volume 1, Section 5.1" to "Section 1.1.5 of Volume 1 of this Final EIS/EIR:"
Change: "The" to "In addition,"
Change: "will" to "would be"
Add: "by means of the Compliance Monitoring Plan" after "basis."
Change: "of" to "at"
Add: "would help to" after "locations and"
Delete: "in Section 3.7.5"
Add: "these" after "significance of"

120. Page 3.7-21

Add: Figure 1.2.3-1

121. Page 3.8-3

Add after Paragraph 5:
"It is unlikely that the presence of a transmission tower will impact reclamation district assessments in the Delta area. Reclamation district representatives who were contacted indicated that they could not recall an instance when the presence of a transmission tower or line had altered the reclamation district assessments. In their experience, the presence of a transmission line was not a factor in determining the amount of the assessments."

122. Page 3.8-20

Table 3.8-7, Segment Numbers S-1A(1), S-1A(2), S-1A(3), S-1A(4), S-1A(5), S-1A, S-8F(1), S-8F(2), S-8F:
Delete: These route segment numbers from the table.

123. Pages 3.8-19 to 3.8-29

Replace: Tables 3.8-6, 3.8-7, 3.8-9, and 3.8-10 with the revised Tables 1.2.3-1, 1.2.3-2, 1.2.3-3, and 1.2.3-4.

124. The following is an addendum to Section 3.8.1 of Volume 2A of the Draft EIS/EIR:

Four social groups are likely to be impacted by the COTP:

- Local residents and property owners
- Recreationists and conservationists
- Native Americans
- Local business owners and employees

These groups are not mutually exclusive and an individual may belong to more than one group. The groups represent a collection of people with similar characteristics who are likely to be impacted in a similar way by the Project.

1. Local Residents and Property Owners

There are essentially two categories of local residents: those that have lived in the area a long time (such as over 15 years), and newcomers. The more established group would include, for example, many ranching and farming families and workers from the lumbering communities and their families. Many of the newcomers are generally urban residents who are drawn to these areas by the more rural life-style. Newcomers include retirees, second home owners, white and blue collar working people, and those with alternative life-styles. Many newcomers to the rural portions of the California counties have made a sacrifice in order to have a home in these areas: incomes are lower, jobs are fewer, and the physical aspects of life can be harsher, especially in the mountainous areas.

Local residents place a high value on their rural life-styles, including enjoyment of the aesthetic qualities of their surroundings. In general, they take great pride in their areas and are keen to preserve the rural atmosphere. For this reason, many are distrusting of new development and tend to be highly vocal in their opposition to projects which they feel could spoil or interfere with their rural life-style. The location of residences near the proposed ROW and potential direct land use impacts to those residences are discussed under Land Use. Direct visual impacts to local residents are assessed under Visual Resources, and other impacts under Socioeconomics.

Very few residents will be forced to relocate as a result of the COTP. Every attempt will be made to avoid relocations, but if they do occur, they will bring a short-term major disruption in life-styles, causing temporary inconveniences and adjustments. Impacted residents and homeowners will receive financial compensation for any forced relocations or damage to property. Such compensation will provide a level of mitigation for the negative financial impacts associated with having to relocate, but it is difficult to predict how this will affect life-styles, as the degree of impact will vary widely.

Potential impacts to the life-styles of this group are rated overall low and negative in the short-term and low to none in the long-term. During the short-term or construction phase, residents living within close proximity to the COTP may be disturbed by noise and dust, and their privacy affected by the presence of construction personnel. In the long-term adverse impacts on aesthetics to residents close to the line could affect their behavioral pattern in terms of how they enjoy outdoor activities on certain parts of their land. Impacts to non-displaced local residents' life-styles are expected to be significant to moderate.

Impacts to attitudes, beliefs and values of non-displaced residents are rated low to moderate in the short-term and low to none in the long-term. Regarding the short-term, a number of local residents have expressed concern over and opposition to the Project because they feel it will interfere with the rural quality of their surroundings. For example, they have raised questions about health and safety and visual quality impacts. In general, it seems that the concept of having a transmission line routed through or within visual range of their neighborhoods has led to an uncertainty about the future in terms of preserving the rural atmosphere of the local environment. The long-term negative impact on attitudes, beliefs, and values may well decrease, although uncertainty may, in some cases, be replaced with a long-term negative feeling about this new urbanized component of a previously rural/residential environment.

There are three main categories of property owners: Those people that are owner occupiers; those that are waiting until they can afford to build; and investors from outside who have purchased land for speculative purposes. As a group, property owners are very concerned about any potential developments that are perceived to affect the value of their property.

Some disruption of land use activities may occur, but is not expected to be substantial (see Section 5.3.2 of the Draft EIS/EIR). Easement payments and compensation allowances will be offered as mitigation for this, but it is difficult to say how this would impact life-styles.

Impacts to the life-styles of property owners are rated low to none in the short-term and none (low to none) in the long-term. Impacts to attitudes, beliefs, and values are rated high to moderate for the short-term because some property owners have expressed concern that the Project could negatively impact the value of their property. Whether or not such an impact actually occurs, concerned property owners may still suffer adverse impacts to their attitudes and beliefs. In the long-term, impacts to attitudes, beliefs, and values are likely to diminish and are, therefore, rated low to none.

2. Recreationists and Conservationists

Apart from the local resident population, a large portion of recreationists are those who live in metropolitan areas such as the San Francisco Bay Area, Sacramento, and Redding and who place a high value on being able to travel on vacations and weekends for the wide variety of recreational opportunities. Some tourists may visit these parts of areas from as far away as out of state or abroad. Recreation and sightseeing are important components of the life-style of most of this group for whom the opportunity to relax and "get away from it all" is perceived as an essential part of their overall well-being. They tend to value the aesthetic beauty of some parts of these areas and to be opposed to any development that might interfere with their enjoyment of the natural landscape.

Conservationists are a widespread, diversified group that are united in their strong commitment to see the preservation and protection of the natural environment to which they attach great importance. Many live either within the potentially affected counties or within adjacent metropolitan areas, often belonging to one or several organized groups such as the Sierra Club and the Audubon Society or more locally based organizations. They are especially opposed to potential damage to the physical or biological environment and also tend to be against projects which they feel might reduce the visual quality of the landscape. They are, in general, a well-organized and highly vocal group who devote a lot of time and effort to fight for what they believe in.

Potential direct land use impacts to recreation resources are assessed under Land Use and Visual Resources. Potential significant impacts to recreational areas are expected to be limited to a few back country recreation areas. These areas represent a small percentage of the recreational resources available, and since back country recreationists are a small percentage of the total group, overall indirect impacts to the life-styles of recreationists are rated low for both the short and the long-term.

Some temporary interruptions in life-styles may occur in the short-term for recreationists as their use of impacted recreation sites and trails is likely to be curtailed due to the presence of construction equipment and personnel. Just as for non-displaced local residents, recreationists visiting these sites in the short-term will also be subject to noise, dust, and an invasion of their privacy. In the long-term, the main impact will be to the life-styles of those for whom an impacted site had held a unique value which they feel will be spoiled by the physical presence of the COTP and which they feel could not be replaced by alternative sites in the same general area. Again, however, as the total number of sites and recreationists affected will be small, the overall level of impact is rated low.

Impacts to recreationists' attitudes, beliefs, and values are given an overall rating of low for the short- and long-term due to the small number of total recreation sites and recreationists likely to be impacted. Recreationists that will be affected by the COTP are likely to be opposed to the presence of a transmission line which they would regard as a symbol of urban growth and development which is precisely what they wish to escape.

Potential life-style impacts are rated negligible as appreciable changes in conservationist work habits and leisure patterns are not expected. A number of conservationists are significantly concerned that the COTP would decrease the overall quality of the environment, both visually and in terms of physical and biological impacts. Hence, impacts to this group's attitudes, beliefs, and values are rated moderate to significant for the short-term. During the operations and maintenance phase of the COTP, these concerns are expected to diminish over time, and hence are rated low to none for the long-term.

3. Native Americans

This group places a high value on being independent and maintaining the traditional elements of their life-style, as well as close family ties. Traditional Native American values reflect a deep love for the natural environment to which they have a strong emotional and spiritual attachment. Native Americans are concerned about maintaining autonomy through ownership of their lands and would strongly oppose any interference with those lands or any disruption of resource collection sites or religious or cultural sites important to their heritage.

A detailed evaluation of the potential social impacts to local Native American communities will be possible when the cultural resources field work associated with siting of the COTP centerline is completed. The precise locations of all Native American sites will then be identified. Impacts to sites of cultural, religious, or resource significance to Native Americans are likely to be small (see Cultural Resources), as every effort will be made to avoid all sites during the selection of the ROW. Short-term benefits may accrue to local native communities as a result of increased employment opportunities.

4. Local Business Owners and Employees

The life-styles of the local business owners throughout the area, including farm and ranch owners and their employees, are sustained directly or indirectly by tourist or recreation-related activity and by farming, ranching, and the timber industry. These people are understandably anxious about any new development projects within their locality that might disrupt their source of livelihood and hence their sense of self-sufficiency and certainty about the future. Business owners in particular tend to hold conservative values and to be opposed to any development which might discourage participation in recreation-related activity or increase the costs of or opportunity for farming or timber harvesting.

Loggers and millworkers represent an important community in the timber-producing regions located mainly within the California counties. They tend to hold fairly traditional values in factors such as the role of the family, marriage, community, and self reliance, to be hard working. Many are seasonally employed and place a high value on living near public lands and being able to work with or near abundant natural resources. As a group, they display concern over the future regarding employment in the lumber and wood products industry and feel that their life-style is becoming threatened.

Impacts to the life-styles of loggers and millworkers are rated low to none in the short-term and low to none in the long-term. In the short-term there may be a small enhancement of employment and earnings generated to clear the COTP ROW. No impacts are anticipated to the attitudes, beliefs, and values of this social group as a result of the COTP.

Farmers and ranchers also tend to hold these traditional values. They display concern over the COTP when it appears that routes crossing or coming near agricultural areas will increase costs of production or decrease the ability to farm or ranch effectively or competitively.

Potential socioeconomic impacts to local businesses and employment are discussed under socioeconomics and potential land use impacts under Land Use. Overall impacts to the life-styles of local business owners are rated low to significant for the short-term, and low to none for the long-term. It may prove necessary to relocate or remove a few business structures in the short run, with a significant short-term disruption of business activity and employment for those concerned. Every effort will be made to avoid such impacts during the detailed siting of the COTP centerline, and the numbers of businesses involved should be very few. The owners would receive financial compensation which will help mitigate the negative impact of such an action if it does have to take place. Therefore, actual short-term impacts to the life-styles of this social group should also be low. No long-term negative impacts are anticipated as a result of relocation as financial compensation should mitigate against such potential impact.

Some short-term impacts to local business owners and their employees' life-styles will be low and positive. These will indirectly result from expenditures by those employed by COTP construction and timber-related activities. In the long-term, however, such short-term gains must be weighed against any potential loss of income from timberlands, farmlands, or ranchlands taken out of production.

Impacts to attitudes, beliefs, and values are rated low to significant in the short-term and low to none in the long-term. Considerable anxiety and hostility has been expressed concerning the COTP by a number of people within those groups who fear that its presence in their areas could damage their source of livelihood. In the long-term, the negative impacts to attitudes, beliefs, and values are likely to diminish, although a relatively low level of anxiety about the future and hostility to the COTP may continue among certain members of these groups for a while after the line has actually been constructed.

Mitigation

No additional mitigation measures are proposed for the potential indirect social impacts listed above because the already-adopted measures to mitigate direct impacts on biophysical resources, visual resources, existing land use, the socioeconomic environment, and cultural resources also indirectly mitigate for social impacts. For example, every effort has been made to avoid residential and recreational areas, hence avoiding indirect social impacts to local residents and recreationists to the greatest extent possible. Another example is the Memorandum of Agreement (MOA) for cultural resources providing for representatives of the Native American community to be consulted regarding the protection and conservation of archaeological sites, which mitigates certain potential indirect social impacts to Native Americans.

125. Page 3.9-6

Paragraph 1, Line 2.
Add after "corridors": "(Dames and Moore 1986)"

126. Page 3.9-10

Table 3.9-3.
Line 4 (N-10A), Columns 4 and 5.
Change: "4" to "3" and "0.4" to ".3"

127. Page 3.9-10

Table 3.9-3.
Line 10 (N-10J), Columns 4 and 5.
Change: "0" to "3", and "0.0" to "1.1"

128. Page 3.9-10

Table 3.9-3.
Line 10 (N-10J), Column 6 (Sites within 1000 ft.).
Add: "1"

129. Page 3.9-11

Table 3.9-4.
Last Line (S-9H), Column 4.
Change: "0.0" to "1.0"

130. Page 3.9-11

Table 3.9-4, Line 18 (N-7 Alt 1), Column 4.
Change: "2.0" to "4.0"

131. Page 3.9-14

Paragraph 3, Lines 6, 7, 8, and 9.
Delete the sentence beginning: "Depending on the nature ..."

132. Page 3.9-14

Paragraph 4, Lines 2, 3, 4, and 5.
Change: "the following steps may be taken, in accordance with a plan to be developed by the lead agencies and reviewed by the State Historic Preservation Officers and the Advisory Council on Historic Preservation."
to: "the steps listed on the Memorandum of Agreement between the lead agencies, the State Historic Preservation Officers, and the Advisory Council on Historic Preservation will be taken. These steps include:"

133. Page 3.10-2

The following is added to Section 3.10.4:

The most prominent recent contributions to the scientific literature on biological effects of electromagnetic fields are the results of 16 studies completed in 1987 and funded by the New York State Power Lines Project (Ahlbom et al., 1987). The research project was funded by the electric utilities that serve New York State and was administered by the New York State Department of Health. A scientific advisory panel consisting of nine experts provided scientific review, monitoring, and evaluation. The New York Project was conducted in response to public concerns about biological effects associated with electrical and magnetic fields produced by 60 Hertz power transmission lines. These fields can be produced by electrical wiring, power lines, appliances, and a variety of other electrical devices commonly found in the home. Particular attention was directed to the fields generated by 765 kV transmission lines, as the concern originated during hearings on the permitting of such a line.

The New York Project included funding of two epidemiological investigations, one each for childhood cancer (Denver, Colorado) and adult leukemia (Seattle, Washington). The Denver study, by Dr. David Savitz, evaluated the incidence of cancer near certain "high current configuration" wiring. A coding of wires and electrical distribution and transmission facilities combined with spot measurements of the magnetic fields, was used to classify magnetic field levels at the study locations. The Savitz study produced results consistent with those obtained in an earlier Denver study (Wertheimer and Leeper, 1979) in which the suggestion of a statistical correlation between low-level AC magnetic fields and childhood cancer was indicated.

The findings of the Denver cancer study were interpreted by the New York scientific panel as showing a positive relationship between the incidence of childhood cancer and the proximity of the subjects' homes to high current configuration wiring. However, the panel noted that some "internal inconsistencies" were troubling. One problem was that the statistical correlation was weak (or non-existent) for measured magnetic fields. If the magnetic fields are the cause of the cancer, a stronger correlation would be expected with the actual field measurements than with the wiring codes. Dr. Leonard Sagan, manager of the Electric Power Research Institute's field effects research, notes that it is conceivable that the wire code may be a better predictor of previous, long-term magnetic field exposure compared to short-term measurements. The discrepancy may suggest, however, that some other factors are involved. Dr. Sagan suggests that a higher density of power lines and current flow is likely to be associated with more crowded, urbanized neighborhoods where there is more traffic, noise, air pollution, and exposure to hazardous chemicals.

Another problem is that, as the panel states, "...research in basic sciences has not revealed any mechanisms that could explain the role of magnetic fields in the origin of cancer." One factor in evaluating epidemiological studies is to see if the results are supported by basic laboratory research. Although some scientists have proposed mechanisms, none of the studies conducted so far have been able to positively identify such a mechanism.

Dr. Savitz explained the significance of the results of his study in a letter addressed generally to persons concerned about reports of electromagnetic fields and childhood cancer. In the letter he states: "It should be kept in mind, however, that we have not proven that magnetic fields cause cancer. Subsequent research will indicate whether we are on the right track or whether our results are in error. Thus, there is a suggestion of a possible hazard which has yet to be resolved."

The second epidemiological study funded by New York State involved adult leukemia and was done in the Seattle area. The design of this study shared many features of the Denver study. Exposure to magnetic fields was assessed by field measurements as well as by the same wire codes as the Denver study. For the Seattle study, the panel reported that "...regardless of how exposure was characterized, no relationship with leukemia incidence was disclosed."

After evaluating the results of the cancer studies, the panel stated "For several reasons, including the fact that a causal relationship between weak magnetic fields and cancer has not been established and that methodological uncertainties associated with quantifying magnetic field exposure levels exist, we cannot offer a recommendation based on the epidemiological studies.", and "At this time no risk assessments can be made because only four studies of this question have been made and the two which report an association are from the same geographic region. More research on cancer as a function of magnetic fields is needed, both in homes and for on-the-job exposure..."

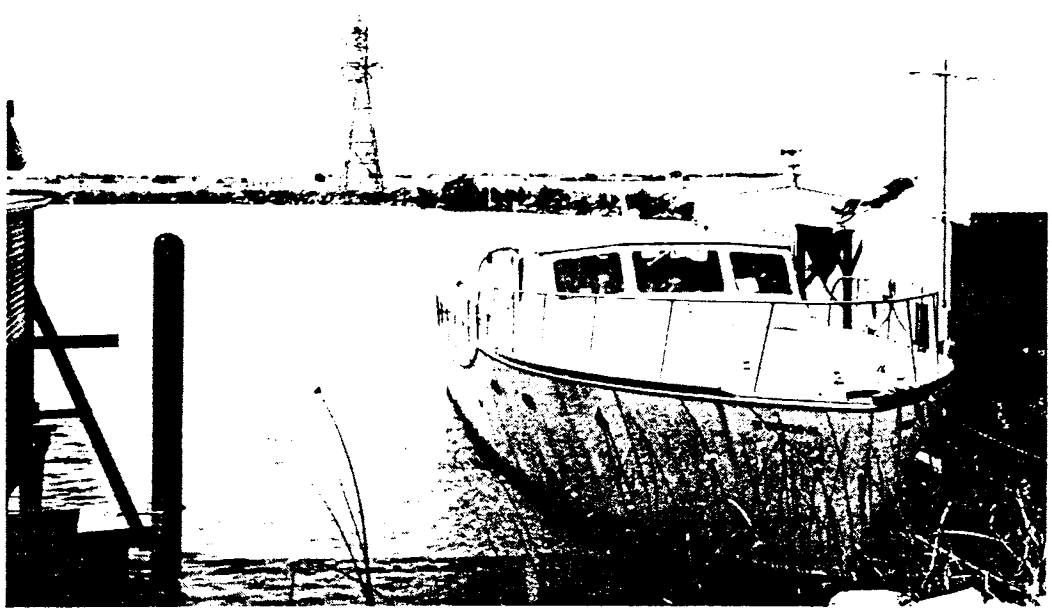
After evaluating the results of all 16 research projects, the New York scientific panel concluded that "Most of the research studies reported no effects of concern. Of the few effects, some warrant further consideration. No effects were found on reproduction, growth, or development. Several studies showed no evidence of genetic or chromosomal damage that might lead to inherited effects or cause cancer. While most measurements of behavior and brain function did not demonstrate changes, some did show changes that were small but consistent. Some of these appear to result from changes in body rhythms and might interfere with normal sleep patterns. There were also changes in pain responses and in the ability of rats to learn."

Regarding magnetic fields, the panel found that, "Except for houses close to power transmission lines, the major sources of magnetic fields in homes are the ground return currents from distribution systems and fields in the immediate vicinity of appliances." Fields in the immediate vicinity of hair dryers, can openers, and electric shavers range from 60 to 20,000 milligauss. The calculated magnetic fields for the COTP line at its maximum operating limit range from 370 milligauss at the centerline to 55 milligauss at a distance of 100 feet from the centerline. A magnetic field ranging from 0.1 to 13 milligauss was the field measured in the homes near distribution lines in the Denver study. The point at which magnetic fields for the COTP line would decline to approximately 10 milligauss is about 250 feet from the centerline. At approximately 525 feet from the centerline, the field would further decline to 2.5 milligauss, the upper limit of the 95 percent confidence interval for the correlation demonstrated in the Denver study. The welfare and safety of the public are of paramount concern in all aspects of the COTP route selection and design criteria. The preferred route for the line is located almost entirely in rural and remote areas, and school sites and other potentially sensitive land uses have been avoided. Even though the New York scientific panel strongly recommends that the results of the study not be used to extrapolate the extent of risk, if one were to speculate on the possible risk based on Dr. Savitz's study, no adverse impacts to public health could be accurately predicted since there would be immeasurable results given the number of residences within the area of the 2.5 milligauss field along the preferred route of the COTP transmission line.

It is generally agreed by the scientific community that further research and study are indicated. From a review of the available literature, it is clear that information regarding any association between electric and magnetic fields and human health effects is incomplete and unavailable. The results of those studies are inconclusive. Scientific research to date has not been able to prove or disprove any causal connection between these fields and cancer. The Electric Power Research Institute, Department of Energy, and other groups are planning further investment of millions of dollars in research on this subject. Based on the mixed results of previous studies and the lack of evidence for a causal biological mechanism, the research programs could well continue for years before more definitive information proving or disproving any effects is found. Such information is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment, if any, that pertain to public health risks.

FIGURE 1.2.3-1

VISUAL SIMULATION ON WEST END OF BETHEL ISLAND



View from boat docking facilities on west end of Bethel Island, near the line's closest point to the island. Line would be beyond the levee, parallel to and approximately **2,000** feet from the existing transmission lines in the distance. The tower structure shown in this illustration is not the only type under consideration in this area.

STAGECON
02-Jul-87

TABLE 1.2.3—1

SHORT-TERM AGRICULTURAL ECONOMIC EFFECTS [a]
($ IN THOUSANDS)

SEGMENT	ROW	FIELD	ORCHARD/VINE	NON-IRRIGATED	ANNUAL TOTAL	AVERAGE PER CORRIDOR MILE
N-1L	$1.3			$0.8	$2.1	$0.2
N-4B		$2.2		$0.6	$2.8	$0.4
N-4F	$4.3	$1.3		$0.1	$5.6	$0.3
N-6B1		$1.4		$1.6	$3.0	$0.2
N-6B2		$0.3			$0.3	NA
N-6D	$28.6	$0.5		$0.6	$29.7	$1.4
N-6E	$4.7			$0.5	$5.3	$0.6
N-6L	$7.6				$7.6	$1.6
N-6M	$0.7				$0.7	$0.4
N-6N	$1.4				$1.4	$0.1
N-6O	$3.1				$3.1	$1.0
N-6P	$3.0				$3.0	$0.5
N-6Z	$2.2	$0.4			$2.6	$0.3
N-9H		$0.3			$0.3	NA
N-9L	$10.1		$0.4		$10.5	$1.2
N-9O	$3.5	$0.8			$4.3	$1.0
N-9 ALT1		$1.4			$1.4	$0.6
N-10A(1)	$0.7				$0.7	NA
N-10A(2)	$1.2				$1.2	NA
N-10A	$1.9				$1.9	$0.2
N-10D	$31.1			$0.3	$31.4	$2.3
N-10E	$0.0				$0.0	$0.0
N-10F	$7.3			$0.1	$7.4	$1.5
N-10G	$2.9			$0.1	$3.0	$0.6
N-10I	$10.9				$10.9	$3.0
N-10 ALT2	$4.4				$4.4	$0.4
N-10 ALT3				$0.1	$0.1	NA
N-10 ALT4				$0.2	$0.2	NA
S-1A(1)	$14.2	$1.8	$0.5		$16.5	NA
S-1A(2)	$35.0	$3.9	$0.9	$3.8	$43.6	NA
S-1A(3)	$43.0		$3.1	$3.6	$49.7	NA
S-1A(4)	$59.4		$2.5	$2.6	$64.5	NA
S-1A(5)	$40.8		$1.6	$4.5	$47.0	NA
S-1A	$192.4	$5.7	$8.5	$14.6	$221.2	$1.3
S-8A(1)				$0.2	$0.2	NA
S-8A(2)		$0.9			$0.9	NA
S-8A(3)	$39.1		$0.7		$39.9	NA
S-8A	$39.1	$0.9	$0.7	$0.2	$41.0	$1.8
S-8B(1)				$0.2	$0.2	NA
S-8B(2)	$0.3				$0.3	NA
S-8B	$0.3			$0.2	$0.5	$0.5
S-8C(1)	$10.0				$10.0	NA
S-8C(2)		$0.6			$0.6	NA
S-8C	$10.0	$0.6			$10.6	$2.5
S-8D(1)	$13.9	$1.2			$15.2	NA
S-8D(2)	$12.1				$12.1	NA
S-8D	$26.0	$1.2			$27.2	$2.3
S-8E(1)	$9.3	$1.2			$10.5	$2.1
S-8E(2)	$5.3				$5.3	NA
S-8E	$14.5	$1.2			$15.7	$1.7
S-8F(1)	$9.9				$9.9	NA
S-8F(2)	$35.0	$1.7	$0.3		$36.9	NA
S-8F	$44.9	$1.7	$0.3		$46.8	$2.1
S-8G(1)	$5.9				$5.9	NA
S-8G(2)	$1.5				$1.5	NA
S-8G	$7.4				$7.4	$2.6
S-8H(1)	$7.4				$7.4	NA
S-8H(2)	$2.6				$2.6	NA
S-8H	$10.1				$10.1	$2.8
S-8I	$6.6				$6.6	$2.8
S-8J(1)	$8.7				$8.7	NA
S-8J(2)	$10.5				$10.5	NA
S-8J	$3.4				$3.4	$0.4
S-8 ALT1	$26.3	$0.7			$27.0	$2.8
S-8 ALT2	$31.7				$31.7	$2.5
S-9D	$3.1				$3.1	$2.4
S-9F	$0.3				$0.3	$0.1
S-9G	$2.2				$2.2	$0.4

[a] Assumes that the Project construction period will encompass one cropping season. Table includes only those segments with short-term agricultural effects

LTAG
02-Jul-87

TABLE 1.2.3—2
LONG-TERM AGRICULTURAL ECONOMIC EFFECTS [a]
($ IN THOUSANDS)

SEGMENT NUMBER	ROW	FIELD	ORCHARD/VINE	NON-IRRIGATED	ANNUAL TOTAL	AVERAGE PER CORRIDOR MILE
N-1L	$0.4			$0.1	$0.5	$0.1
N-4B		$0.4		$0.1	$0.4	$0.1
N-4F	$1.2	$0.2			$1.4	$0.1
N-6B1		$0.2		$0.2	$0.4	$.0
N-6B2		$0.1			$0.1	$.0
N-6D	$8.1	$0.1		$0.1	$8.2	$0.4
N-6E	$1.3			$0.1	$1.4	$0.2
N-6L	$2.1				$2.1	$0.5
N-6M	$0.2				$0.2	$0.1
N-6N	$0.4				$0.4	$.0
N-6O	$0.9				$0.9	$0.3
N-6P	$0.9				$0.9	$0.1
N-6Z	$0.6				$0.6	$0.1
N-9H		$0.1			$0.1	$.0
N-9L	$5.1		$0.1		$5.1	$0.6
N-9O	$1.8	$0.1			$1.9	$0.4
N-9 ALT1		$0.2			$0.2	$0.1
N-10A	$0.5				$0.5	$0.1
N-10D	$8.8				$8.8	$0.6
N-10E	$0.0				$0.0	$0.0
N-10F	$2.1				$2.1	$0.4
N-10G	$0.8				$0.8	$0.2
N-10I	$3.1				$3.1	$0.9
N-10 ALT2	$1.2				$1.2	$0.1
N-10 ALT3				$.0	$.0	$.0
N-10 ALT4				$.0	$.0	$.0
S-1A(1)	$4.0	$0.2	$0.1		$4.3	$0.1
S-1A(2)	$9.9	$0.4	$0.1	$0.5	$10.9	$0.4
S-1A(3)	$12.2		$0.5	$0.4	$13.1	$0.4
S-1A(4)	$16.8		$0.4	$0.3	$17.5	$0.6
S-1A(5)	$11.5		$0.2	$0.6	$12.3	$0.4
S-1A	$54.4	$0.6	$1.3	$1.8	$58.0	$0.3
S-8A(1)					$0.0	NA
S-8A(2)		$0.1			$0.1	NA
S-8A(3)	$11.1		$0.1		$11.2	NA
S-8A	$11.1	$0.1	$0.1	$.0	$11.3	$0.5
S-8B(1)				$.0	$.0	$0.0
S-8B(2)	$0.1				$0.1	$0.3
S-8B	$0.1			$.0	$0.1	$0.1
S-8C(1)	$2.8				$2.8	$0.8
S-8C(2)		$0.1			$0.1	$0.1
S-8C	$2.8				$2.8	$0.7
S-8D(1)	$3.9	$0.1			$4.1	$0.5
S-8D(2)	$3.4				$3.4	$0.9
S-8D	$7.3	$0.1			$7.5	$0.6
S-8E(1)	$2.6	$0.1			$2.7	$0.5
S-8E(2)	$1.5				$1.5	$0.6
S-8E	$4.11	$0.12			$4.23	$1.10
S-8F(1)	$2.8				$2.8	$0.8
S-8F(2)	$9.9	$0.2			$10.1	$0.5
S-8F	$12.7	$0.2			$12.9	$0.6
S-8G(1)	$1.7				$1.7	$0.8
S-8G(2)	$0.4				$0.4	$0.5
S-8G	$2.1				$2.1	$0.7
S-8H(1)	$2.1				$2.1	$0.8
S-8H(2)	$0.7				$0.7	$0.8
S-8H	$2.8				$2.8	$0.8
S-8I	$1.9				$1.9	$0.8
S-8J(1)	$2.4				$2.4	$0.7
S-8J(2)	$3.0				$3.0	$1.0
S-8J	$1.0				$1.0	$0.1
S-8 ALT1	$7.4	$0.1			$7.5	$0.8
S-8 ALT2	$9.0				$9.0	$0.7
S-9D	$0.9				$0.9	$0.7
S-9F	$0.1				$0.1	$0.0
S-9G	$0.6				$0.6	$0.1

[a] Table includes only those segments with long term agricultural effects
NA = Not applicable

LOCALEXP
28-Mar-87

TABLE 1.2.3—3

ESTIMATE OF LOCAL EXPENDITURES
($ IN THOUSANDS)

Number	County	Length (Miles)	Construction Cost	Local Expenditures By COTP [a]	T-Line Payroll	Expenditures By Non-Local Workers	Total Taxable Expenditures	Local Sales Taxes [b]
N-1A	Jackson	8.14	$3,531.0	$176.6	$564.1	$142.2	$318.7	$0.0
N-1B	Jackson	7.19	$3,151.0	$157.6	$498.3	$125.6	$283.1	$0.0
N-1C	Jackson	1.45	$657.0	$32.9	$100.5	$25.3	$58.2	$0.0
N-1D	Various	3.07	$1,614.0	$80.7	$212.8	$53.6	$134.3	$1.1
N-1D(1)	Jackson	1.07	$562.5	$28.1	$74.2	$18.7	$46.8	$0.0
N-1D(2)	Siskiyou	2.00	$1,051.5	$52.6	$138.6	$34.9	$87.5	$1.1
N-1E	Various	4.77	$2,140.0	$107.0	$330.6	$83.3	$190.3	$1.5
N-1E(1)	Jackson	1.75	$785.1	$39.3	$121.3	$30.6	$69.8	$0.0
N-1E(2)	Siskiyou	3.02	$1,354.9	$67.7	$209.3	$52.7	$120.5	$1.5
N-1F	Siskiyou	1.00	$699.0	$35.0	$69.3	$17.5	$52.4	$0.7
N-1G	Siskiyou	1.32	$732.0	$36.6	$91.5	$23.1	$59.7	$0.7
N-1H	Siskiyou	0.89	$658.0	$32.9	$61.7	$15.5	$48.4	$0.6
N-1I	Siskiyou	1.84	$1,077.0	$53.9	$127.5	$32.1	$86.0	$1.1
N-1J	Siskiyou	1.55	$985.0	$49.3	$107.4	$27.1	$76.3	$1.0
N-1K	Siskiyou	1.36	$647.0	$32.4	$94.2	$23.8	$56.1	$0.7
N-1L	Siskiyou	9.01	$4,245.0	$212.3	$624.4	$157.3	$369.6	$4.6
N-4A	Siskiyou	22.45	$12,870.0	$643.5	$1,555.8	$392.1	$1,035.6	$12.9
N-4B	Siskiyou	7.37	$3,145.0	$157.3	$510.7	$128.7	$286.0	$3.6
N-4F	Siskiyou	19.53	$8,649.0	$432.5	$1,353.4	$341.1	$773.5	$9.7
N-4G	Siskiyou	11.33	$5,606.0	$280.3	$785.2	$197.9	$478.2	$6.0
N-4H	Siskiyou	3.82	$1,714.0	$85.7	$264.7	$66.7	$152.4	$1.9
N-4I	Siskiyou	2.83	$1,301.0	$65.1	$196.1	$49.4	$114.5	$1.4
N-4J	Siskiyou	5.70	$2,542.0	$127.1	$395.0	$99.5	$226.6	$2.8
N-4K	Siskiyou	3.54	$1,590.0	$79.5	$245.3	$61.8	$141.3	$1.8
N-6A	Klamath	3.54	$1,716.0	$85.8	$245.3	$61.8	$147.6	$0.0
N-6B1	Various	18.64	$8,201.7	$410.1	$1,291.8	$325.5	$735.6	$6.2
N-6B1(1)	Klamath	6.00	$2,640.0	$132.0	$415.8	$104.8	$236.8	$0.0
N-6B1(2)	Siskiyou	12.64	$5,561.7	$278.1	$876.0	$220.7	$498.8	$6.2
N-6B2	Siskiyou	7.45	$3,278.0	$163.9	$516.3	$130.1	$294.0	$3.7
N-6C	Klamath	2.72	$1,298.0	$64.9	$188.5	$47.5	$112.4	$0.0
N-6D	Various	21.60	$8,841.0	$442.1	$1,496.9	$377.2	$819.3	$8.1
N-6D(1)	Klamath	4.50	$1,841.9	$92.1	$311.9	$78.6	$170.7	$0.0
N-6D(2)	Siskiyou	17.10	$6,999.1	$350.0	$1,185.0	$298.6	$648.6	$8.1
N-6E	Various	9.33	$4,114.0	$205.7	$646.6	$162.9	$368.6	$2.2
N-6E(1)	Klamath	4.73	$2,085.7	$104.3	$327.8	$82.6	$186.9	$0.0
N-6E(2)	Siskiyou	4.50	$1,984.2	$99.2	$311.9	$78.6	$177.8	$2.2
N-6F	Siskiyou	8.42	$5,112.0	$255.6	$583.5	$147.0	$402.6	$5.0
N-6G	Siskiyou	8.97	$5,057.0	$252.9	$621.6	$156.6	$409.5	$5.1
N-6H	Siskiyou	4.83	$2,462.0	$123.1	$334.7	$84.3	$207.4	$2.6
N-6I	Siskiyou	2.47	$1,134.0	$56.7	$171.2	$43.1	$99.8	$1.2
N-6J	Siskiyou	5.06	$2,015.0	$100.8	$350.7	$88.4	$189.1	$2.4
N-6K	Siskiyou	2.25	$932.0	$46.6	$155.9	$39.3	$85.9	$1.1
N-6L	Siskiyou	4.71	$2,014.0	$100.7	$326.4	$82.3	$183.0	$2.3
N-6M	Siskiyou	2.03	$865.0	$43.3	$140.7	$35.5	$78.7	$1.0
N-6N	Siskiyou	11.19	$4,975.0	$248.8	$775.5	$195.4	$444.2	$5.6
N-6O	Siskiyou	2.94	$1,262.0	$63.1	$203.7	$51.3	$114.4	$1.4
N-6P	Siskiyou	5.71	$2,309.0	$115.5	$395.7	$99.7	$215.2	$2.7
N-6Q	Siskiyou	5.15	$2,051.0	$102.6	$356.9	$89.9	$192.5	$2.4
N-6R	Siskiyou	2.42	$1,097.0	$54.9	$167.7	$42.3	$97.1	$1.2
N-6S	Siskiyou	6.24	$2,628.0	$131.4	$432.4	$109.0	$240.4	$3.0
N-6T	Siskiyou	4.06	$1,725.0	$86.3	$281.4	$70.9	$157.2	$2.0
N-6U1	Siskiyou	3.80	$1,672.0	$83.6	$263.3	$66.4	$150.0	$1.9
N-6U2	Siskiyou	3.50	$1,540.0	$77.0	$242.6	$61.1	$138.1	$1.7
N-6V	Siskiyou	14.83	$6,224.0	$311.2	$1,027.7	$259.0	$570.2	$7.1
N-6W	Siskiyou	5.48	$2,412.0	$120.6	$379.8	$95.7	$216.3	$2.7
N-6X	Siskiyou	6.65	$3,020.0	$151.0	$460.8	$116.1	$267.1	$3.3
N-6Y	Siskiyou	5.92	$2,604.8	$130.2	$410.3	$103.4	$233.6	$2.9
N-6Z	Siskiyou	9.55	$4,202.1	$210.1	$661.8	$166.8	$376.9	$4.7
N-6ALT1	Various	13.90	$6,116.1	$305.8	$963.3	$242.7	$548.5	$4.0
N-6ALT1(1)	Klamath	5.70	$2,508.0	$125.4	$395.0	$99.5	$224.9	$0.0
N-6ALT1(2)	Siskiyou	8.20	$3,608.1	$180.4	$568.3	$143.2	$323.6	$4.0

[a] Estimated at 5 percent of the construction cost.
[b] Regarding the 6% sales tax, 1.25 % of the gross sales goes to local sources. No sales taxes in Oregon.

TABLE 1.2.3—3 (continued)
ESTIMATE OF LOCAL EXPENDITURES
($ IN THOUSANDS)

Number	County	Length (Miles)	Construction Cost	Local Expenditures By COTP [a]	T-Line Payroll	Expenditures By Non-Local Workers	Total Taxable Expenditures	Local Sales Taxes [b]
N-7A	Siskiyou	0.85	$552.0	$27.6	$58.9	$14.8	$42.4	$0.5
N-7B	Siskiyou	8.45	$3,824.0	$191.2	$585.6	$147.6	$338.8	$4.2
N-7C	Siskiyou	4.39	$2,069.0	$103.5	$304.2	$76.7	$180.1	$2.3
N-7H1	Siskiyou	10.40	$5,683.3	$284.2	$720.7	$181.6	$465.8	$5.8
N-7H2	Various	10.05	$5,492.0	$274.6	$696.5	$175.5	$450.1	$5.6
N-7H2(1)	Siskiyou	2.55	$1,393.5	$69.7	$176.7	$44.5	$114.2	$1.4
N-7H2(2)	Shasta	7.50	$4,098.5	$204.9	$519.8	$131.0	$335.9	$4.2
N-7I	Siskiyou	8.84	$4,114.0	$205.7	$612.6	$154.4	$360.1	$4.5
N-7J	Siskiyou	1.67	$736.0	$36.8	$115.7	$29.2	$66.0	$0.8
N-7L	Siskiyou	8.15	$3,601.0	$180.1	$564.8	$142.3	$322.4	$4.0
N-7M	Siskiyou	1.67	$771.0	$38.6	$115.7	$29.2	$67.7	$0.8
N-7N	Various	3.44	$2,069.0	$103.5	$238.4	$60.1	$163.5	$2.0
N-7N(1)	Siskiyou	2.50	$1,503.6	$75.2	$173.3	$43.7	$118.8	$1.5
N-7N(2)	Shasta	0.94	$565.4	$28.3	$65.1	$16.4	$44.7	$0.6
N-7O	Various	2.33	$1,505.0	$75.3	$161.5	$40.7	$115.9	$1.4
N-7O(1)	Siskiyou	0.75	$484.4	$24.2	$52.0	$13.1	$37.3	$0.5
N-7O(2)	Shasta	1.58	$1,020.6	$51.0	$109.5	$27.6	$78.6	$1.0
N-7R	Shasta	4.67	$2,968.0	$148.4	$323.6	$81.6	$230.0	$2.9
N-7ALT1	Various	11.75	$6,421.0	$321.1	$814.3	$205.2	$526.2	$6.6
N-7ALT1(1)	Siskiyou	2.40	$1,311.5	$65.6	$166.3	$41.9	$107.5	$1.3
N-7ALT1(2)	Shasta	9.35	$5,109.5	$255.5	$648.0	$163.3	$418.8	$5.2
N-8A	Shasta	6.85	$4,420.0	$221.0	$474.7	$119.6	$340.6	$4.3
N-8B	Shasta	9.58	$5,820.0	$291.0	$663.9	$167.3	$458.3	$5.7
N-8C	Shasta	2.09	$998.0	$49.9	$144.8	$36.5	$86.4	$1.1
N-8D	Shasta	7.45	$4,624.0	$231.2	$516.3	$130.1	$361.3	$4.5
N-8E	Shasta	7.10	$4,498.0	$224.9	$492.0	$124.0	$348.9	$4.4
N-8F	Shasta	0.92	$437.0	$21.9	$63.8	$16.1	$37.9	$0.5
N-8G	Shasta	1.87	$1,387.0	$69.4	$129.6	$32.7	$102.0	$1.3
N-8Z	Shasta	3.96	$3,460.0	$173.0	$274.4	$69.2	$242.2	$3.0
N-8ALT1	Shasta	3.95	$2,543.8	$127.2	$273.7	$69.0	$196.2	$2.5
N-8ALT2	Shasta	5.20	$3,348.8	$167.4	$360.4	$90.8	$258.3	$3.2
N-8ALT3	Shasta	3.10	$1,996.4	$99.8	$214.8	$54.1	$154.0	$1.9
N-9A	Shasta	1.75	$946.0	$47.3	$121.3	$30.6	$77.9	$1.0
N-9B	Shasta	1.67	$794.0	$39.7	$115.7	$29.2	$68.9	$0.9
N-9C	Shasta	2.68	$1,614.0	$80.7	$185.7	$46.8	$127.5	$1.6
N-9D	Shasta	6.62	$3,313.0	$165.7	$458.8	$115.6	$281.3	$3.5
N-9G	Shasta	1.96	$896.0	$44.8	$135.8	$34.2	$79.0	$1.0
N-9H	Shasta	14.22	$6,282.0	$314.1	$985.4	$248.3	$562.4	$7.0
N-9J	Shasta	14.61	$6,788.0	$339.4	$1,012.5	$255.1	$594.5	$7.4
N-9K	Shasta	2.24	$949.0	$47.5	$155.2	$39.1	$86.6	$1.1
N-9L	Shasta	9.12	$3,989.0	$199.5	$632.0	$159.3	$358.7	$4.5
N-9M	Shasta	3.63	$1,514.0	$75.7	$251.6	$63.4	$139.1	$1.7
N-9N	Shasta	1.51	$602.0	$30.1	$104.6	$26.4	$56.5	$0.7
N-9O	Shasta	4.43	$1,735.0	$86.8	$307.0	$77.4	$164.1	$2.1
N-9Q	Shasta	0.57	$331.0	$16.6	$39.5	$10.0	$26.5	$0.3
N-9S	Shasta	1.60	$731.4	$36.6	$110.9	$27.9	$64.5	$0.8
N-9ALT1	Shasta	2.35	$1,072.9	$53.6	$162.9	$41.0	$94.7	$1.2
N-10A	Klamath	9.21	$4,899.0	$245.0	$638.3	$160.8	$405.8	$0.0
N-10D	Modoc	13.92	$5,665.0	$283.3	$964.7	$243.1	$526.3	$6.6
N-10E	Modoc	1.03	$444.0	$22.2	$71.4	$18.0	$40.2	$0.5
N-10F	Modoc	5.04	$2,163.0	$108.2	$349.3	$88.0	$196.2	$2.5
N-10G	Modoc	4.92	$2,046.0	$102.3	$341.0	$85.9	$188.2	$2.4
N-10I	Modoc	3.57	$1,755.0	$87.8	$247.4	$62.3	$150.1	$1.9
N-10J	Modoc	3.25	$1,354.0	$67.7	$225.2	$56.8	$124.5	$1.6
N-10K	Modoc	5.00	$1,941.0	$97.1	$346.5	$87.3	$184.4	$2.3
N-10L	Modoc	7.47	$2,934.0	$146.7	$517.7	$130.5	$277.2	$3.5
N-10M1	Modoc	3.10	$1,313.0	$65.7	$214.8	$54.1	$119.8	$1.5
N-10M2	Various	35.56	$15,062.0	$753.1	$2,464.3	$621.0	$1,374.1	$8.1
N-10M2(1)	Modoc	16.10	$6,819.4	$341.0	$1,115.7	$281.2	$622.1	$7.8
N-10M2(2)	Siskiyou	18.71	$7,924.9	$396.2	$1,296.6	$326.7	$723.0	$9.0
N-10M2(3)	Shasta	0.75	$317.7	$15.9	$52.0	$13.1	$29.0	$0.4

[a] Estimated at 5 percent of the construction cost.
[b] Regarding the 6% sales tax, 1.25 % of the gross sales goes to local sources. No sales taxes in Oregon.

TABLE 1.2.3—3 (continued)
ESTIMATE OF LOCAL EXPENDITURES
($ IN THOUSANDS)

Number	County	Length (Miles)	Construction Cost	Local Expenditures By COTP [a]	T-Line Payroll	Expenditures By Non-Local Workers	Total Taxable Expenditures	Local Sales Taxes [b]
N-10ALT2	Modoc	12.05	$5,147.8	$257.4	$835.1	$210.4	$467.8	$5.8
N-10ALT3	Modoc	12.95	$5,532.2	$276.6	$897.4	$226.2	$502.8	$6.3
N-10ALT4	Modoc	16.55	$7,070.2	$353.5	$1,146.9	$289.0	$642.5	$8.0
N-10ALT5	Various	40.30	$17,216.2	$860.8	$2,792.8	$703.8	$1,564.6	$19.6
N-10ALT5(1)	Modoc	4.20	$1,794.2	$89.7	$291.1	$73.3	$163.1	$2.0
N-10ALT5(2)	Siskiyou	36.10	$15,421.9	$771.1	$2,501.7	$630.4	$1,401.5	$17.5
N-11D	Shasta	7.07	$4,640.0	$232.0	$490.0	$123.5	$355.5	$4.4
N-13A	Shasta	6.87	$2,735.0	$136.8	$476.1	$120.0	$256.7	$3.2
S-1A	Various	167.94	$5,245.5	$262.3	$6,197.0	$1,388.1	$1,650.4	$20.6
S-1A(1)	Tehama	39.70	$1,240.0	$62.0	$1,464.9	$328.1	$390.1	$4.9
S-1A(2)	Glenn	29.20	$912.0	$45.6	$1,077.5	$241.4	$287.0	$3.6
S-1A(3)	Colusa	34.64	$1,082.0	$54.1	$1,278.2	$286.3	$340.4	$4.3
S-1A(4)	Yolo	29.60	$924.5	$46.2	$1,092.2	$244.7	$290.9	$3.6
S-1A(5)	Solano	34.80	$1,087.0	$54.3	$1,284.1	$287.6	$342.0	$4.3
S-8A	Various	23.87	$13,889.9	$694.5	$880.8	$197.3	$891.8	$11.1
S-8A(1)	Solano	0.50	$290.9	$14.5	$18.5	$4.1	$18.7	$0.2
S-8A(2)	Sacramento	6.09	$3,543.8	$177.2	$224.7	$50.3	$227.5	$2.8
S-8A(3)	Contra Costa	17.28	$10,055.2	$502.8	$637.6	$142.8	$645.6	$8.1
S-8B	Various	1.12	$407.9	$20.4	$41.3	$9.3	$29.7	$0.4
S-8B(1)	Contra Costa	0.80	$291.4	$14.6	$29.5	$6.6	$21.2	$0.3
S-8B(2)	Sacramento	0.32	$116.5	$5.8	$11.8	$2.6	$8.5	$0.1
S-8C	Various	4.21	$3,945.2	$197.3	$155.3	$34.8	$232.1	$2.9
S-8C(1)	Sacramento	3.60	$3,373.6	$168.7	$132.8	$29.8	$198.4	$2.5
S-8C(2)	Contra Costa	0.61	$571.6	$28.6	$22.5	$5.0	$33.6	$0.4
S-8D	Various	11.93	$10,055.0	$502.8	$440.2	$98.6	$601.4	$7.5
S-8D(1)	Contra Costa	7.93	$6,683.7	$334.2	$292.6	$65.5	$399.7	$5.0
S-8D(2)	San Joaquin	4.00	$3,371.3	$168.6	$147.6	$33.1	$201.6	$2.5
S-8E1	Contra Costa	6.51	$4,118.0	$205.9	$240.2	$53.8	$259.7	$3.2
S-8E2	Contra Costa	2.57	$1,625.7	$81.3	$94.8	$21.2	$102.5	$1.3
S-8F	Various	22.46	$6,620.0	$331.0	$828.8	$185.6	$516.6	$6.5
S-8F(1)	Sacramento	3.52	$1,037.5	$51.9	$129.9	$29.1	$81.0	$1.0
S-8F(2)	Contra Costa	18.94	$5,582.5	$279.1	$698.9	$156.6	$435.7	$5.4
S-8G	Various	2.81	$2,668.8	$133.4	$103.7	$23.2	$156.7	$2.0
S-8G(1)	Contra Costa	2.00	$1,899.5	$95.0	$73.8	$16.5	$111.5	$1.4
S-8G(2)	San Joaquin	0.81	$769.3	$38.5	$29.9	$6.7	$45.2	$0.6
S-8H	Various	3.53	$3,122.0	$156.1	$130.3	$29.2	$185.3	$2.3
S-8H(1)	Contra Costa	2.56	$2,264.1	$113.2	$94.5	$21.2	$134.4	$1.7
S-8H(2)	San Joaquin	0.97	$857.9	$42.9	$35.8	$8.0	$50.9	$0.6
S-8I	San Joaquin	2.35	$1,597.5	$79.9	$86.7	$19.4	$99.3	$1.2
S-8J	Various	6.60	$6,413.5	$320.7	$243.5	$54.6	$375.2	$4.7
S-8J(1)	Contra Costa	3.60	$3,498.3	$174.9	$132.8	$29.8	$204.7	$2.6
S-8J(2)	San Joaquin	3.00	$2,915.2	$145.8	$110.7	$24.8	$170.6	$2.1
S-8K	Various	5.25	$3,321.0	$166.0	$193.7	$43.4	$209.4	$2.6
S-8K(1)	Contra Costa	1.05	$664.2	$33.2	$38.7	$8.7	$41.9	$0.5
S-8K(2)	San Joaquin	2.90	$1,834.5	$91.7	$107.0	$24.0	$115.7	$1.4
S-8K(3)	Alameda	1.30	$822.3	$41.1	$48.0	$10.7	$51.9	$0.6
S-8ALT1	Various	9.75	$6,167.6	$308.4	$359.8	$80.6	$389.0	$4.9
S-8ALT1(1)	Sacramento	2.50	$1,581.4	$79.1	$92.3	$20.7	$99.7	$1.2
S-8ALT1(2)	Contra Costa	7.25	$4,586.1	$229.3	$267.5	$59.9	$289.2	$3.6
S-8ALT2	Various	12.75	$8,065.3	$403.3	$470.5	$105.4	$508.7	$6.4
S-8ALT2(1)	Contra Costa	11.75	$7,432.7	$371.6	$433.6	$97.1	$468.8	$5.9
S-8ALT2(2)	Alameda	1.00	$632.6	$31.6	$36.9	$8.3	$39.9	$0.5
S-9A	San Joaquin	2.66	$1,671.6	$83.6	$98.2	$22.0	$105.6	$1.3
S-9B	San Joaquin	2.51	$1,325.4	$66.3	$92.6	$20.7	$87.0	$1.1
S-9C	San Joaquin	0.57	$1,148.0	$57.4	$21.0	$4.7	$62.1	$0.8
S-9D	Alameda	1.29	$764.7	$38.2	$47.6	$10.7	$48.9	$0.6
S-9E	Alameda	7.11	$4,088.6	$204.4	$262.4	$58.8	$263.2	$3.3
S-9F	Alameda	4.92	$2,622.8	$131.1	$181.5	$40.7	$171.8	$2.1
S-9G	Alameda	5.52	$2,971.3	$148.6	$203.7	$45.6	$194.2	$2.4
S-9H	Alameda	0.26	$224.6	$11.2	$9.6	$2.1	$13.4	$0.2

[a] Estimated at 5 percent of the construction cost.
[b] Regarding the 6% sales tax, 1.25 % of the gross sales goes to local sources. No sales taxes in Oregon.

TABLE 1.2.3-6
COMPARISON OF LOCAL TAXES GENERATED
TO COUNTY REVENUES
(LONG-TERM)

NUMBER	COUNTY	COUNTY PROPERTY TAX REVENUE ($ MILLIONS)	TOTAL COUNTY REVENUE ($ MILLIONS)	COTP PROPERTY TAXES ($ THOUSANDS)	PERCENT OF COUNTY PROPERTY TAX REVENUE	LESS: TIMBER REVENUE TO COUNTY [a] ($ THOUSANDS)	TOTAL TAX REVENUE ($ THOUSANDS)	PERCENT OF TOTAL COUNTY REVENUE
N-1A	Jackson	$0.88	$40.90	$74.7	8.49%	($0.09)	$74.60	0.18%
N-1B	Jackson	$0.88	$40.90	$67.4	7.66%	($0.08)	$67.28	0.16%
N-1C	Jackson	$0.88	$40.90	$13.3	1.51%	($0.00)	$13.29	0.03%
N-1D	Various	NA	NA	$15.6	NA	$0.00	$15.55	NA
N-1D(1)	Jackson	$0.88	$40.90	$11.2	1.28%	($0.00)	$11.24	0.03%
N-1D(2)	Siskiyou	$4.54	$28.37	$4.3	0.09%	($0.00)	$4.31	0.02%
N-1E	Various	NA	NA	$22.2	NA	$0.00	$22.18	NA
N-1E(1)	Jackson	$0.88	$40.90	$16.6	1.89%	($0.00)	$16.63	0.04%
N-1E(2)	Siskiyou	$4.54	$28.37	$5.6	0.12%	($0.00)	$5.55	0.02%
N-1F	Siskiyou	$4.54	$28.37	$2.9	0.06%	$0.00	$2.87	0.01%
N-1G	Siskiyou	$4.54	$28.37	$3.0	0.07%	$0.00	$3.00	0.01%
N-1H	Siskiyou	$4.54	$28.37	$2.7	0.06%	$0.00	$2.70	0.01%
N-1I	Siskiyou	$4.54	$28.37	$4.4	0.10%	$0.00	$4.42	0.02%
N-1J	Siskiyou	$4.54	$28.37	$4.0	0.09%	$0.00	$4.04	0.01%
N-1K	Siskiyou	$4.54	$28.37	$2.7	0.06%	$0.00	$2.65	0.01%
N-1L	Siskiyou	$4.54	$28.37	$17.4	0.38%	$0.00	$17.40	0.06%
N-4A	Siskiyou	$4.54	$28.37	$52.8	1.16%	($2.92)	$49.85	0.18%
N-4B	Siskiyou	$4.54	$28.37	$12.9	0.28%	$0.00	$12.89	0.05%
N-4F	Siskiyou	$4.54	$28.37	$35.5	0.78%	($1.42)	$34.04	0.12%
N-4G	Siskiyou	$4.54	$28.37	$23.0	0.51%	($3.50)	$19.49	0.07%
N-4H	Siskiyou	$4.54	$28.37	$7.0	0.15%	($0.49)	$6.54	0.02%
N-4I	Siskiyou	$4.54	$28.37	$5.3	0.12%	($1.11)	$4.22	0.01%
N-4J	Siskiyou	$4.54	$28.37	$10.4	0.23%	($2.30)	$8.13	0.03%
N-4K	Siskiyou	$4.54	$28.37	$6.5	0.14%	($1.54)	$4.98	0.02%
N-4K	Siskiyou	$4.54	$28.37	$6.5	0.14%	($1.54)	$4.98	0.02%
N-4K	Siskiyou	$4.54	$28.37	$6.5	0.14%	($1.54)	$4.98	0.02%
N-6A	Klamath	$3.00	$21.00	$23.8	0.79%	($0.19)	$23.62	0.11%
N-6A	Klamath	$3.00	$21.00	$23.8	0.79%	($0.19)	$23.62	0.11%
N-6B1	Various	NA	NA	$59.2	NA	($1.08)	$58.11	NA
N-6B1(1)	Klamath	$3.00	$21.00	$36.4	1.21%	($1.25)	$35.14	0.17%
N-6B1(2)	Siskiyou	$4.54	$28.37	$22.8	0.50%	($0.07)	$22.73	0.08%
N-6B2	Siskiyou	$4.54	$28.37	$13.4	0.30%	($0.25)	$13.19	0.05%
N-6C	Klamath	$3.00	$21.00	$17.6	0.59%	($0.24)	$17.40	0.08%
N-6D	Various	NA	NA	$54.7	NA	($0.08)	$54.59	NA
N-6D(1)	Klamath	$3.00	$21.00	$26.0	0.87%	($0.08)	$25.90	0.12%
N-6D(2)	Siskiyou	$4.54	$28.37	$28.7	0.63%	($0.04)	$28.66	0.10%
N-6E	Various	NA	NA	$37.5	NA	($0.01)	$37.44	NA
N-6E(1)	Klamath	$3.00	$21.00	$29.3	0.98%	($0.05)	$29.27	0.14%
N-6E(2)	Siskiyou	$4.54	$28.37	$8.1	0.18%	$0.00	$8.14	0.03%
N-6F	Siskiyou	$4.54	$28.37	$21.0	0.46%	($0.00)	$20.95	0.07%
N-6G	Siskiyou	$4.54	$28.37	$20.7	0.46%	($0.00)	$20.73	0.07%
N-6H	Siskiyou	$4.54	$28.37	$10.1	0.22%	($0.01)	$10.09	0.04%
N-6I	Siskiyou	$4.54	$28.37	$4.6	0.10%	($0.03)	$4.62	0.02%
N-6J	Siskiyou	$4.54	$28.37	$8.3	0.18%	($0.05)	$8.21	0.03%
N-6K	Siskiyou	$4.54	$28.37	$3.8	0.08%	($0.02)	$3.80	0.01%
N-6L	Siskiyou	$4.54	$28.37	$8.3	0.18%	($0.02)	$8.24	0.03%
N-6M	Siskiyou	$4.54	$28.37	$3.5	0.08%	($0.02)	$3.53	0.01%
N-6N	Siskiyou	$4.54	$28.37	$20.4	0.45%	($0.10)	$20.30	0.07%
N-6O	Siskiyou	$4.54	$28.37	$5.2	0.11%	($0.02)	$5.15	0.02%
N-6P	Siskiyou	$4.54	$28.37	$9.5	0.21%	($0.92)	$8.55	0.03%
N-6Q	Siskiyou	$4.54	$28.37	$8.4	0.19%	($1.63)	$6.78	0.02%
N-6R	Siskiyou	$4.54	$28.37	$4.5	0.10%	($1.26)	$3.24	0.01%
N-6S	Siskiyou	$4.54	$28.37	$10.8	0.24%	($3.25)	$7.53	0.03%
N-6T	Siskiyou	$4.54	$28.37	$7.1	0.16%	($2.11)	$4.96	0.02%
N-6U1	Siskiyou	$4.54	$28.37	$6.9	0.15%	($1.46)	$5.44	0.02%
N-6U2	Siskiyou	$4.54	$28.37	$6.3	0.14%	($1.20)	$5.10	0.02%
N-6U2	Siskiyou	$4.54	$28.37	$6.3	0.14%	($1.20)	$5.10	0.02%
N-6V	Siskiyou	$4.54	$28.37	$25.5	0.56%	($7.26)	$18.26	0.06%
N-6W	Siskiyou	$4.54	$28.37	$9.9	0.22%	($0.43)	$9.45	0.03%
N-6W	Siskiyou	$4.54	$28.37	$9.9	0.22%	($0.43)	$9.45	0.03%
N-6X	Siskiyou	$4.54	$28.37	$12.4	0.27%	($1.06)	$11.32	0.04%
N-6Y	Siskiyou	$4.54	$28.37	$10.7	0.24%	($2.71)	$7.99	0.03%
N-6Y	Siskiyou	$4.54	$28.37	$10.7	0.24%	($2.71)	$7.99	0.03%
N-6Z	Siskiyou	$4.54	$28.37	$17.2	0.38%	($0.58)	$16.62	0.06%

NA means Not Applicable
[a] From Table 3.8-8, column "Total Timber Revenue to Counties"

TABLE 1.2.3-4 (continued)
COMPARISON OF LOCAL TAXES GENERATED
TO COUNTY REVENUES

NUMBER	COUNTY	COUNTY PROPERTY TAX REVENUE ($ MILLIONS)	TOTAL COUNTY REVENUE ($ MILLIONS)	COTP PROPERTY TAXES ($ THOUSANDS)	PERCENT OF COUNTY PROPERTY TAX REVENUE	LESS: TIMBER REVENUE TO COUNTY [a] ($ THOUSANDS)	TOTAL TAX REVENUE ($ THOUSANDS)	PERCENT OF TOTAL COUNTY REVENUE
N-6ALT1	Various	NA	NA	$64.3	NA	($0.73)	$63.57	NA
N-6ALT1(1)	Klamath	$3.00	$21.00	$49.5	1.65%	($0.28)	$49.23	0.23%
N-6ALT1(2)	Siskiyou	$4.54	$28.37	$14.8	0.33%	($0.45)	$14.34	0.05%
N-7A	Siskiyou	$4.54	$28.37	$2.3	0.05%	($0.22)	$2.08	0.01%
N-7B	Siskiyou	$4.54	$28.37	$15.7	0.35%	($0.47)	$15.21	0.05%
N-7C	Siskiyou	$4.54	$28.37	$8.5	0.19%	($2.09)	$6.39	0.02%
N-7H1	Siskiyou	$4.54	$28.37	$23.3	0.51%	($2.84)	$20.46	0.07%
N-7H1	Siskiyou	$4.54	$28.37	$23.3	0.51%	($2.84)	$20.46	0.07%
N-7H1	Siskiyou	$4.54	$28.37	$23.3	0.51%	($2.84)	$20.46	0.07%
N-7H2	Various	NA	NA	$22.5	NA	($0.78)	$21.74	NA
N-7H2(1)	Siskiyou	$4.54	$28.37	$5.7	0.13%	$0.00	$5.71	0.02%
N-7H2(2)	Shasta	$10.41	$75.12	$16.8	0.16%	($0.64)	$16.17	0.02%
N-7I	Siskiyou	$4.54	$28.37	$16.9	0.37%	($2.78)	$14.09	0.05%
N-7J	Siskiyou	$4.54	$28.37	$3.0	0.07%	$0.00	$3.02	0.01%
N-7L	Siskiyou	$4.54	$28.37	$14.8	0.33%	($3.97)	$10.79	0.04%
N-7N	Various	NA	NA	$8.5	NA	($1.63)	$6.85	NA
N-7N(1)	Siskiyou	$4.54	$28.37	$6.2	0.14%	($1.25)	$4.92	0.02%
N-7N(2)	Shasta	$10.41	$75.12	$2.3	0.02%	($0.38)	$1.93	0.00%
N-7O	Various	NA	NA	$6.2	NA	($1.22)	$4.95	NA
N-7O(1)	Siskiyou	$4.54	$28.37	$2.0	0.04%	($0.75)	$1.24	0.00%
N-7O(2)	Shasta	$10.41	$75.12	$4.2	0.04%	($0.47)	$3.71	0.00%
N-7R	Shasta	$10.41	$75.12	$12.2	0.12%	($1.60)	$10.57	0.01%
N-7ALT1	Various	NA	NA	$26.3	NA	($2.31)	$23.99	NA
N-7ALT1(1)	Siskiyou	$4.54	$28.37	$5.4	0.12%	($2.31)	$3.09	0.01%
N-7ALT1(2)	Shasta	$10.41	$75.12	$20.9	0.20%	$0.00	$20.90	0.03%
N-8A	Shasta	$10.41	$75.12	$18.1	0.17%	($2.23)	$15.89	0.02%
N-8B	Shasta	$10.41	$75.12	$23.9	0.23%	($2.49)	$21.37	0.03%
N-8C	Shasta	$10.41	$75.12	$4.1	0.04%	$0.00	$4.09	0.01%
N-8D	Shasta	$10.41	$75.12	$19.0	0.18%	($0.01)	$18.95	0.03%
N-8E	Shasta	$10.41	$75.12	$18.4	0.18%	$0.00	$18.44	0.02%
N-8F	Shasta	$10.41	$75.12	$1.8	0.02%	$0.00	$1.79	0.00%
N-8G	Shasta	$10.41	$75.12	$5.7	0.05%	($0.16)	$5.53	0.01%
N-8Z	Shasta	$10.41	$75.12	$14.2	0.14%	($1.66)	$12.53	0.02%
N-8ALT1	Shasta	$10.41	$75.12	$10.4	0.10%	$0.00	$10.43	0.01%
N-8ALT2	Shasta	$10.41	$75.12	$13.7	0.13%	($0.57)	$13.16	0.02%
N-8ALT3	Shasta	$10.41	$75.12	$8.2	0.08%	$0.00	$8.19	0.01%
N-9A	Shasta	$10.41	$75.12	$3.9	0.04%	($0.84)	$3.03	0.00%
N-9B	Shasta	$10.41	$75.12	$3.3	0.03%	($0.81)	$2.45	0.00%
N-9C	Shasta	$10.41	$75.12	$6.6	0.06%	$0.00	$6.62	0.01%
N-9D	Shasta	$10.41	$75.12	$13.6	0.13%	$0.00	$13.58	0.02%
N-9G	Shasta	$10.41	$75.12	$3.7	0.04%	$0.00	$3.67	0.00%
N-9H	Shasta	$10.41	$75.12	$25.8	0.25%	$0.00	$25.76	0.03%
N-9I	Shasta	$10.41	$75.12	$26.6	0.26%	$0.00	$26.62	0.04%
N-9J	Shasta	$10.41	$75.12	$27.8	0.27%	$0.00	$27.83	0.04%
N-9K	Shasta	$10.41	$75.12	$3.9	0.04%	$0.00	$3.89	0.01%
N-9L	Shasta	$10.41	$75.12	$16.4	0.16%	($0.00)	$16.35	0.02%
N-9M	Shasta	$10.41	$75.12	$6.2	0.06%	$0.00	$6.21	0.01%
N-9N	Shasta	$10.41	$75.12	$2.5	0.02%	$0.00	$2.47	0.00%
N-9O	Shasta	$10.41	$75.12	$7.1	0.07%	$0.00	$7.11	0.01%
N-9Q	Shasta	$10.41	$75.12	$1.4	0.01%	$0.00	$1.36	0.00%
N-9S	Shasta	$10.41	$75.12	$3.0	0.03%	$0.00	$3.00	0.00%
N-10A	Klamath	$3.00	$21.00	$68.1	2.27%	($0.10)	$67.99	0.32%
N-10D	Modoc	$1.80	$7.90	$23.2	1.29%	$0.00	$23.23	0.29%
N-10E	Modoc	$1.80	$7.90	$1.8	0.10%	$0.00	$1.82	0.02%
N-10F	Modoc	$1.80	$7.90	$8.9	0.49%	$0.00	$8.87	0.11%
N-10G	Modoc	$1.80	$7.90	$8.4	0.47%	$0.00	$8.39	0.11%
N-10I	Modoc	$1.80	$7.90	$7.2	0.40%	$0.00	$7.20	0.09%
N-10J	Modoc	$1.80	$7.90	$5.6	0.31%	$0.00	$5.55	0.07%
N-10K	Modoc	$1.80	$7.90	$8.0	0.44%	$0.00	$7.96	0.10%
N-10L	Modoc	$1.80	$7.90	$12.0	0.67%	($0.06)	$11.97	0.15%
N-10M1	Modoc	$1.80	$7.90	$5.4	0.30%	($0.67)	$4.71	0.06%
N-10M2	Various	NA	NA	$61.8	NA	($2.47)	$59.28	NA
N-10M2(1)	Modoc	$1.80	$7.90	$28.0	1.55%	($0.42)	$27.54	0.35%
N-10M2(2)	Siskiyou	$4.54	$28.37	$32.5	0.72%	($2.18)	$30.31	0.11%
N-10M2(3)	Shasta	$10.41	$75.12	$1.3	0.01%	($0.14)	$1.16	0.00%

NA means Not Applicable
[a] From Table 3.8-8, column "Total Timber Revenue to Counties"

TABLE 1.2.3-4 (continued)
COMPARISON OF LOCAL TAXES GENERATED
TO COUNTY REVENUES

NUMBER	COUNTY	COUNTY PROPERTY TAX REVENUE ($ MILLIONS)	TOTAL COUNTY REVENUE ($ MILLIONS)	COTP PROPERTY TAXES ($ THOUSANDS)	PERCENT OF COUNTY PROPERTY TAX REVENUE	LESS: TIMBER REVENUE TO COUNTY [a] ($ THOUSANDS)	TOTAL TAX REVENUE ($ THOUSANDS)	PERCENT OF TOTAL COUNTY REVENUE
N-10ALT2	Modoc	$1.80	$7.90	$21.1	1.17%	$0.00	$21.11	0.27%
N-10ALT3	Modoc	$1.80	$7.90	$22.7	1.26%	$0.00	$22.68	0.29%
N-10ALT4	Modoc	$1.80	$7.90	$29.0	1.61%	$0.00	$28.99	0.37%
N-10ALT5	Various	NA	NA	$70.6	NA	($12.02)	$58.56	NA
N-10ALT5(1)	Modoc	$1.80	$7.90	$7.4	0.41%	($0.52)	$6.84	0.09%
N-10ALT5(2)	Siskiyou	$4.54	$28.37	$63.2	1.39%	($11.08)	$52.15	0.18%
N-11D	Shasta	$10.41	$75.12	$19.0	0.18%	$0.00	$19.02	0.03%
N-13A	Shasta	$10.41	$75.12	$11.2	0.11%	$0.00	$11.21	0.01%
S-1A	Various	NA	NA	$21.5	NA	$0.00	$21.51	NA
S-1A(1)	Tehama	$4.20	$24.94	$5.1	0.12%	$0.00	$5.08	0.02%
S-1A(2)	Glenn	$3.25	$14.47	$3.7	0.12%	$0.00	$3.74	0.03%
S-1A(3)	Colusa	$4.17	$11.86	$4.4	0.11%	$0.00	$4.44	0.04%
S-1A(4)	Yolo	$35.94	$65.11	$3.8	0.01%	$0.00	$3.79	0.01%
S-1A(5)	Solano	$27.66	$112.50	$4.5	0.02%	$0.00	$4.46	0.00%
S-8ALT2(1)	Contra Costa	$79.98	$321.13	$30.5	0.04%	$0.00	$30.47	0.01%
S-9D	Alameda	$109.60	$548.75	$3.1	0.00%	$0.00	$3.14	0.00%
S-9F	Alameda	$109.60	$548.75	$10.8	0.01%	$0.00	$10.75	0.00%
S-9H	Alameda	$109.60	$548.75	$0.9	0.00%	$0.00	$0.92	0.00%
S-8ALT2(2)	Alameda	$109.60	$548.75	$2.6	0.00%	$0.00	$2.59	0.00%
S-8B(1)	Contra Costa	$79.98	$321.13	$1.2	0.00%	$0.00	$1.19	0.00%
S-8B(2)	Sacramento	$79.88	$534.12	$0.5	0.00%	$0.00	$0.48	0.00%
S-8C(2)	Contra Costa	$79.98	$321.13	$2.3	0.00%	$0.00	$2.34	0.00%
S-8E1	Contra Costa	$79.98	$321.13	$16.9	0.02%	$0.00	$16.88	0.01%
S-8C(1)	Sacramento	$79.88	$534.12	$13.8	0.02%	$0.00	$13.83	0.00%
S-9D	Alameda	$109.60	$548.75	$3.1	0.00%	$0.00	$3.14	0.00%
S-9F	Alameda	$109.60	$548.75	$10.8	0.01%	$0.00	$10.75	0.00%
S-9H	Alameda	$109.60	$548.75	$0.9	0.00%	$0.00	$0.92	0.00%
S-8B(1)	Contra Costa	$79.98	$321.13	$1.2	0.00%	$0.00	$1.19	0.00%
S-8B(2)	Sacramento	$79.88	$534.12	$0.5	0.00%	$0.00	$0.48	0.00%
S-8C(2)	Contra Costa	$79.98	$321.13	$2.3	0.00%	$0.00	$2.34	0.00%
S-8E1	Contra Costa	$79.98	$321.13	$16.9	0.02%	$0.00	$16.88	0.01%
S-8E2	Contra Costa	$79.98	$321.13	$6.7	0.01%	$0.00	$6.67	0.00%
S-8H(1)	Contra Costa	$79.98	$321.13	$9.3	0.01%	$0.00	$9.28	0.00%
S-8J(1)	Contra Costa	$79.98	$321.13	$14.3	0.02%	$0.00	$14.34	0.00%
S-8C(1)	Sacramento	$79.88	$534.12	$13.8	0.02%	$0.00	$13.83	0.00%
S-8H(2)	San Joaquin	$40.14	$262.39	$3.5	0.01%	$0.00	$3.52	0.00%
S-8J(2)	San Joaquin	$40.14	$262.39	$12.0	0.03%	$0.00	$11.95	0.00%
S-9D	Alameda	$109.60	$548.75	$3.1	0.00%	$0.00	$3.14	0.00%
S-9F	Alameda	$109.60	$548.75	$10.8	0.01%	$0.00	$10.75	0.00%
S-9H	Alameda	$109.60	$548.75	$0.9	0.00%	$0.00	$0.92	0.00%
S-8B(1)	Contra Costa	$79.98	$321.13	$1.2	0.00%	$0.00	$1.19	0.00%
S-8B(2)	Sacramento	$79.88	$534.12	$0.5	0.00%	$0.00	$0.48	0.00%
S-8C(2)	Contra Costa	$79.98	$321.13	$2.3	0.00%	$0.00	$2.34	0.00%
S-8D(1)	Contra Costa	$79.98	$321.13	$27.4	0.03%	$0.00	$27.40	0.01%
S-8J(1)	Contra Costa	$79.98	$321.13	$14.3	0.02%	$0.00	$14.34	0.00%
S-8C(1)	Sacramento	$79.88	$534.12	$13.8	0.02%	$0.00	$13.83	0.00%
S-8D(2)	San Joaquin	$40.14	$262.39	$13.8	0.03%	$0.00	$13.82	0.01%
S-8I	San Joaquin	$40.14	$262.39	$6.5	0.02%	$0.00	$6.55	0.00%
S-8J(2)	San Joaquin	$40.14	$262.39	$12.0	0.03%	$0.00	$11.95	0.00%

NA means Not Applicable
[a] From Table 3.8-8, column "Total Timber Revenue to Counties"

Volume 2B - Los Banos-Gates Supporting Environmental Report

1.3 CHANGES TO THE DRAFT EIS/EIR VOLUME 2B - LOS BANOS-GATES SUPPORTING ENVIRONMENTAL REPORT

1. Page 2-1

   Paragraph 2, Line 16.
   Add: "of" after "50 MW"

2. Page 3.4-2

   Paragraph 4, Line 11.
   Add: "It is possible that Atriplex spinifera is present in the iodine salt bush complex, although it was not positively identified during the 1986 field surveys." after "present."

3. Page 3.4-6

   Paragraph 3, Lines 3 and 4.
   Delete the words: "only one" and "common".
   Change: "shrub" to "shrubs".
   Add: ", A. laniformis, and A. spinifera". after "polycarpa"

4. Page 3.4-6

   Add the following paragraph after paragraph 3:
   "Salt bushes provide significant wildlife habitat value, particularly for upland species nesting and cover. BLM, CBFG, and Fresno County Sports Club cooperate on a shrub enhancement program to replace shrubs lost to wildfires in the Panoche and Tumey Hills. Various species, including Atriplex polycarpa and A. laniformis are being re-established in the grasslands. In alcoline areas, A. spinifera is also encouraged because of its value to upland game. Soil surface treatment and installation of silt catchment basins are techniques used to promote shrub growth."

5. Page 3.5-6

   Add the following paragraph after paragraph 1:
   "The Panoche Hills area is considered an important wildlife area by the California Department of Fish and Game. In 1962 the federal land in this area was classified as the Panoche National Cooperative Land and Wildlife Management Area. With this classification, the land was withdrawn from possible trading or selling. The purpose of this designation was to manage this land area primarily for Chucker and Quail. Wildlife habitat improvements have been undertaken in this area.

   The Panoche Hills/Coalinga Area of Critical Environmental Concern will be managed according to guidelines and a management plan that is due to be released in April 1987. These areas were selected as Areas of Critical Environmental Concern because of the presence of the San Joaquin Kit Fox and the Blunt-nosed Leopard Lizard."

6. Page 3.10-7

   Add the following paragraph after paragraph 5:
   "As part of the adopted Holister Resource Management Plan (BLM, 1983) 18,000 acres of the Panoche Hills-Moreno formation was designated as a paleontological Area of Critical Environmental Concern (ACEC). Approximately 3 square miles of this area lies within the Western Los Banos-Gates transmission project. Of that, approximately 1,275 of the west alternative routes west-5 (363 acres), west-6 (363 acres), west-7 (548 acres) fall within the designated area. The ACEC designation does not include an area in which no development occurs; however, it does include a determination (of what special management) these paleontological resources required (BLM, 1983)."

7. Page 3.6-15

   Paragraph 3, Line 1.
   Change: "San Joaquin Pipeline Project" to "the San Joaquin Valley Pipeline Project".

8. Page 3.6-15

Paragraph 3, Line 8.
Delete: the sentence beginning "Environmental documentation...".
Add: the following sentence at the end of the paragraph: "An Environmental Impact Report has been prepared and approved by the State Lands Commission. The project is being put on hold until further notice. (John Lien, 1987)."

9. Page 4.2-1

Add the following paragraph after paragraph 5:
"Seismicity--Developing Maximum Probable Bedrock Acceleration (MPBA) for a project 84 miles in length is difficult because faults located at one end of the Project may have no influence on developing this parameter for the other end of the line. Within the level of detail warranted for this study, the only reasonable approach was to develop a generalized parameter. Looking at the MPBA for both the north and south portions of the Project, we found that in general, the MPBA falls in the range of 0.2g to 0.3g - based on Maximum Probable Earthquakes on faults located at both ends of the line. Since this range is below the critical value of 0.3g of above, as stated by PG&E, no special design criteria will be required."

10. Page 4.6-9

Paragraph 3, Line 2.
Change: "San Joaquin Pipeline" to "San Joaquin Valley Pipeline".

11. Page 4.8-5

Paragraph 2, Line 5.
Change: "workers commuted" to "commuters (140)".

12. Page 4.8-5

Paragraph 2, Line 7.
Change: "one" to "four"

13. Page 4.9-1

Add the following paragraph after paragraph 3:
"Concern regarding potential adverse health effects from electric and magnetic fields from overhead EHV transmission lines prompted the New York State Power Lines Project to fund several studies on both electric and magnetic fields and their effect on biological systems. A summary of the New York State Power Lines Project is included in Section 1.2.3 and in responses to comments L-330 F3 and SL-51 A."

14. Page 8-1

Paragraph 3, Line 1.
Add the following paragraph to replace bullet item 3: "Conduct site specific scoping session with the U. S. Fish and Wildlife Service and the California Department of Fish and Game as required under State and Federal Endangered Fish and Game Act. Consultation is needed to focus field studies, impact analyses, and mitigation assessments."

15. Page 8-7

Paragraph 6, Line 5.
Replace the sentence, "The number of..." with the following: "Nesting platforms would be determined in consultation with California Department of Fish and Game during the transmission line alignment analyses."

16. Page 8-7

Paragraph 10, Line 4.
Add: "and areas of low wildlife value." after "crops."

17. A report entitled, "South of Tesla Reinforcements for Deferral of the Los Banos-Gates Transmission Project," has been added. If the Los Banos-Gates Project is not constructed or is deferred, it may be necessary to make minor modifications to the transmission system south of Tesla.

SOUTH OF TESLA REINFORCEMENTS FOR
DEFERRAL OF THE LOS BANOS-GATES TRANSMISSION PROJECT

TABLE OF CONTENTS
SOUTH OF TESLA REINFORCEMENTS FOR
DEFERRAL OF THE LOS BANOS-GATES TRANSMISSION PROJECT

TABLE OF CONTENTS (CONTINUED)

1.0 Introduction

If a decision is made to defer the Los Banos-Gates Transmission Project, the transmission system south of Tesla Substation may have to be modified to support the increased power transfers resulting from the California-Oregon Transmission Project (COTP).

1.1 Purpose and Need

The new facilities and system modifications may be required to prevent overloading the Gates-Panoche 230 kV transmission line and to prevent instability in the event of a double circuit outage of the Tesla-Midway 500 kV lines. The required facilities will meet WSCC criteria for a double circuit outage.

2.0 Proposed Action

2.1 Description of Proposed Facilities

The following new facilities and system modifications would be required south of Tesla Substation if the Los Banos-Gates Project is deferred.

- Upgrade of existing 500 kV series capacitors in the Los Banos-Midway 500 kV transmission lines at Los Banos Substation.
- Reinforcement of the Gates-Panoche 230 kV Transmission Line. This requires the construction of an approximately 12.5-mile 70 kV wood pole line.
- Remedial action schemes for system disturbance at various locations.
- Possible installation of 500 kV shunt capacitors at existing substations to be determined, pending further studies.

2.1.1 Reinforcement of the Gates-Panoche Transmission Line

Two reinforcement alternatives were investigated as part of the deferral of Los Banos-Gates. The preferred alternative involves the reconnection of the Gates-Panoche 230 kV circuit No. 1, which is currently not operated at 230 kV. See Section 5.0 for a discussion of the rejected alternative and a comparison with the preferred alternative. The preferred alternative includes:

- Replacing circuit breaker No. 262 at Gates Substation and No. 232 at Panoche Substation and modifying the related protection.
- Reconductoring the Gates-Panoche No. 2 230 kV Transmission Line from Panoche Substation to Tower 43/206 (approximately 160 feet).
- Constructing a new 70 kV wood pole line approximately 12.5 miles long to relocate the existing Gates-Coalinga No. 2 70 kV circuit from its current position on the Gates-Panoche 230 kV transmission line between towers 0/1 and 9/40.
- Reconnecting the 230 kV line section between tower 0/1 and tower 13/65 thereby reestablishing the Gates-Panoche No. 1 230 kV circuit.
- Reconductoring the Gates-Panoche No. 2 230 kV Transmission Line from Gates Substation to Tower 0/1 (approximately 500 feet).
- Remedial action schemes for system disturbances may be needed at various locations.

The system reinforcement cost estimates contained in the transmission principles do not include voltage support facilities. This estimate could be subject to modification for the installation of voltage support facilities to the extent these costs are not covered under other projects.

2.1.2 New 70 kV Wood Pole Line for the Gates-Coalinga 70 kV No. 2 Circuit

Two route alternatives and one route variation were studied for the Gates-Coalinga 70 kV pole line. Overall, no one route is clearly superior to the others from an environmental standpoint. The preferred route, Route Alternative 1, is 12.5 miles in length. (See Figure 1.3-1) The route is located at the edge of fields and is oriented in cardinal directions. Except for three miles along El Dorado Avenue, a paved county road, the preferred route follows unpaved, private agricultural roads. Approximately 2.5 miles of the route contains existing distribution lines. These lines will be rebuilt with taller poles consolidating the existing distribution circuit with the new 70 kV transmission circuit. The height of the existing poles is 40-45 feet. The new poles will be 55-60 feet in height with the transmission circuit on the uppermost part of the pole. See Section 5.0 for a discussion of route alternatives not used and a comparison with the preferred route.

The preferred route runs west on PG&E property from the 70 kV portion of Gates Substation to Lake Avenue. (See Figure 1.3-2) At Lake Avenue it turns north and rebuilds an existing distribution pole line located along the east side of Lake Avenue. Lake Avenue is a private farm road. At Phelps Avenue, also a private farm road, the route turns west, crosses Interstate 5 rebuilding an existing distribution circuit, and continues to El Dorado Avenue.

At El Dorado Avenue, a 60-foot wide county road easement, the route turns north and parallels El Dorado generally on the west side, to Tornado Avenue, a private farm road. Franchise rights can be used for this three-mile segment. The preferred route turns west on the south side of Tornado Avenue and continues to Napa Avenue. At Napa Avenue the route turns north and parallels private farm roads until intersecting the existing Gates-Coalinga 70 kV pole line, which parallels the westerly side of Interstate 5. The length of the preferred route is 12.5 miles. Of the total length, approximately 2.5 miles is a rebuild of existing distribution lines.

2.2 Right-of-Way Acquisition

Following decisions by the lead agencies, the California Public Utilities Commission (CPUC) and the Participants, acquisition of land rights for the new line would be obtained. This would begin with a search of existing rights. These rights would be compared with the rights required for the line. If the existing rights were determined to be insufficient, new easement rights to build, operate, and maintain the transmission line would be acquired. A typical PG&E easement for the Gates-Coalinga 70 kV wood pole line alternative would consist of a 40-foot right-of-way for construction and operation of the 70 kV wood pole line. In the event it was determined the existing rights are sufficient for the line in its reconstructed form, property owners would be notified of PG&E's plans prior to any work on their property. Construction details would be coordinated with them.

2.3 Construction Practices

Gates-Coalinga 70 kV Wood Pole Line Alternative

2.3.1 Access Requirements

The preferred route for the 70 kV wood pole line is generally adjacent to farm roads, and access is readily available. Very little clearing will be required because construction and stringing will occur along the edges of fields.

2.3.2 Surveying

Surveying for construction of a 70 kV pole line includes property, right-of-way, ground profile, access road, and construction surveys. A typical survey crew includes three people. One crew would likely be needed to complete necessary surveying in one month, enabling design work to be completed on schedule. Follow-up surveys four to six months later will be needed to stake structure locations.

2.3.3 Clearing Requirements

Except for the temporary disruption of crop land during construction, clearing is not required for construction of a new 70 kV wood pole line. The grower would be compensated for the value of crops lost as a result of construction of the wood pole line.

2.3.4 Pole Installation

After the pole locations have been identified, the wood poles are transported to the right-of-way and the proper length and class of pole is delivered to each location. The appropriate insulator mounting hardware, insulators, and guys (if required) are mounted on the pole while it is laying on the ground. Holes for the poles are 2 to 3 feet in diameter and 8 to 12 feet deep and are dug by truck-mounted augers or in inaccessible locations are dug by hand. At the same time, anchors for the guys on the poles (if required) are installed by the same equipment that was used to auger the hole for the pole. A standard line construction truck with a derrick or a light crane is used to set the pole. After the pole has been set, soil removed from the hole is used as compacted backfill around the pole, and any guys are attached to anchors. Excess soil is removed from the site.

2.3.5 Conductor Installation

The slack stringing method would be used to install the 70 kV conductor. In this method, the conductor is pulled either by men, vehicle, tractor, or helicopter directly from a reel mounted on a trailer. At times, the conductor may come in contact with the ground or vegetation during the stringing operation. Clearance structures are installed at road and rail crossings and at locations where the conductor might otherwise contact electrical or communication facilities. The conductor is brought up to a precalculated tension and attached to the insulators.

2.3.6 Cleanup and Removal

Cleanup work includes the same tasks discussed in Section 2.3.8 of the Los Banos-Gates Transmission Project Environmental Report. The work is inspected for completion and standards compliance. Corrections are made accordingly.

2.4 Construction Schedule, Cost, and Work Force

Gates-Coalinga 70 kV Wood Pole Line Alternative

Schedule - Figure 1.3-3 presents the project schedule showing the relationship of engineering and design, land acquisition, and construction. Substation improvements will take approximately 24 months, from July 1989 to July 1991. Construction of the 70 kV wood pole line will take about six months from January 1991 to July 1991. Operation of the project is scheduled for July 1991.

Project Cost - The preliminary gross financial cost for the substation and transmission reinforcements is $9,800,000 in 1991 dollars.

Work Force - The work force during construction will consist of a Heavy Line Crew of 10 people for 3 months.

2.5 Operation and maintenance Practices

2.5.1 Operational Characteristics and Procedures

When completed, the transmission line would be energized and operated at a nominal voltage of 70 kV, plus or minus 5 percent. Changes in load flow would cause minor fluctuations in the actual operating voltage. System dispatchers in power control centers direct the day-to-day scheduling and equipment operation by supervisory control to operate, maintain, and protect the system. Circuit breakers will operate automatically in an emergency to help ensure the safety of the system.

2.5.2 Right-of-Way Use

Land use activities within and adjacent to the transmission line right-of-way would be permitted within the terms of the easement. Farming and grazing are generally encouraged within the right-of-way if appropriate precautions are observed. (See Appendix M in Section 1.6 of the Final EIS/EIR.) Incompatible activities within the right-of-way include construction of buildings, drilling of wells, growing of trees which may interfere with line operation, or other activities that may compromise safety. If necessary, appropriate techniques would be used within the right-of-way to control vegetation that might interfere with reliable service.

2.5.3 Maintenance Practices

A maintenance program would be established to ensure continued reliable service of the transmission system. The proposed transmission line structures and rights-of-way would be inspected annually by air patrol and foot or vehicle patrol. Repairs would be made if the transmission line were damaged. Maintenance crews of fewer than 10 persons would use tools, trucks, support vehicles, aerial lift trucks, cranes, and other equipment necessary for repairing and maintaining insulators, conductors, and structures.

3.0 Environmental Setting

The project study area is located in the western portion of the San Joaquin Valley in Fresno County, California. (See Figure 1.3-4) The northern terminus is the Panoche Substation, located approximately 2-1/4 miles east of Interstate 5 and 1-1/2 miles south of Panoche Creek. The southern terminus is the Gates Substation, which is approximately 14 miles east of Coalinga. Agriculture is the predominate land use. Other land uses include rural residential and agricultural operations areas; commercial areas along Interstate 5; oil and gas development and associated operations; and linear features such as transportation systems, transmission lines, pipelines, and water conveyance systems.

For a detailed discussion of natural and human resources in the project vicinity, please see Section 3.0 Affected Environment in the Los Banos-Gates Transmission Project Environmental Report.

4.0 Environmental Consequences and Mitigation

Section 4.0 presents a discussion of the environmental consequences that would result if the Los Banos-Gates Project were deferred and the Proposed Action was implemented. Potential impacts resulting from construction and operation of the project are discussed for each resource area. Where it is appropriate, measures to reduce or avoid impacts are suggested for adoption.

4.1 Climate and Air Quality

4.1.1 Climate

If the Los Banos-Gates Project is deferred and other facilities are required, their construction would not have a significant short-term impact on local or regional climate. Therefore, no mitigation is required.

4.1.2 Air Quality

No significant long-term impacts resulting from the operation of facilities related to the Proposed Action will occur if the Los Banos-Gates Project is deferred. During construction of the Gates-Coalinga 70 kV wood pole line, the air quality mitigation controls proposed for the Los Banos-Gates Project will be used.

4.2 Earth Resources

This section describes the potential hazards or impacts that could result from construction activities and operation of other facilities should the Los Banos-Gates Project be deferred. These include soil erosion, soil compaction and soil horizon mixing, slope instability, and soil hydrocompaction. The discussion focuses on the level and significance of potential hazards or impacts and identifies mitigation measures that can be applied to avoid or minimize environmental effects.

4.2.1 Seismicity

Ground Shaking

Fault displacement causes earthquakes that result in ground shaking within a region. The severity of ground shaking at a given location is strongly influenced by the earthquake magnitude, the distance from the fault, and the ground conditions at the location being shaken. Maximum probable peak ground accelerations for the project area may reach the range of 0.3g to 0.6g.

The construction and operation of any facilities will be designed to withstand expected significant ground accelerations.

Fault Rupture

A fault rupture hazard is considered to be present if the project crosses the known or suspected surface trace of an active fault. This situation does not occur. Therefore, there is no known fault rupture hazard to the project. Appendix H, Earth Resources Technical Report, of the Los Banos-Gates 500-kV Transmission Project Environmental Report and Technical Appendices (September 1986) provides a more detailed discussion of earth resources in the project vicinity.

4.2.2 Soils

Construction activities can result in soil erosion, even in areas not having high erosion potential. Removal of vegetation and disturbance of the upper soil horizon for construction of pulling sites and staging areas can result in increased erosion potential during and immediately following construction. The facilities required if the Los Banos-Gates Project is deferred are not located in highly erodible areas. Most construction is limited to existing substations, minimizing soil impacts to the construction of the Gates-Coalinga wood pole line. At Los Gatos Creek a slight erosion potential exists where the preferred route crosses the creek. The erosion control measures proposed for the Los Banos-Gates Project will be used where applicable to control erosion.

Soil compaction (densification of soil structure) would result from the operation of heavy equipment on roads, construction sites, and staging areas. Compaction would reduce the infiltration rate and water-holding capacity of the soils, increase runoff and erosion, and adversely affect the success of revegetation efforts. During construction applicable mitigation measures proposed for the Los Banos-Gates Project will be used.

4.2.3 Slope Stability

Construction in hilly terrain has the potential for creating unstable conditions on slopes that may lead to failures such as landsliding or slumping.

Construction of the facilities required if the Los Banos-Gates Project is deferred are located on relatively flat ground. Where the wood pole line crosses Arroyo Pasajero, the poles will be placed to span the arroyo to avoid potentially unstable slopes.

4.2.4 Soil Hydrocompaction

Construction of any facilities required if the Los Banos-Gates Project is deferred would not occur in areas of potential soil hydrocompaction. Therefore, no mitigation measures are necessary.

4.2.5 Mineral, Oil and Gas Resources

Any facilities required if the Los Banos-Gates Project is deferred would not be located on any known mineral deposits. Undeveloped oil and gas resources may underlie portions of the preferred route. Most of the construction activity would be concentrated in existing substations. The preferred route for the Gates-Coalinga 70 kV wood pole line would follow an existing road network.

4.3 Water Resources

The chief source of impacts on water quality is erosion resulting from physical disturbance of stream banks and stream beds at water crossings by construction equipment. Any facilities required if the Los Banos-Gates Project is deferred are generally located near substations and away from streams with exceptions of Los Gatos and Zapato Chino Creeks. The Gates-Coalinga 70 kV wood pole line construction should not affect water quality in these creeks if erosion control measures proposed for the Los Banos-Gates Project are utilized.

4.4 Vegetation

4.4.1 Potential Impacts to Vegetation Resources

Construction and operation of any facilities required if the Los Banos-Gates Project is deferred would not affect any native plant communities or any rare plants. Most construction activities would occur within existing substation boundaries. Potential impacts of the Gates-Coalinga 70 kV wood pole line include temporary and permanent removal of vegetation, disturbance of sensitive plant communities, and disturbance of special status plants. In general, the construction and operation of a pole line requires considerably less ground disturbance than a tower line. Permanent vegetation loss for the preferred route would be negligible.

4.4.2 Potential Site-Specific Impacts

In the preferred route, construction of a wood pole line along the east side of El Dorado Avenue may disturb some vegetation at the Los Gatos Creek crossing, although it is unlikely that tree removal would be necessary. Los Gatos Creek on the west side of El Dorado Avenue is highly disturbed, and construction activities at this site are unlikely to cause any noticeable further disturbance. Sensitive plant species that potentially occur in the project vicinity are described in Section 3.4, Volume 2B, of the COTP and Los Banos-Gates Transmission Project Draft EIS/EIR (November 1986). Four species from Table 3.4-3 are likely to occur in the Project area.

The riparian zone of Los Gatos Creek provides marginal habitat for the Slough thistle (Cirsium crassicaule) and Sanfords arrowhead (Sagittaria sanfordii). If present, they could be disturbed by construction activities. Congdon's eatonella (Eatonella congdonii) and California jewelflower (Caulanthus californicus) are potentially present in uncultivated upland portions of the route. Construction activities could disturb these plants.

4.4.3 Impact Avoidance and Mitigation

The following mitigation measures will prevent or minimize impacts of the 70 kV wood pole line construction.

- Conduct surveys for sensitive plants prior to selection of the final alignment and pole sites.
- Protect any rare plants from construction activities. Specific protection measures should be prescribed on a case-by-case basis.
- Avoid disturbing riparian vegetation during construction near Los Gatos Creek.

4.5 Wildlife

4.5.1 Potential Impacts to Wildlife Resources

The facilities required if the Los Banos-Gates Project is deferred will be located primarily within existing substations. Potential impacts of the construction and operation of the Gates-Coalinga 70 kV wood pole line include temporary disturbances of wildlife habitat and disturbance of sensitive wildlife species. Permanent loss of wildlife habitat will be limited to the immediate pole sites.

4.5.2 Potential Site-Specific Impacts

The grasslands and scrub lands along the preferred route provide good habitat for kit foxes and may also support the following sensitive species: San Joaquin antelope squirrel, blunt-nosed leopard lizard, pocket mouse, and giant kangaroo rat. A significant number of kit fox sightings and dens have been reported from the vicinity of the project. Construction could potentially disturb kit fox dens or burrows used by sensitive rodents or blunt-nosed leopard lizards.

The Los Gatos Creek crossing for the preferred route is highly disturbed. Aside from potential impacts to sensitive species mentioned above, the project is not expected to cause further impacts to wildlife resources at this crossing.

4.5.3 Impact Avoidance and Mitigation

The following measures will prevent or minimize impacts to wildlife resources from the Gates-Coalinga 70 kV wood pole line construction:

- Conduct surveys for sensitive wildlife prior to selection of the final alignment and pole sites.
- Protect any active kit fox dens or locations for blunt-nosed leopard lizards or sensitive rodents from construction activities. Specific protection measures should be prescribed on a case-by-case basis.
- Avoid disturbing streamside vegetation during construction near Los Gatos Creek.
- Conduct surveys in the vicinity of substations where new facilities are required.

4.6 Land Use and Status

This section addresses potential impacts on current and planned land use which would result if the Los Banos-Gates Project were deferred and the Proposed Action was implemented.

4.6.1 Land Ownership/Jurisdiction

The proposed project will have no effect on land ownership or jurisdiction. Right-of-way easements will be acquired through negotiation with the landowners. No additional land rights are required for facilities located within existing substations. A three-mile segment of the preferred route along El Dorado Avenue can be constructed using existing franchise rights. It will be necessary to acquire right-of-way easements for other portions of the Gates-Coalinga 70 kV wood pole line. These will be acquired through negotiation with the landowners.

4.6.2 Public Plans and Policies

Potential impacts on public plans and policies can occur when a proposed project is inconsistent with applicable general and regional plans. Construction and operation of any facilities associated with the deferral of the Los Banos-Gates Project would not conflict with or be inconsistent with any established federal, state, or local plans and policies. PG&E will consult with Fresno County officials during the planning of the 70 kV wood pole line and determine the need for local review.

4.6.3 Existing Uses

Most of the facilities required if the Los Banos-Gates Project is deferred are located within existing substations. For the Gates-Coalinga 70 kV wood pole line, the Fresno County General Plan designates the land use along the preferred route as agricultural. Land use along the preferred route includes grain/hay fields, irrigated crops, and agricultural-related areas. Land uses in the vicinity of the preferred route include oil and agricultural operations areas, Interstate 5, and the Harris Ranch Airport.

A major advantage to the selection of the preferred route is that it would allow an existing segment of the Gates-Coalinga 70 kV pole line within the FAA notification zone of the Harris Ranch Airport to be removed, thereby improving the compatibility of the existing Gates-Coalinga pole line with the Harris Ranch Airport.

The preferred route does not bisect agricultural fields, but follows the existing road network. This would eliminate the need for access roads associated with construction of the 70 kV wood pole line. The route crosses Interstate 5 at Phelps Avenue.

4.6.4 Agriculture

Impacts to agricultural resources were determined by identifying typical cropping patterns along the preferred route, developed from the 1986 California Department of Water Resources Guijarral Hills Land Use Map and from a field survey conducted in the area. Principal agricultural uses along the Preferred Route are cotton, lettuce, tomatoes, grain, and native vegetation, which represent a majority of the land uses, followed by fallow field crop land, non-irrigated grain, pistachios, idle land, and carrots.

Transmission line impacts have been separated into short- and long-term impacts. Short-term impacts occur solely as a result of construction activity. Some short-term impacts may affect farming operations and crop yields only during the construction period, while other short-term impacts may affect crop production for 2-12 years after construction depending on crop type, the effects of soil compaction, perennial crop re-establishment, and tree crop recovery from pruning.

Because all construction activity along the preferred route will be conducted within the confines of existing farm roads, it is estimated that there will be no significant impacts to agricultural resources caused by short-term construction activities. Construction conducted along farm roads has the potential to increase the costs related to equipment operations for the short-term. However, PG&E expects construction activity that would interfere with field operations at any one site to be relatively brief and transitory in nature. As a result, the probability of construction activity occurring at the same time as field equipment operations at any one site is estimated to be very low.

Long-term impacts are those expected to affect various agricultural resources during the entire life of the proposed 70 kV wood pole line.

Since all transmission line structures will be sited on field boundaries and will be single wood poles, it is estimated that there will be no significant impacts to agricultural resources caused by long-term operation. However, the proposed transmission line will have an impact on agricultural aircraft operations along specific sections of the preferred route.

As obstacles to normal agricultural aircraft operations, transmission poles and lines increase flying time and the amount of material required to adequately treat (e.g., spray, seed, fertilize, apply dry materials) a particular field. Clean-up passes are normally required around towers and may be required between towers.

Previous studies and experiences have shown that growers have generally been charged for additional materials expended in performing clean-up passes around transmission lines but not for any additional flying time required. As a result, the estimated cost of additional aerial applications in this analysis is based on estimated additional material costs only. Costs are calculated for a 50-year period and expressed in construction-year dollars using a four percent discount rate. Using these computation assumptions construction and operation of the pole line on the preferred route would result in a cost discounted to the present of $105,986 on agricultural aircraft operations. Compensation for this increased cost of agriculture aircraft operations will be included in right-of-way compensation. (Please see Appendix M, Final EIS/EIR, Volume 1, COTP for a more detailed discussion of agricultural impacts.)

4.6.5 Recreation

The construction and operation of any facilities required if the Los Banos-Gates Project is deferred will not impact any recreational activities. Most construction activity will be within existing substations, away from recreation areas.

4.6.6 Population

If the Los Banos-Gates Project is deferred, construction and operation of any facilities required would cause no temporary or permanent population increase in the local or regional area. All members of the construction crew will be PG&E employees drawn from offices within the PG&E system. There would be no new employment by PG&E.

4.6.7 Economics

The construction and operation of the facilities required if the Los Banos-Gates Project is deferred will not create a significant impact on the regional economy within the area. Approximate total cost of the Gates-Coalinga 70 kV wood pole line alternative is $9,800,000. Construction crews will use equipment already owned by PG&E or purchased from PG&E's regular suppliers.

4.6.8 Community Values

If the Los Banos-Gates Project is deferred, no impact is expected with construction and operation of any facilities required. The number of crew workers will be small and is not expected to create community value conflicts.

4.7 Visual Resources

Most of the construction facilities required if the Los Banos-Gates Project is deferred will take place within existing substations. However, the Gates-Coalinga 70 kV wood pole line would be 60 feet in height and constructed directly adjacent to the road network. A visual resource assessment was prepared based on the Bureau of Land Management Visual Resources Management System and a modification of the scenic quality unit classification developed for the Los Banos-Gates Project. The preferred route lies with LB-G Scenic Quality Unit 3, San Joaquin Farm, and BLM Scenic Quality Unit 4, Coalinga.

This area is composed primarily of flat agricultural lands with long range views and few visually dominant man-made features. Pole line construction activities would reduce the scenic quality of both units because it would add additional man-made features that would be in contrast to the flat horizontal planes of the agricultural fields. (See Figures 1.3-5 and 1.3-6) The preferred route primarily follows lightly traveled private roads, and the area is sparsely inhabited. The visual impact would be minimal. During construction applicable visual resource mitigation measures proposed for the Los Banos-Gates Project will be used.

4.8 Cultural Resources

4.8.1 Archaeological and Historical Resources

The records of the California Archaeological Inventory, Central San Joaquin Valley Information Center at California State College, Bakersfield, were examined. The results of this records check for the Gates-Coalinga 70 kV wood pole line alternative revealed no recorded cultural resources within the project boundaries. However, only a small portion of the proposed project areas has been systematically examined for cultural resources (Maniery 1987).

Based on the cultural resource feasibility study (Maniery 1987) for the 70 kV wood pole line construction, the probability of locating sites is low to moderate. The exception of this is in areas where the proposed project crosses the Los Gatos and Zapato Creek drainages. These areas are considered moderate to high sensitivity. The majority of the project area has been highly disturbed by agricultural practices (fields and roads).

An archaeological survey will be conducted of all impact areas prior to construction of the Gates-Coalinga 70 kV wood pole line. If cultural resources sites are located, avoidance and protection will be the first priority action. For those sites which cannot be avoided through project modification, the sites will be evaluated for their eligibility to the National Register of Historic Places and appropriately mitigated.

4.8.2 Ethnographic/Native American Resources

Native American consultation will be included as part of the inventory of cultural resource values of the project. Native American input will also be included as part of any mitigation of significant cultural resources which would be impacted by the project.

4.8.3 Paleontological Resources

The 70 kV wood pole line alternative is not within any known areas with potential to contain paleontological resources (Maniery 1987). In the event a paleontological resource is encountered during construction, project activity in the immediate area of the find will be halted. A qualified paleontologist will be called to remove the specimen. The specimen will be curated at an appropriate institution.

5.0 Transmission Alternatives Eliminated from Detailed Consideration

5.1 Reinforcement of the Gates-Panoche 230 kV No. 2 Transmission Line

An alternative to reestablishing the Gates-Panoche No. 1 230 kV circuit between Tower 9/40 and Gates Substation is to reconductor nine miles of the Gates-Panoche No. 2 circuit between Tower 9/40 and Gates Substation. This alternative does not require a new wood pole line for the Gates-Coalinga No. 2 70 kV circuit which would continue to use the Gates-Panoche No. 1 circuit between Gates Substation and Tower 9/40.

Reconductoring the Gates-Panoche No. 2 circuit with larger conductor to increase its capacity would cost an estimated $11,000,000 as contrasted with $9,800,000 to construct the Gates-Coalinga 70 kV wood pole line alternative.

The nine-mile segment of the Gates-Panoche No. 2 230 kV Transmission Line that would need to be reconductored is located primarily in the middle of intensively cultivated agricultural fields. To maintain the conductor-to-ground clearances required by the CPUC's "Rules for Overhead Electric Line Construction, General Order No. 95," it will be necessary to raise the height of each tower. This would be accomplished by constructing new concrete footings approximately 30 to 50 feet ahead or behind the existing towers. A new lattice steel tower section 15 to 20 feet in height would be constructed on top of the new concrete footings. The existing tower would then be unbolted from its existing concrete base and relocated to the top of the new steel section. The abandoned concrete footings would be removed to a depth so that they will not interfere with farming operations. Temporary access roads to the existing and new tower locations would be required for the proposed modifications. A work force of up to 50 people would require approximately four to five months to complete the work.

This alternative was rejected because construction would require extensive disruption of agricultural operations within fields crossed by the tower line.

Approximately 20 acres of crops would be heavily impacted during tower raising. An additional 9 acres of crops would be temporarily impacted by access roads to the tower sites. After construction is complete, the productivity of the crop land impacted by construction and access would be restored. New long-term impacts would therefore be insignificant. The insignificance of long-term impact is essentially offset by the severity of the short-term impacts on agriculture. Thus, this alternative offers no advantage over the preferred Gates-Coalinga 70 kV wood pole alternative.

5.2 Gates-Coalinga 70 kV Wood Pole Line

Two route alternatives (the preferred route and Route Alternative 2) and one route variation (Route Alternative 1A) were considered for the Gates-Coalinga 70 kV wood pole line. The preferred route was selected over Route Alternative 2 because it creates an opportunity to remove a segment of the existing Coalinga-Gates 70 kV pole line between Tower 9/40 and the intersection of Interstate 5 and El Dorado Avenue. This existing segment is located in the FAA notification zone of Harris Ranch Airport. Its removal will improve the compatibility of the existing Gates-Coalinga 70 kV pole line with the Harris Ranch Airport. Route Alternative 2 does, however, contain more existing distribution line that could be overbuilt by the new 70 kV line.

Route Alternative 1 was chosen over Route Alternative 1A because it avoids conflicts with the El Dorado Avenue overpass, and it minimizes views from Interstate 5, a designated scenic highway. Table 1.3-1 compares the route alternatives studied.

The following is a description of the Route Alternative 2 and Route Alternative 1A. Also see Figure 1.3-2.

Route Alternative 2

Route Alternative 2 runs westerly from Gates Substation as described for the Preferred Route. At Lake Avenue, Route Alternative 2 turns north and would be consolidated with a distribution pole line along the east side of Lake Avenue. Lake Avenue is a private farm road. The alternative continues north to Mitchell Avenue, then turns westerly and continues along the south side of Mitchell Avenue. The alternative connects to the existing Gates-Coalinga 70 kV circuit near Tower 9/40 on the Gates-Panoche 230 kV line. The length of Route Alternative 2 is 11.4 miles. Of the total length, approximately 8.25 miles would be consolidated with existing distribution pole lines. The alternative, however, runs through an intensively farmed area.

Route Alternative 1A

Route Alternative 1A is a variation of the Preferred Route. Beginning at Gates Substation, it travels on the same route as the Preferred Route to the intersection of El Dorado and Tornado Avenues. From this point, Route Alternative 1A continues north along El Dorado Avenue until El Dorado curves to the west for an overcrossing of Interstate 5. The route parallels a section line, then turns northwesterly along the west side of Highway 5. The route crosses the El Dorado overpass. Taller poles will be required to clear the overpass. Continuing parallel to Interstate 5, Route Alternative 1A connects with the existing Gates-Coalinga 70 kV pole line. The length of Route Alternative 1A is 11.4 miles. Of the total length, approximately 2.5 miles would rebuild existing distribution pole lines.

SOUTH OF TESLA REINFORCEMENTS
FOR
DEFERRAL OF THE LOS BANOS-GATES TRANSMISSION PROJECT
PROJECT VICINITY

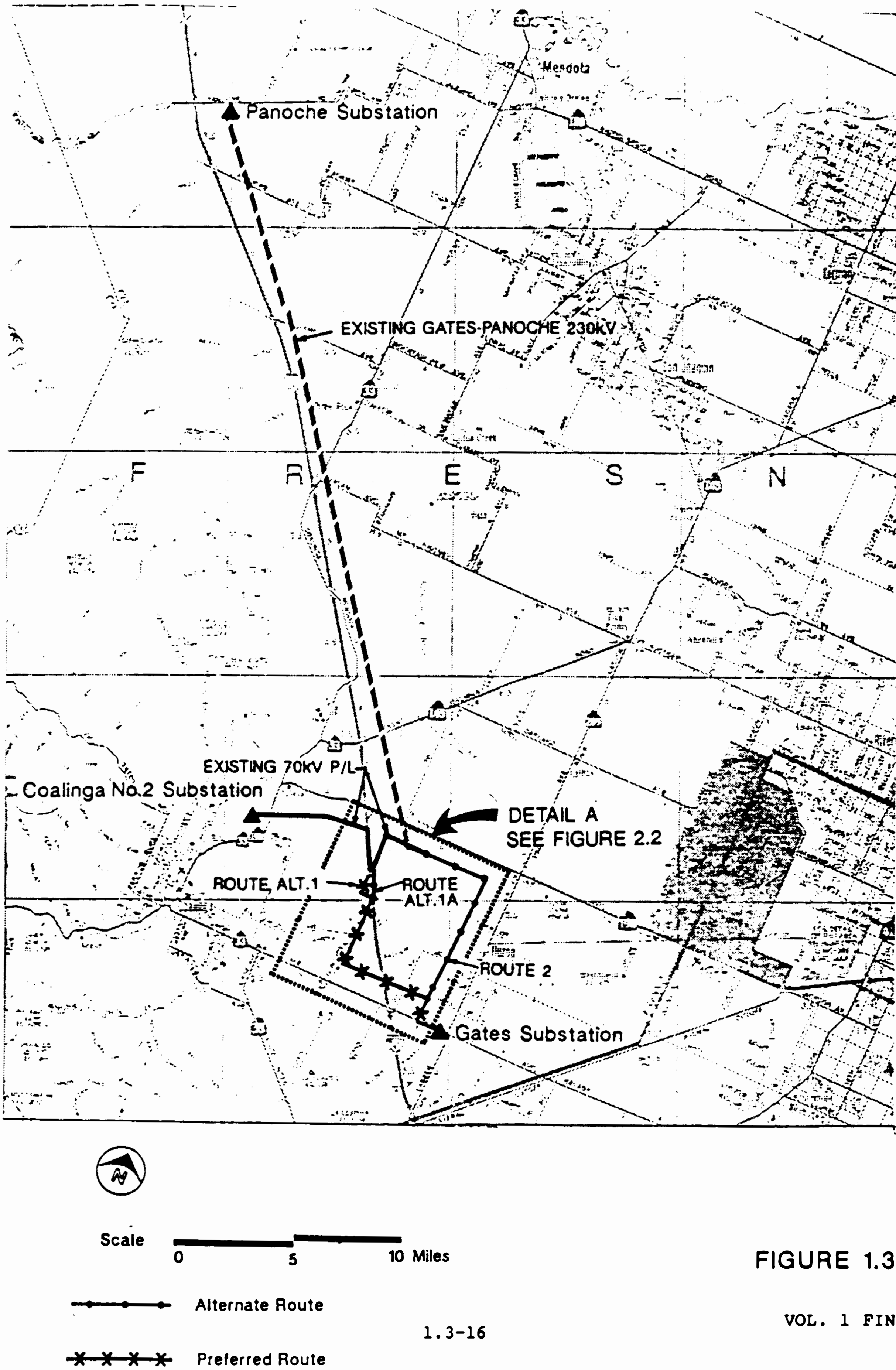


FIGURE 1.3-1

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SOUTH OF TESLA REINFORCEMENTS FOR DEFERRAL OF THE LOS BANOS-GATES TRANSMISSION PROJECT

DETAIL A

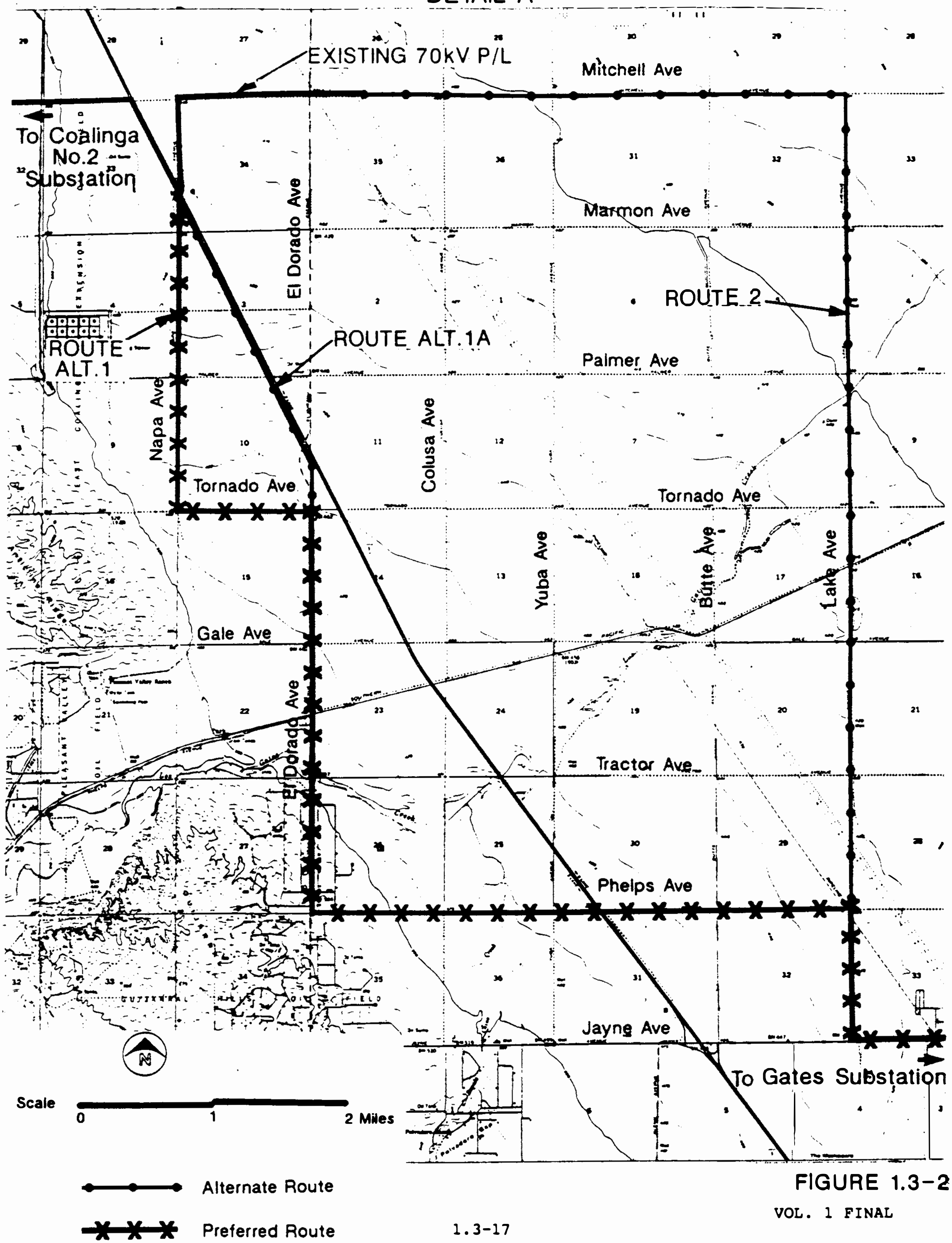

FIGURE 1.3-2

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SOUTH OF TESLA REINFORCEMENTS
FOR
DEFERRAL OF THE LOS BANOS-GATES TRANSMISSION PROJECT

PROJECT SCHEDULE

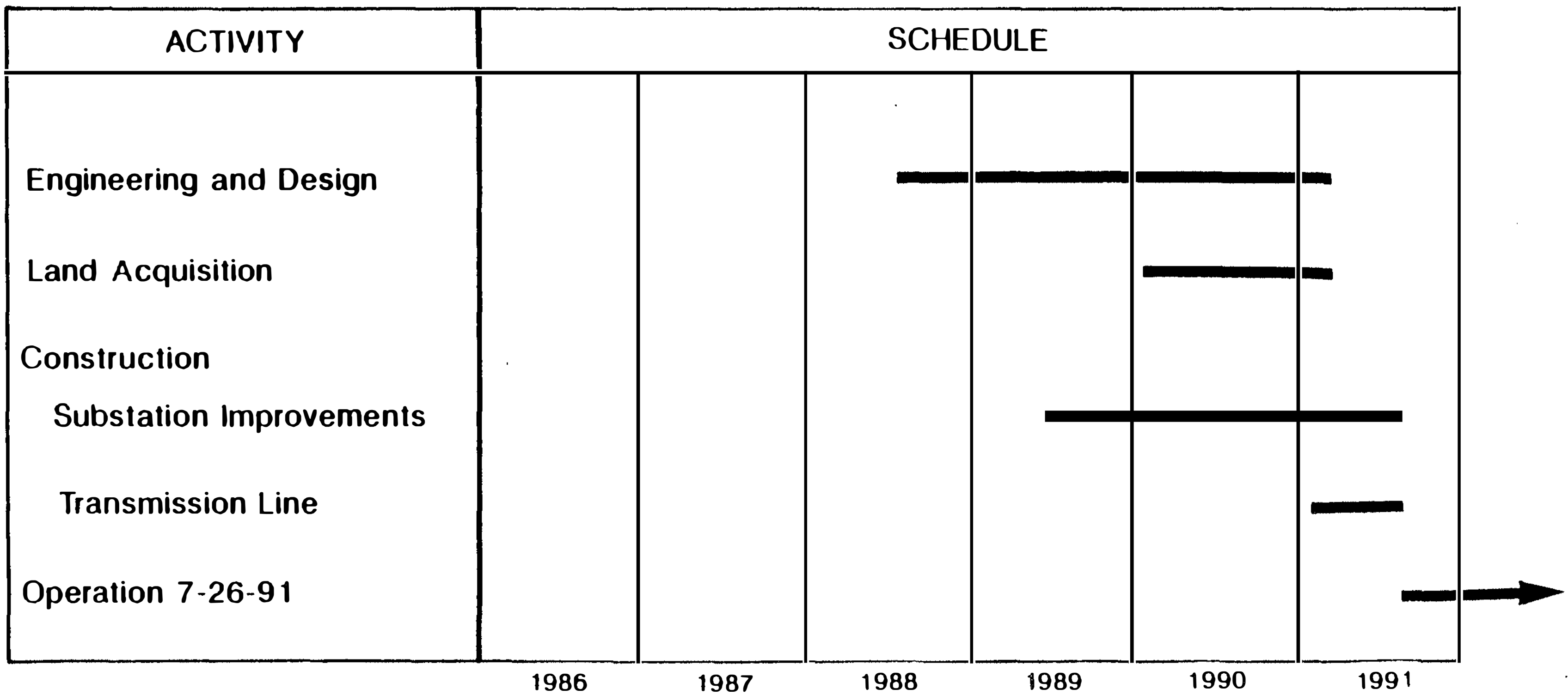

FIGURE 1.3-3

SOUTH OF TESLA REINFORCEMENTS
FOR
DEFERRAL OF THE LOS BANOS-GATES TRANSMISSION PROJECT
REGIONAL LOCATION MAP

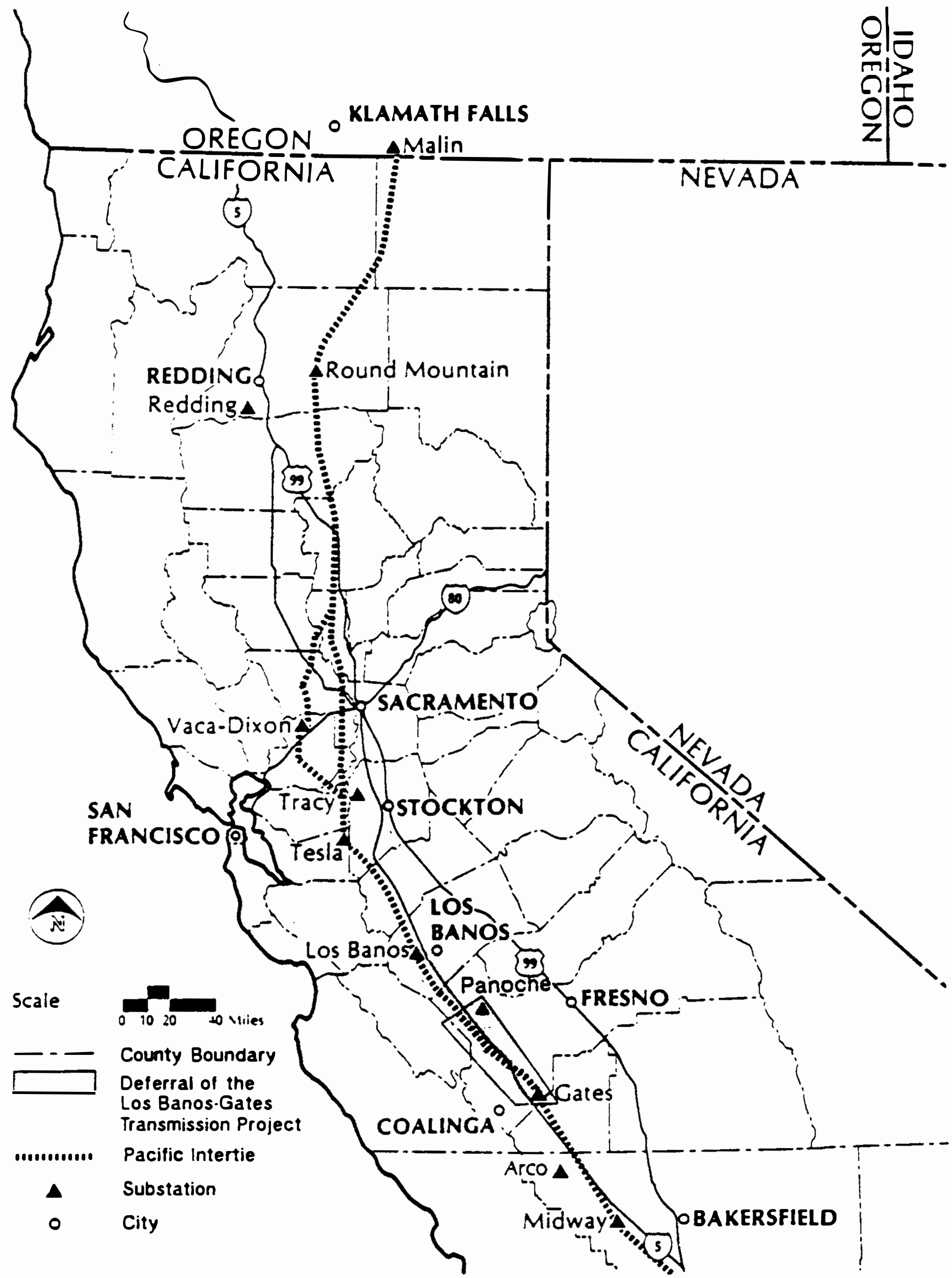

FIGURE 1.3-4

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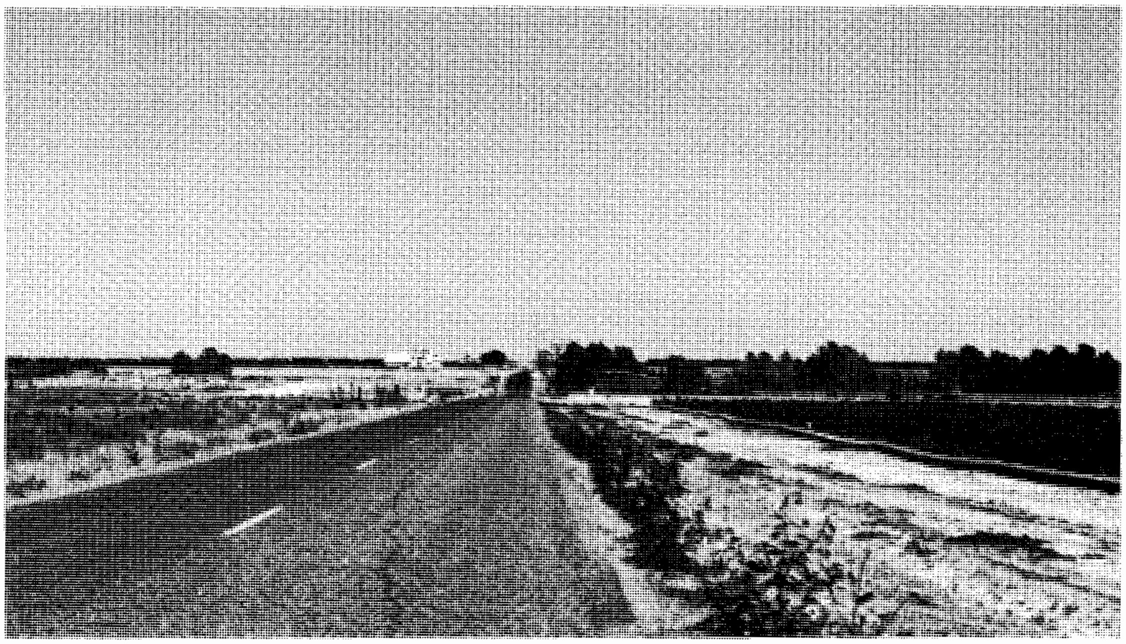
FIGURE 1.3-5

EXISTING

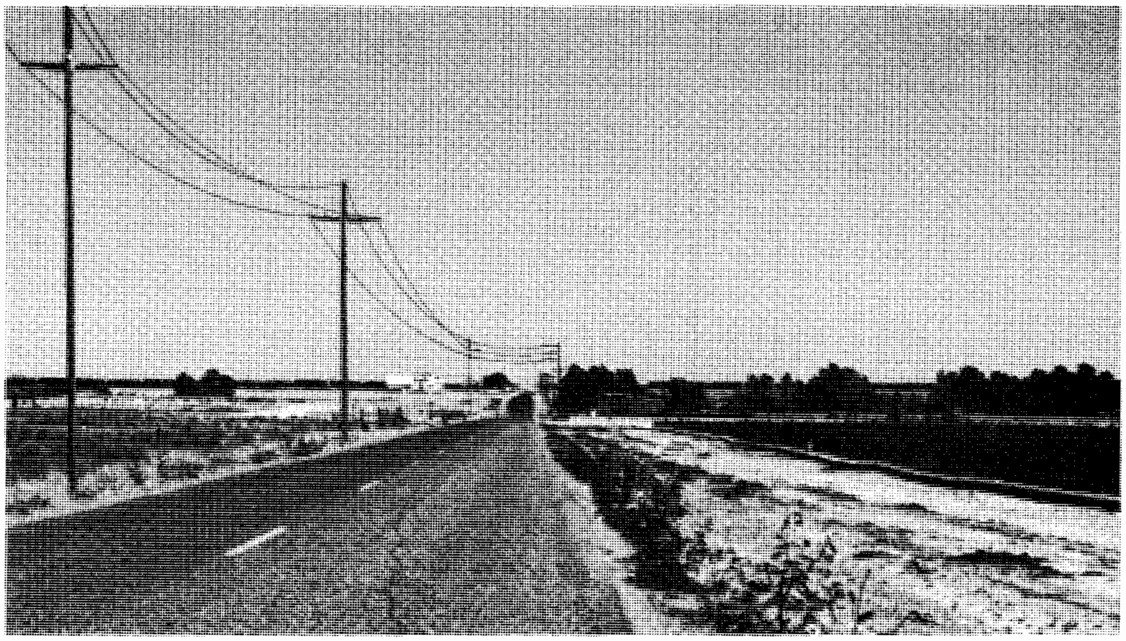
PROPOSED CONSTRUCTION OF 70 KV WOOD POLE LINE

PHELPS AVENUE - LOOKING EAST

FIGURE 1.3-6



EXISTING



PROPOSED CONSTRUCTION OF 70 KV WOOD POLE LINE

EL DORADO AVENUE - LOOKING NORTH

TABLE 1.3-1

COMPARISON OF 70 kV
ROUTE ALTERNATIVES

Factor	Preferred Route	Route 2	Route 1A
Engineering:			
Length (Miles)	12.5	11.4	11.4
Consolidation with Distribution (Miles)	2.5	8.25	2.5
Miles in Franchise	3	0	3
Environmental:			
Biology	Insignificant 1/	Insignificant 1/	Insignificant 1/
Visual	Insignificant	Insignificant	Parallels Interstate 5 for 2.60 miles, a designated scenic highway.
Cultural Resources	Low to moderate potential	Low to moderate potential	Low to moderate potential
Land Use	Reduces number of poles in FAA Notification Zone for Harris Ranch Airport.	Does not eliminate any poles in FAA Notification Zone for Harris Ranch Airport.	Reduces number of poles in FAA Notification Zone for Harris Ranch Airport.
Agricultural	Poles located on edge of fields; has most impact on agricultural aircraft operations.	Poles located on edge of fields; has least impact on agricultural aircraft operations.	Poles located on edge of fields; has less impact on agricultural aircraft than the Preferred Alternative.

1/ Assumes recommended mitigation measures are used.

Volume 2C - Pacific Northwest Reinforcement Project Supporting Environmental Report

1.4 CHANGES TO THE DRAFT EIS/EIR VOLUME 2C - PACIFIC NORTHWEST REINFORCEMENT PROJECT SUPPORTING ENVIRONMENTAL REPORT

1. Summary

Environmental Consequences

Replace paragraph 3 with the following paragraph:
"Review of cultural resource literature in consultation with the Oregon State Historic Preservation Office have shown that in all areas, except for Marcola Substation site and the Grizzly-Malin loop-in, intensive research recorded no important sites, and none are likely to be found. No sites have been recorded at Marcola Substation area and the Grizzly-Malin loop-in. However, it is highly possible that significant sites may be present. Therefore, BPA will conduct cultural resource investigations of these areas before construction begins."

2. Page 2

Add the following paragraphs after paragraph 4:
"The preferred options indicated by (p) on Table 1.4-1 are based on a Preliminary Plan of Service, and may change once the Final Plan of Service is decided upon by BPA, PGE, and PP&L. Final options chosen will be identified in BPA's Record of Decision for the Project.

The plan of service has progressed so that it is now preferred not to eliminate either of BPA's or PGE's Sand Spring, Fort Rock, and Sycan series compensation stations. At Sand Spring, the preferred option is to replace both BPA's and PGE's series capacitor banks. It is also preferred to install a new BPA series compensation station at Sand Spring for the Grizzly-Summer Lake circuit. At Sycan, the preferred option is to replace both BPA's and PGE's series capacitor banks. It is also preferred to install a new BPA series compensation station at Sycan for the Summer Lake-Malin circuit. Environmental Impacts of the preferred options will be the same as stated in this report."

3. Page 11

Paragraph 3, Line 1 and 2
Replace the sentence, "Under Option C,..." with the following: "Option C would loop BPA's Grizzly-Malin 500 kV line into the proposed Southern Oregon Substation Site E3. Site E3 (Figure 1.1.2-4 in this document) is located about 2,400 feet north of Site E2 within the proposed Southern Oregon site area identified in Figure 10 of Volume 2C of the Draft EIS/EIR. The loop into Site E3 would be a double-circuit line (approximately 1.5 miles) using lattice steel towers. 1-1/2 miles of new access road construction would be needed along the right-of-way.

This option will also require looping in the Malin-Meridian 500 kV line since Site E3 is located 2,400 feet away from the line. The Malin-Meridian loop-in may involve single- or double-circuit line construction, and require access roads.

Option D - Under Option D, the Grizzly-Malin line would not be looped into the Southern Oregon Substation."

4. Page 6

Table 1 has been revised and is presented as Table 1.1.2-2 in Section 1.1.2.

Volume 3A - COTP Technical Appendices

1.5 CHANGES TO VOLUME 3A OF THE DRAFT EIS/EIR

There have been a number of changes to the data and analyses presented in Volume 3A of the Draft EIS/EIR. This section of the Final EIS/EIR documents those changes.

The sections of Volume 3A updated by information in Section 1.5 are listed below:

Volume 3A Section	Final EIS/EIR Section
Appendix A: COTP Design, Construction, and Operation and Maintenance Characteristics	1.5.1 Appendix A: COTP Design, Construction, and Operation and Maintenance Characteristics
Appendix B: Evaluation of the Economic Benefits of the COTP	1.5.2 Appendix B: Evaluation of the Economic Benefits of the COTP
Appendix C: Substation and Related Facilities Siting Report	1.5.3 Appendix C: Substation and Related Facilities Siting Report
Appendix D: Summary of Intertie Development and Use EIS	1.5.4 Appendix D: Summary of Intertie Development and Use EIS
Appendix E: Wetlands and Floodplains Crossed by the Preferred Alternative	1.5.5 Appendix E: Wetlands and Floodplains Crossed by the Preferred Alternative
	1.5.6 Additional COTP Technical Appendices

1.5.1 CHANGES TO THE DRAFT EIS/EIR VOLUME 3A APPENDIX A - COTP DESIGN, CONSTRUCTION, AND OPERATION AND MAINTENANCE CHARACTERISTICS

1. Page A-1

Add the following at the end of paragraph 2:

"In addition studies have shown that a simultaneous outage of the COTP and one existing AC Intertie line North of Round Mountain substation would cause an overload condition to exist on the remaining existing AC Intertie line. This overload condition would cause the third line to trip within a short time, which would result in the same impact as a simultaneous three line outage. However, the COTP by itself can withstand a simultaneous outage of both existing Intertie lines. This factor provides additional reasons to retain sufficient separation between COTP and either or both of the existing Intertie lines."

2. Page A-2

In Section A.2 of the Draft EIS/EIR, the design characteristics of the California-Oregon Transmission Project were summarized in Table A-1. Table 1.5.1-1 updates Table A-1 and includes design refinements developed since circulation of the Draft EIS/EIR. Figure A-1 in the Draft EIS/EIR was a schematic one-line diagram of the COTP revised as of November 21, 1986. A revised COTP one-line diagram is included in this Final EIS/EIR as Figure 1.5.1-1.

3. Page A-2

Paragraph 3, Line 2.
Add the following paragraph after "Table A-1.":

"Calculations for temporary construction impacts for tower assembly sites were assumed to be 100' x 100'. Further design indicates that the area needed for tower assembly may be up to 200' x 200'. This will increase the affected area up to 0.7 acre per tower assembly site."

4. Page A-2

Paragraph 1, Lines 7-10
Replace the last two sentences with the following:

"Approximately ten percent of the existing towers on the upgrade section will need to be either relocated along the existing right-of-way, or will require modifications to their foundations. South of the Sacramento River, angle structures will be of the upgrade design, and the remaining structures will be either the upgrade lattice-type design or a single-circuit H-frame structure." The tower types are illustrated in revised Figures 1.1.2-2 and 1.1.2-3.

The Draft EIS/EIR notes that typical tower-to-tower spans are anticipated to range from approximately 1,100 to 1,400 feet. Typical tower heights would normally range from 125 to 140 feet. Deadend towers at substations, heavily loaded tower locations, some angle positions, and at specific utility crossings (for added safety) would be lattice towers similar to suspension-type towers with different insulation systems and added tower weight to withstand greater longitudinal and transverse loadings."

5. Page A-6

Paragraph 1, Line 4.
Change: "28" to "32".

6. Page A-7

Paragraph 1, Line 2.
Add the following paragraph after "Table A-1":

"Calculations for temporary construction impacts for tower assembly sites were assumed to be 100' x 100'. Further design indicates that the area needed for tower assembly is 200' x 200'. The larger area of impact anticipated with the 200' x 200' tower assembly sites will increase the affected area. This amounts to .7 acre per tower assembly site."

7. Page A-7

Paragraph 1, Line 8.
Add the following paragraph after "line.":

"In addition to clearing the right-of-way by removing trees and brush within and adjacent to the right-of-way that could interfere with surveying, electrical clearance, line reliability, and construction, maintenance, and safe operation of the transmission line, additional clearing in forested areas in the form of fuel management may be required in sections where the COTP transmission line and the existing AC intertie lines are in close proximity. This additional fuel-management activity will be undertaken to improve the line reliability. Fuel-management activity will involve the removal of trees and brush within the fuel-management area. In addition, it is mentioned that non-merchantable slash would either be removed, burned in an approved manner, chipped or left for wildlife cover. This action could also apply to merchantable materials other than just slash."

8. Page A-7

Paragraph 3, Lines 1 and 2.
It is also mentioned that prior to construction of the line, temporary staging areas or constructions yards of approximately five acres would be established at 20- to 30-mile intervals along the transmission line route. These temporary staging areas could also be established during the construction of the line as the line construction progresses. Therefore, these constructions areas would be established prior to and during construction.

9. Page A-10

Add: the additions presented in Table 1.5.1-2 to Table A-2.

10. Page A-10

Table A-2, Line 11 (N-10M1), Column 16
Change: "$16,375" to $1,313"

11. Page A-11

Paragraph 4, Line 6.
The construction of temporary roads across cultivated areas is mentioned and the intent is that all existing roads in cultivated areas would be left in a condition equal to or better than their condition prior to the construction of the transmission line.

12. Page A-11

Paragraph 1, Line 8.
Add the following after "dowel.":
"One additional type of foundation, the poured-in place foundation, should be added to the types that are under consideration."

13. Page A-13

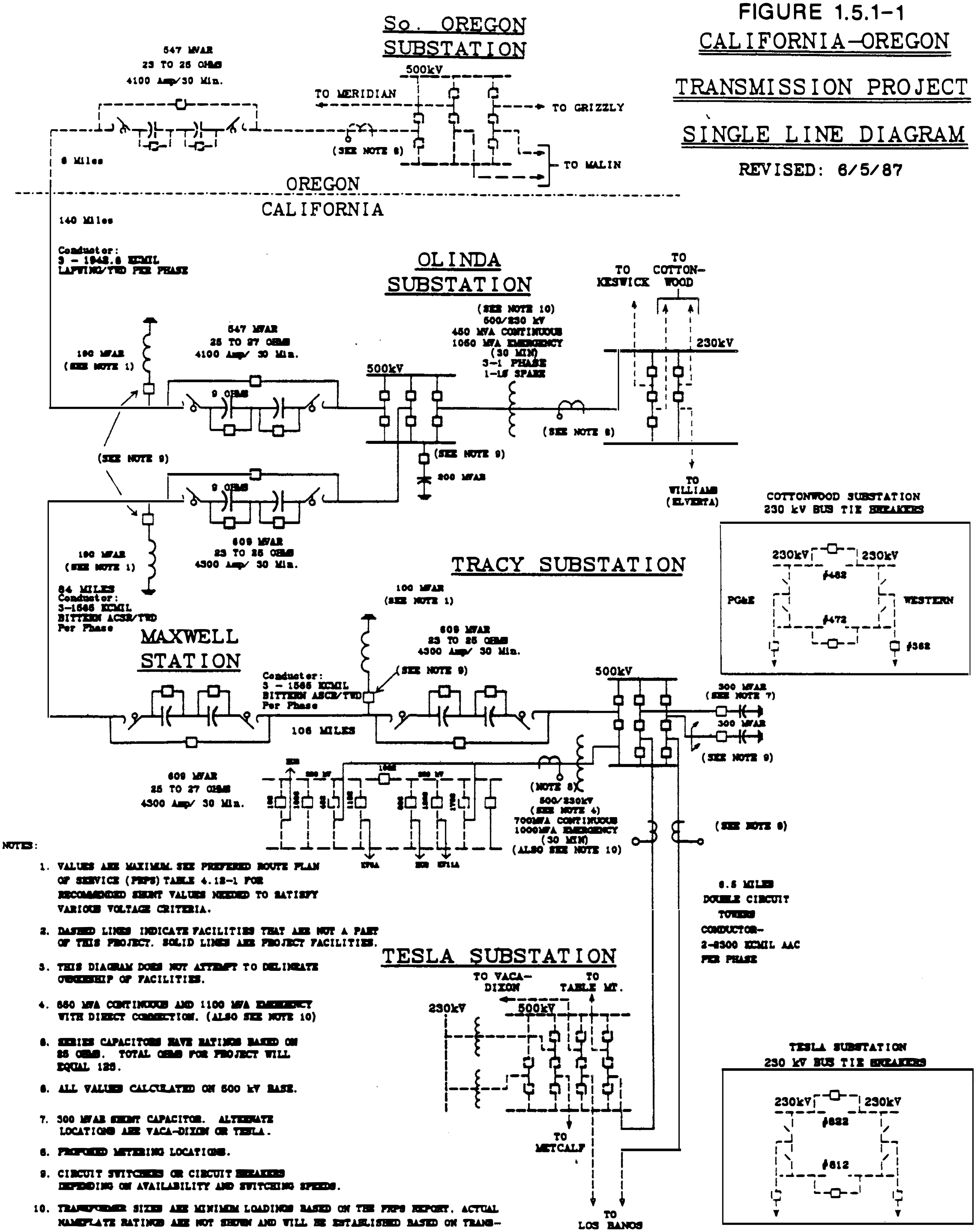
Line 5.
It should be noted that disturbed areas <u>outside croplands</u> would be seeded and fertilized with desirable grass species to establish groundcover and minimize soil erosion, in order to clarify the areas to be seeded.

14. Page A-13

The discussion in the Draft EIS/EIR of reliability of the lines in forest-fire areas indicates that separation of five miles or more would be required in the forested areas of southeastern Siskiyou and southwestern Modoc Counties where the rate of spread of a forest fire may threaten all three transmission lines. As a result of further discussions and work with the U. S. Forest Service, it has been determined that closer alignments to the existing Intertie lines in these fire areas are possible when accompanied by appropriate fuel-management practices.

FIGURE 1.5.1-1
CALIFORNIA–OREGON TRANSMISSION PROJECT SINGLE LINE DIAGRAM

REVISED: 6/5/87



NOTES:

1. VALUES ARE MAXIMUM. SEE PREFERRED ROUTE PLAN OF SERVICE (PRPS) TABLE 4.12-1 FOR RECOMMENDED SHUNT VALUES NEEDED TO SATISFY VARIOUS VOLTAGE CRITERIA.
2. DASHED LINES INDICATE FACILITIES THAT ARE NOT A PART OF THIS PROJECT. SOLID LINES ARE PROJECT FACILITIES.
3. THIS DIAGRAM DOES NOT ATTEMPT TO DELINEATE OWNERSHIP OF FACILITIES.
4. 850 MVA CONTINUOUS AND 1100 MVA EMERGENCY WITH DIRECT CONNECTION. (ALSO SEE NOTE 10)
5. SERIES CAPACITORS HAVE RATINGS BASED ON 25 OHMS. TOTAL OHMS FOR PROJECT WILL EQUAL 125.
6. ALL VALUES CALCULATED ON 500 kV BASE.
7. 300 MVAR SHUNT CAPACITOR. ALTERNATE LOCATIONS ARE VACA-DIXON OR TESLA.
8. PROPOSED METERING LOCATIONS.
9. CIRCUIT SWITCHERS OR CIRCUIT BREAKERS DEPENDING ON AVAILABILITY AND SWITCHING SPEEDS.
10. TRANSFORMER SIZES ARE MINIMUM LOADINGS BASED ON THE PRPS REPORT. ACTUAL NAMEPLATE RATINGS ARE NOT SHOWN AND WILL BE ESTABLISHED BASED ON TRANSFORMER DESIGNS AND PARTICIPANT CONTRACTUAL REQUIREMENTS.

TABLE 1.5.1-1
DESIGN CHARACTERISTICS OF THE COTP 500 kV TRANSMISSION LINE

Line Length	Approximately 340 miles
New line length	Approximately 150 miles
Upgrade line length	Approximately 190 miles*
Type of Structure	Steel lattice towers
Structure Height	Approximately 125 to 140 feet
Structure Base	35 x 35 feet approximate outside dimension
Span Length	1,100 to 1,400 feet (1,200 feet average)
Number of Structures per Mile	4 to 5 (4.3 average)
Right-of-Way Width	125 to 200 feet
Land Temporarily Disturbed:	
Tower Assembly Site	200 x 200 feet (0.9 acre)
Wire-Pulling Sites	200 x 200 feet (0.9 acre) per 2 miles
Wire-Splicing Sites	75 x 50 feet (0.09 acre) per 2 miles
Construction Yards	400 x 500 feet (5 acres) per 20 to 30 miles
Batch Plants/Concrete	1 to 2 acres per 20 to 30 miles
Conductor Tensioning and	200 x 300 feet (1.4 acres) per 2 miles Pull Sites
Land Permanently Impacted:	
Tower Base	35 x 35 feet approximately dimension (0.028 acre)
Access Road (approximate acres per mile of transmission line):	
a. New Roads Required	2.7 acres
b. Upgrade Existing Roads	1.8 acres
Voltage	525,000 volts (525 kV) AC, +/- 5%
Capacity	1,600-1,700 MW CA-OR border to Redding area 1,900-2,200 MW Redding area to Tracy Substation
Circuit Configuration - AC	Single circuit per structure north of Tracy Substation and single or double circuit per structure south of Tracy Substation, two or three sub-conductor bundle per phase with three phases.
Approximate Electric Field at Edge of Right-of-Way	2 kV/m for Upgrade)
Approximate Magnetic Field at Edge of Right-of-Way	0.08G (0.13G for Upgrade)

* Approximately 20 miles of the upgrade line between the Sacramento River and the Tracy Substation would involve either relocation or new construction and new right-of-way.

TABLE 1.5.1-2
TABLE A-2 ADDITIONS

Number	Corridor Name	Length	Row Required: Width (feet)	Row Required: New Row (acres)	Access Roads: Upgraded (miles)	Access Roads: New (miles)	Miles of Forest	% Access Rd. in Forested Row	Clearing: Access Roads	Clearing: Row	Type of Structure	Design: Number	Design: Area Occupied by Structures	Design: Other Construction Sites	Estimated Construction Costs
North 1	Newell	9.70	200	235	N/A	14.68	3.3	.83	35.59	60.0	Horizontal steel lattice	43	1.20	N/A	$3,545
North 2A	Newell	5.20	200	128	N/A	7.20	2.6	.87	23.08	60.0	Horizontal steel lattice	23	.64	N/A	2,203
North 2B	Newell	9.10	200	221	N/A	11.00	7.5	.87	26.67	136.4	Horizontal steel lattice	40	1.12	N/A	3,084
North 2C	Newell	5.10	200	124	N/A	6.16	5.2	.87	4.93	94.5	Horizontal steel lattice	22	.63	N/A	1,728
N-10 M2(A1)	Newell	8.70	200	211	N/A	10.44	7.2	.89	25.30	130.91	Horizontal steel lattice	38	1.07	N/A	12,948
N-10 M2(A)	Newell	14.10	200	342	N/A	22.56	8.0	.89	54.69	145.5	Horizontal steel lattice	62	1.74	N/A	5,972
N-10 M2(B)	Newell	5.20	200	126	N/A	6.57	4.6	.89	15.93	83.64	Horizontal steel lattice	23	.64	N/A	2,203
N-10 Alt.5 (A1)	Newell	4.10	200	99	N/A	4.97	4.1	.89	12.05	74.51	Horizontal steel lattice	18	.51	N/A	1,389
N-10 Alt.5 (A)	Newell	26.00	200	629	N/A	31.60	25.1	.85	76.61	456.38	Horizontal steel lattice	114	2.70	N/A	7,421
N-10 Alt.5 (B)	Newell	3.40	200	82	N/A	5.62	3.4	.85	13.62	60.08	Horizontal steel lattice	15	.64	N/A	1,152
N-10 Alt.5 (C)	Newell	4.10	200	99	N/A	5.90	4.1	.85	14.30	75.50	Horizontal steel lattice	18	.51	N/A	1,507
N-10 Alt.5 (D)	Newell	2.70	200	68	N/A	16.97	7.4	.85	16.88	—	Horizontal steel lattice	12	1.08	N/A	5,747
North 3A(2)	Bartle	4.45	200	108	N/A	7.11	7.6	.85	17.24	80.91	Horizontal steel lattice	20	.64	N/A	1,635
North 3J	Bartle	8.70	200	211	N/A	18.48	8.1	.75	44.80	147.27	Horizontal steel lattice	38	1.06	N/A	3,197
North 3K	Bartle	2.40	200	58	N/A	6.52	2.4	.78	15.81	43.64	Horizontal steel lattice	11	.30	N/A	882
N-7 Alt.1(A)	Bartle	2.50	200	61	N/A	3.59	2.5	.75	8.70	45.50	Horizontal steel lattice	11	.31	N/A	919
N-7 Alt.1(B)	Bartle	.69	200	17	N/A	1.81	.7	.75	4.39	12.54	Horizontal steel lattice	3	.09	N/A	254
N-7 Alt.1(C)	Bartle	8.56	200	207	N/A	18.04	8.8	.75	43.33	155.64	Horizontal steel lattice	37	1.05	N/A	3,146
N-7 M2(A)	Bartle	6.28	200	152	N/A	14.89	6.3	.82	36.10	106.91	Horizontal steel lattice	28	.91	N/A	2,308
N-7 M2(B)	Bartle	1.10	200	26	N/A	2.53	1.1	.82	6.13	20.00	Horizontal steel lattice	5	.14	N/A	404
N-8A	Bartle	.50	200	12	N/A	1.15	.5	.75	2.79	9.1	Horizontal steel lattice	2	.06	N/A	323
N-8A(1)	Bartle	1.25	200	30	N/A	3.36	1.3	.75	8.15	22.73	Horizontal steel lattice	6	.18	N/A	807
N-8A(2)	Bartle	.25	200	6	N/A	.58	1.5	.75	1.41	4.55	Horizontal steel lattice	1	.18	N/A	882
N-8A(3)	Bartle	4.85	200	118	N/A	9.96	3.8	.75	24.13	61.17	Horizontal steel lattice	22	.63	N/A	2,408
North 4	Pit River	4.60	200	112	N/A	8.08	4.4	.88	19.59	80.00	Horizontal steel lattice	20	.57	N/A	2,962
N-8 Alt.2	Pit River	.70	200	17	N/A	1.96	.7	.90	4.75	12.50	Horizontal steel lattice	2	.09	N/A	451
N-8 Alt.2(A)	Pit River	4.50	200	109	N/A	10.99	4.3	.90	16.68	51.25	Horizontal steel lattice	19	.61	N/A	2,898
South 1	Delta	9.50	200	230	0	0	0	0	0	0	Horizontal Steel Lattice	42		N/A	$6,737
South 2	Delta	4.15	200	101	0	0	0	0	0	0	Horizontal Steel Lattice	18		N/A	$2,720
S-8E1	Delta	3.00	200	73	0	0	0	0	0	0	Horizontal Steel Lattice	13		N/A	$1,850
S-8E1(A)	Delta	3.51	200	84	0	0	0	0	0	0	Horizontal Steel Lattice	16		N/A	$2,268
S-8J	Delta	5.06	200	122	0	0	0	0	0	0	Horizontal Steel Lattice	22		N/A	$3,616
S-8J(1)	Delta	.58	200	13	0	0	0	0	0	0	Horizontal Steel Lattice	2		N/A	$474
S-8J(2)	Delta	2.60	200	63	0	0	0	0	0	0	Horizontal Steel Lattice	11		N/A	$1,838
S-8A1L3	Delta	2.96	200	72	0	0	0	0	0	0	Horizontal Steel Lattice	13		N/A	$1,855
S-9G(1)	Tesla	3.42	200	95	0	0	0	0	0	0	Horizontal Steel Lattice	17		N/A	$2,648
S-9G	Tesla	1.60	200	39	0	0	0	0	0	0	Horizontal Steel Lattice	9		/A	$323

1.5.2 CHANGES TO THE DRAFT EIS/EIR VOLUME 3A APPENDIX B - EVALUATION OF THE ECONOMIC BENEFITS OF THE COTP

1. Page 49

   Table 6-2, First Line of Data.
   Before the 1986 data, add the line:
   "1985 (1) 39324 (1) (1) 201353 (1)"

2. Page 49

   Table 6-2, Last Line of Data.
   At the bottom of the table, add the note:
   "(1) The high, medium, and low forecasts begin with the same values for peak demand and energy in 1985. The average growth rates are calculated between 1985 and 2004."

3. Page 113

   Figure A-4(c):
   Change labels on the bar graph:
   From "E1" to "D-E1",
   From "E2" to "D-E2",
   From "E3" to "D-E3",
   From "E4" to "D-E4", and
   From "E5" to "D-E5".

4. Page 117

   Line 16, Equation 1.
   Change from: "Pe = 0.21 Ph (1/.4) (0.32 Pc + 0.43 Pg)"
   To: "Pe = 0.21 Ph + (1/.4) (0.32 Pc + 0.43 Pg)"

5. Page 132

   Last Line.
   Change from: "EFOR=(2) times [1 - EFOR(1)]"
   To: "EFOR(2) times [1 - EFOR(1)]"

1.5.3 CHANGES TO THE DRAFT EIS/EIR VOLUME 3A APPENDIX C - SUBSTATION AND RELATED FACILITIES SITING REPORT

An additional site (E3) for the Southern Oregon Switching Station was identified and analyzed in the Supplement to the Draft EIS/EIR, Section 2.1. It has been identified as the preferred site for this switching station. See Section 1.1.2 and Figure 1.1.2-4 of this document for information on this site.

1.5.4 CHANGES TO THE DRAFT EIS/EIR VOLUME 3A APPENDIX D - SUMMARY OF INTERTIE DEVELOPMENT AND USE EIS

1. A report entitled "Summary of Intertie Development and Use EIS" has been added.

SUMMARY OF INTERTIE DEVELOPMENT AND USE EIS

SUMMARY OF INTERTIE DEVELOPMENT AND USE EIS

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TABLE OF CONTENTS
(CONTINUED)

TABLES

SUMMARY OF INTERTIE DEVELOPMENT AND USE EIS

1. Introduction

The Intertie Development and Use (IDU) Environmental Impact Statement (EIS) identifies and evaluates the potential environmental effects of three Bonneville Power Administration (BPA) actions, each with several alternatives. The first action is to increase the capacity of the Pacific Northwest/Pacific Southwest Intertie (Intertie). The second is to implement a policy for allocating access to the BPA-controlled share of the Intertie. The third action is to consummate Firm Marketing arrangements with the Pacific Southwest. For a discussion of the interrelationship between the IDU and COTP EIS's, refer to the Foreword of the COTP EIS/EIR, page vii.

2. Purpose and Need

The need for the proposed BPA actions is to enable short- and long-term contractual sales and transfers of Federal power that is surplus to the BPA Administrator's requirements for Pacific Northwest (PNW) loads, and to manage other interregional transfers of surplus power between the PNW and the Pacific Southwest (PSW) over the BPA-controlled portion of the Intertie. These actions may include: (1) Intertie capacity upgrades; (2) adoption of a Long-Term Intertie Access Policy (LTIAP) that will address short-term and long-term transmission of Federal and non-Federal surplus power over the Intertie; and, (3) implementing Firm Marketing arrangements. Purposes of the Intertie capacity upgrades, LTIAP, and Firm Marketing arrangements, are listed below.

The purposes of Intertie upgrades are to:

- enhance economic and operational efficiency;
- support acceptable environmental quality;
- increase system flexibility and reliability;
- increase the ability to deliver surplus power during times when the surplus is most valuable to the importing region; and
- achieve consistency with other National environmental policies.

The purposes the Administrator will consider in developing the Intertie Access Policy are to:

- enhance BPA's ability to repay the U.S. Treasury for the Federal investment in a timely manner;
- support acceptable environmental quality;
- support the Administrator's ability to maintain reasonable power rates for BPA's wholesale customers in the PNW;
- allocate equitably access to Intertie capacity in excess of that the Administrator determines is required for BPA use;
- provide an opportunity for long-term assured access to enable long-term firm power or firm capacity transactions; and
- achieve consistency with other National environmental policies.

The purposes of developing Firm Marketing arrangements are to:

- enhance BPA's ability to market PNW Federal surplus;
- encourage diversified use of electric power at the lowest practical rates; and
- assure an adequate, reliable, economical, efficient, and environmentally acceptable power supply.
- support acceptable environmental quality; and
- achieve consistency with other National environmental policies.

3. Decisions to be Made

BPA must make decisions concerning:

participation in expansion of the capacity of the Intertie system and operation at enhanced capacity;
provisions of the Long Term Intertie Access Policy; and
the implementation of Firm Marketing arrangements.

4. Background

BPA markets wholesale electric power to several customer groups within the Pacific Northwest. Under provisions of the Pacific Northwest Electric Power Planning and Conservation Act and the Pacific Northwest Regional Preference Act, BPA may sell outside the region surplus power not needed in the region. Since it was completed in 1968, the Intertie has transmitted firm and nonfirm power between the PNW and California. Congressional intent in authorizing the Intertie was to increase BPA revenues (and thus allow BPA to repay its construction debt to the U.S. Treasury in a timely manner); to make efficient use of resources in the PNW and California; and to provide an equitable distribution of benefits for both regions.

However, circumstances since 1968 have worked to thwart these purposes. The absence of an Intertie Access Policy worked to BPA's detriment, hampering BPA's ability to market its own surplus power. Slower load growth plus a PNW recession led to more Federal surplus available for sale and less BPA access to its own Intertie than it needed. This fact led to an increasing financial burden on the BPA and a cost burden for BPA's PNW ratepayers.

In response, BPA developed an Interim Intertie Access Policy (September 1984) and, following preparation of an Environmental Assessment, a Near-Term Intertie Access Policy (NTIAP), effective June 1985, to govern access to the Intertie pending completion of a Long-Term Intertie Access Policy (LTIAP). The NTIAP established conditions for granting PNW scheduling utilities assured (guaranteed) Intertie access for firm power sales to California. It also established mechanisms for scheduling Intertie capacity for nonfirm energy and surplus firm energy not required for firm power sales.

Currently, BPA is developing a Long-Term Intertie Access Policy (LTIAP) to examine additional issues, including long-term firm power transactions and new new resource development. In October 1984, BPA announced its intent to prepare an EIS to evaluate these issues. Public involvement began in November 1984, with meetings to define the issues for the environmental studies. Comments received at these meetings and afterwards were used to prepare an Implementation Plan to be used in addressing issues and preparing the EIS. Means to increase the physical capacity of the Intertie were defined, and studies were begun on the consequences of undertaking any of the options for these actions. The Draft Intertie Development and Use (IDU) EIS, issued in October 1986, presented the results of those studies.

Following the comment period on the Draft IDU EIS, BPA evaluated public comments and incorporated appropriate changes into the environmental analysis and the models used to simulate power system operations and impacts. Revisions to the models were tested in July 1987 and were further refined during August and September to better simulate actual operation of the Columbia River System. More current input data were also incorporated where available. These changes are discussed in Section 10 of this summary. A paper reporting the results of these new model runs, entitled "Hydro Operations Information Paper," was issued November 13, 1987. Comments were accepted through December 31, 1987. The Final IDU EIS, scheduled for completion in April 1988, is in the final preparation stages. This summary is based on analyses completed to date for the Final IDU EIS and replaces the summary of the Draft IDU EIS in Appendix D of Volume 3A of the Draft COTP EIS/EIR.

5. Description of Intertie Decisions and Their Alternatives

5.1 Intertie Capacity

Existing Capacity: The existing Intertie system consists of one direct-current (DC) and two alternating-current (AC) high-voltage transmission lines that extend from the northern border of Oregon on the Columbia River to Central (AC lines) and Southern (DC line) California. The existing system, which has physical facilities capable of operating at a combined total capacity of about 5200 megawatts (MW), can accommodate most off-peak requests for transmission of surplus energy. However, during abundant water years, more electricity may be produced than can be sent to California. In addition, existing capacity constrains the amount of surplus power that can be sent during the hours when the power is most valuable to California, reducing potential income for the PNW and potential savings to California.

Terminal Expansion Project (Under Construction): The Terminal Expansion project will increase the carrying capacity of the DC line by about 1100 MW. Because the required construction involves increasing the capacity of the converter stations and only minor line modifications, the costs of this upgrade are small, both economically and environmentally, compared with building a new line. Construction is estimated to take about 2 years. All deliveries over the DC Intertie would be subject to BPA's Intertie Access Policy, as DC Intertie facilities in Oregon are wholly owned by BPA.

Proposed Third AC/COTP Project: As described earlier in this EIS, the California/Oregon Transmission Project (COTP) has been proposed by a consortium of publicly and privately owned California utilities, led by the Transmission Agency of Northern California (TANC). The COTP would provide 1600 MW of additional capacity on the Intertie. It also would provide access to a different market than the DC Terminal Expansion--North/Central rather than Southern California. Only those portions of Oregon facilities owned by BPA would be subject to the LTIAP.

Maximum Intertie Capacity: Constructing and operating both DC and AC facilities would increase Intertie capacity to about 7900 MW. Such an action, as would be the case with any expansion of the Intertie, could affect types of sales; the parties involved in such sales; the operation of power systems in British Columbia, the Pacific Northwest, California and the Inland Southwest; and the environment.

5.2 Long-Term Intertie Access Policy

Several major issues must be addressed by the LTIAP. First, a procedure must be established to allocate access for nonfirm transactions on the portion of the Intertie not required to support long-term firm power sales; that is, a nonfirm formula allocation procedure. Second, the policy must address allocation of access for long-term Assured Delivery to support long-term firm power sales and Seasonal Exchanges. Third, BPA must determine the amount of access to be allowed new resources and to hydroelectric resources that could interfere with the Administrator's fish and wildlife enhancement efforts. Finally, questions relating to access for extraregional entities must be addressed. The descriptions below cover the individual options corresponding to these issues.

Formula Allocation Procedure: Three means to allocate access to the Intertie for surplus nonfirm energy were examined. The Pre-IAP mode mirrors conditions before the Interim or Near-Term IAP's were implemented. Access is essentially on a first-come, first-served basis. This option depresses the prices received by BPA. When regional demand for Intertie capacity for delivery of nonfirm sales exceeds available Intertie capacity, the NTIAP option specifies shared access for nonfirm energy sales based on the amount of surplus energy each utility declares available for export. Federal and non-Federal users of the Intertie are treated the same. The Hydro-First option, by contrast, grants priority to surplus hydro sales.

Assured Delivery: Assured delivery lets utilities provide a firm guarantee to their customers to supply power. It provides guaranteed access to the Intertie. At present, under the NTIAP, there is no assured delivery for sales by PNW utilities, other than BPA, for periods extending beyond the life of the NTIAP. Thus, California utilities use the power to displace currently operating, more expensive power sources rather than to defer capital investment in new resources.

Assured delivery for long-term firm power sales and seasonal exchanges could enhance the value to California of current Northwest surpluses and could reduce the need for capacity additions in both the Northwest and the Southwest. California utilities could count on such firm power and/or Seasonal Exchanges to defer capital investment as well as running costs. Northwest utilities could expect to receive higher revenues for such power because of its added benefit to the California buyers.

Access for New Resources: The NTIAP allows Intertie access only for existing resources. Three options for access for power from new resources are examined in the IDU EIS. First, new resources could be limited to nonfirm sales only. This would limit development of new resources because the value of the power to California would be lower than if firm, long-term sales were allowed. Second, assured delivery could be provided for new resources only after the region reaches load/resource balance. New resources could then be used for capacity sales and seasonal capacity exchanges. Such sales could take place as long as they did not interfere with BPA's power marketing program. This option could lead to substantial reductions in the amount of new resources required to serve PNW and PSW loads, due to the diversity of loads and resources in the two regions. Third, new resources could have access on the same basis as existing resources. Since the power could then be used to defer construction of new resources in California, this option might significantly increase resource development in the PNW.

Access for Hydroelectric Resources: BPA is considering denying access to new or relicensed hydro resources that could adversely affect BPA's efforts to protect fish and wildlife.

Extraregional Access: Extraregional utilities currently receive access to the Intertie only on a formula allocation (nonfirm) basis and only when there is unused capacity on the Intertie. They could receive enhanced access in exchange for increased participation in the PNW's coordinated power system planning and operation. Such an action would require BPA environmental analysis and compliance activities.

5.3 Firm Marketing

Three levels of firm marketing were analyzed. The first of these was termed "Base Level Contracts" and represented a no-action alternative for firm marketing and consisted of 600 MW of firm sales to the PSW. The second level, termed "Federal Marketing," included the Base Level Contracts plus a variety of generic firm sales contracts representing a total of 2150 MW. The third level is termed "Assured Delivery," and includes Federal Marketing contracts plus an additional 400 MW long-term power sale bringing the total amount of firm sales to the PSW to 2550 MW. These totals were assumed given existing Intertie capacity. In all cases assuming expanded Intertie capacity, the Federal Marketing and Assured Delivery amounts were increased by 600 MW. This analysis differs from the draft IDU EIS which considered only two firm sales levels.

6. Economic Effects

6.1 Sales Level

Export Sales

Sales to California from the Pacific Northwest and British Columbia increase with each increment of capacity upgrade. The Pacific Northwest power sales have increases ranging from 9 to 21 percent. The British Columbia sales show a broader range of increases (for the DC, 20-42 percent; Third AC, 38-41 percent; and maximum capacity, 42-70 percent) than was observed for the Pacific Northwest. However, actual MW increases in British Columbia sales are small relative to the sales being made by the Pacific Northwest. The largest changes in sales occur at maximum capacity in the study year 1998 for both the Pacific Northwest and British Columbia. This is most likely due to the shape of the California market, where increasing energy needs, a large intertie size, and available Northwest surplus would account for increased sales.

Formula allocation has the most significant effects on British Columbia sales at existing capacity by generally decreasing sales (14 percent). There are two exceptions, the first being the Proposed Policy where a large jump in sales occurs for 1988 (44-93 percent). The second exception is in the Hydro-First alternative where a major decrease in British Columbia sales for 1988 (100 percent) occurs. Pacific Northwest sales at existing capacity exhibited little impact. Both the Proposed Policy and Hydro-First options show insignificant changes (less than 5 percent) in sales.

Formula allocation at the maximum capacity shows decreases (up to 10 percent) in British Columbia sales in both the Proposed Policy and Hydro-First alternatives. Negligible effects were observed for Pacific Northwest sales.

The long-term firm marketing alternatives had insignificant effects on Pacific Northwest sales (less than 5 percent). In the case of British Columbia, sales generally decrease (up to 18 percent). The study year 1988, at existing capacity, was the exception. Under the Federal Marketing alternative, British Columbia had decreases in sales of 34 percent and in the Assured Delivery alternative had decreases of 57 percent. This is because power sales being made in the early years of the study fill the Intertie at existing capacity. In later years, some of the power sales convert to either annual capacity energy exchanges or seasonal exchanges, which gives British Columbia more opportunity to compete on the Intertie due to the types of sales being made.

6.2 Generation Mixes

Pacific Northwest Resources

In the Pacific Northwest, increasing Intertie capacity results in slight increases in operating levels of both hydro (less than 2 percent) and coal (less than 12 percent) resources. Other resources (miscellaneous resources that are too small to explicitly model, small hydro, and PURPA resources) show decreases of up to 5 percent in the year 1993 for all capacity sizes and marketing schemes. The effects of formula allocation on hydro resource operation are insignificant. Coal generation shows increases and/or decreases of up to 2 percent for all capacity sizes and marketing schemes. The effect of long-term firm contracts on PNW resources is marginal. "Other Resources" is the only resource category which shows increases of up to 8 percent while coal shows decreases up to 3 percent. Hydro resources were not affected by long-term firm contracts.

California Resources

In California, the greatest impact of Intertie capacity upgrades on generation would be seen in oil and gas generation levels. At most, sales from the PNW, enabled by the additional capacity, would displace up to 10 percent of the California oil and gas generation that would operate given existing capacity. Effects on other resources are insignificant. A change in formula allocation would result in slight increases (1 percent) in oil and gas generation at either the existing or maximum Intertie capacity levels and across marketing schemes. The effects of long-term firm marketing contracts at different capacity sizes show increases and/or decreases up to 2 percent for oil and gas generation in California. Other resources were not affected.

Inland Southwest Resources

In the Inland Southwest, each capacity upgrade increment results in more displacement of coal generation; however, the impacts are quite small. The largest effect is a decrease of less than 2 percent. The formula allocation schemes show no impacts on levels of coal generation in the Inland Southwest at either the existing or maximum Intertie capacity levels. The effects of long-term firm marketing contracts at different capacity sizes show a decrease of 1 percent for coal generation in one year, 1988, for the Assured Delivery marketing case. All other firm marketing effects are negligible.

6.3 Cost/Benefit Analysis of Capacity Expansions

BPA has conducted an analysis of the net present value of upgrading the Intertie from the existing capacity level of 5200 MW to a maximum capacity of 7900 MW. This analysis takes into account the costs of constructing, operating and maintaining the Intertie upgrades and the savings in power costs that can be achieved as a result of the availability of the expanded capacity for interregional transfers of electrical power.

This analysis assumes Pacific Northwest loads will be as forecast in BPA's July 1986 medium load forecast, the California market will be as forecast in the CFM VI forecast of loads and resources, and California gas prices will be as forecast in BPA's January 1987 medium California gas price forecast. It also assumes the Pacific Southwest would pay no more than 75 percent of the marginal cost of displaceable resources for Pacific Northwest nonfirm energy, that no new firm contracts (beyond those in the existing contracts Base Case) would be consummated, that the DC Upgrade would come online in February 1989 and the Third AC in May 1991. An inflation rate of 5.0 percent and a real discount rate of 3.0 percent are assumed. The assumed cost of transmission construction, operation and maintenance is $327 million for the Northwest and $557 million for California for a total 1987 present value of $884 million. The benefits and costs are valued over the period 1991 to 2030.

The results of this analysis indicate that the total net present value of the additional benefits achieved by adding the Third AC Intertie to the existing system plus the DC Upgrade amounts to $661 million (1987 dollars).

The assumption in this cost/benefit analysis that there would be no new firm contracts makes this analysis very conservative. An analysis is being prepared which includes the assumption that there would be additional firm contracts as a result of the expansion of the Intertie. This second analysis will be completed and included in the Final IDU EIS. It is expected that the inclusion of the assumption of additional firm contracts will result in a greater level of present value benefits.

6.4 Retail Electric Rates

Pacific Northwest wholesale (BPA) and retail power rates would change negligibly with any of the Intertie capacity upgrades, formula allocation options, or firm marketing efforts. Power costs would decline slightly with firm marketing.

Intertie capacity upgrades and formula allocation options would have negligible effects in the aggregate on power costs in California. Benefits to individual California utilities from firm marketing levels would be expected and would stem from reduced operating costs and the deferral of capital spending. British Columbia power costs would not be significantly affected by any of the intertie actions under consideration.

7. Environmental Effects

7.1 Hydroelectric System Operations

The Columbia and Snake River systems are important to the structure of the environment in the PNW. They offer substantial opportunities for recreation and provide habitat for anadromous and resident fisheries. Furthermore, numerous cultural resource sites exist in and around the major storage reservoirs that are now a part of these river systems. In order to understand the potential effects of Intertie decisions on these environmental resources, it is important to understand their effects on the operation of the hydroelectric facilities and how, in turn, these alter the character of the environmental resources.

The PNW hydro system is operated according to constraints established by project owners and operators (in the case of Federal projects, the Corps of Engineers and the Bureau of Reclamation), and according to guidelines provided by the Pacific Northwest Coordination Agreement (PNCA). Federal hydro projects are operated to provide for multiple uses including flood control, power production, irrigation, navigation, recreation, fisheries, wildlife, and other uses.

The PNCA provides an annual planning process that increases system reliability and optimizes the use of resources within constraints provided by the project owners as required by various of the multiple uses, applicable regulations, or projects needs. BPA and most of the region's public and private generating utilities operate under this agreement. This planning process and the guidelines established by it would not be changed as a result of decisions by BPA or other utilities to market power to the PSW or by BPA to provide Intertie access. During the year, projects are operated within the framework established by the annual planning process. Within that context, decisions to market south or provide access to the Intertie may affect how the hydro system is operated with resulting changes in reservoir elevations, flows, and spill. Such changes, reflecting hydro operations, can impact river uses for fish and recreation, and could affect cultural resources.

Below is a discussion of the potential environmental impacts which may be associated with decisions on Intertie capacity expansion. A more detailed discussion of impacts created by operational changes in the Pacific Northwest's hydroelectric system resulting from other aspects of the Intertie or the IAP can be found in the Hydro Operations Information Paper (BPA, November 1987) and the draft and final EIS for Intertie Development and Use (BPA, 1986, and to be issued April 1988, respectively).

7.2 Anadromous Fish

There are two areas of potential concern for impacts of Intertie decisions on anadromous fish. The first is with the migration of juvenile fish through the hydroelectric system to the ocean. The second concerns the spawning and emergence of fall chinook in the Hanford Reach of the Columbia River.

Effects On Migration

In the draft IDU EIS, potentially significant adverse effects on juvenile migration were displayed for the Third AC as a second-added facility (after the DC upgrade). With the Intertie at the maximum Intertie capacity level, relative mean decreases in survival of from 0.5 to 2 percent would be expected for a number of anadromous stocks. The proposed formula allocation option had no significant effect, while the hydro-first option showed relative decreases as high as 6.2 percent. Long-term firm contracts showed primarily positive effects on fish survival with no significant decreases.

The current juvenile migration studies have identified several fish stocks that also exhibit survival decreases that need to be examined for significance. BPA's Hydro Operations Information Paper discusses numerous scenarios involving no change in Intertie capacity with various marketing schemes and three scenarios in which only the DC upgrade is involved. While the scenarios involving no changes in intertie capacity showed no impacts of concern, for two fish stocks (Wells pool summer chinook and Lower Monumental pool fall chinook) the D.C. upgrade showed noticeable impact with the proposed policy formula allocation scheme and the base level contracts case. The reader is referred to the Hydro Operations Information Paper for more detailed information.

One test case was analyzed that involved increasing the capacity of the Intertie by the addition of only the Third AC (COTP) Intertie. In this case, the Proposed formula allocation option and Assured Delivery and a firm marketing level of 3150 MW were assumed. In comparison with the base case (the base case assumes Pre-IAP formula allocation option, Base Level Contract and existing Intertie capacity), this case produced mean relative decreases in survival of several stocks which would be of concern. These stocks include the Wells pool spring and summer chinook, Wells pool sockeye, Lower Monumental pool fall chinook, and John Day pool fall chinook.

Although there were decreases in relative survival for these stocks over the 20-year study period, anticipated fish passage improvements are projected to provide substantial benefits for these stocks, with the possible exception of the John Day pool fall chinook. Table 1 displays information on the range of (1) mean relative survival decreases for each stock of concern for the years studied as well as (2) projected increases in mean survival due to benefits over the 20-year period from the construction of bypass facilities and other passage improvements.

TABLE 1

ANTICIPATED FISH PASSAGE IMPROVEMENTS AND SURVIVAL DECREASES FOR STOCKS OF CONCERN: ANALYSIS INCLUDING EXISTING PLUS COTP CAPACITY (percent)

Stock	Range of Survival Decrease	Anticipated Passage Improvements (1988 to 2003)
Wells pool spring chinook	0.8 to 1.4	38.3
Wells pool summer chinook	0.5 to 1.5	69.6
Wells pool sockeye	1.1 to 1.2	43.2
Lower Monumental fall chinook	1.3 to 1.6	24.0
John Day pool fall chinook	0.9 to 1.1	1.8

When compared with the projected magnitude of benefits provided by anticipated passage improvements, the survival decreases indicated in Table 1 would not represent a significant impact to the listed stocks' viability and harvest. Although John Day pool fall chinook appear to derive limited future benefit from bypass construction, an expected large, but unquantified, improvement in the survival of these fish should already have occurred in the early 1980s with installation of bypass facilities at John Day Dam and improved spill and passage conditions at The Dalles. Estimation of this improvement is planned prior to completion of the Final IDU EIS.

Fall chinook from the John Day pool, primarily a new Umatilla run, are part of a larger stock of up-river bright fall chinook that are propagated and managed throughout the lower and mid-Columbia River. These fish numbers have increased dramatically. A population of less than 100,000 adults returning in 1980 increased to over 280,000 returning in 1986. The stock is resilient and healthy with significant harvestable surpluses. These fish are expected to continue returning in large numbers due to the passage improvements and improved ocean harvest regulations. A decrease in mean survival of up to 1.1 percent is not of concern given the preceding information. These fall chinook populations, and the other stocks in Table 1, are expected to continue to grow.

Seven test cases were analyzed involving maximum Intertie capacity. These were as follows:

1. Pre-IAP nonfirm allocation, maximum capacity, and Federal Marketing
2. Pre-IAP nonfirm allocation, maximum capacity, Assured Delivery
3. Proposed Policy formula allocation, maximum capacity, Base Level Contracts
4. Proposed Policy formula allocation, maximum capacity, Federal Marketing
5. Proposed Policy formula allocation, maximum capacity, Assured Delivery
6. Hydro-first formula allocation, maximum capacity, Federal Marketing
7. Hydro-first formula allocation, maximum capacity, Assured Delivery

For these seven decision scenarios, Table 2 compares projected mean relative decreases in survival for fish stocks of concern with increases in mean survival projected to be derived from anticipated passage improvements. With the exceptions of the Lower Monumental pool fall chinook and John Day pool fall chinook, these benefits far exceed projected survival decreases due to Intertie decisions.

TABLE 2

ANTICIPATED FISH PASSAGE IMPROVEMENTS AND DECREASES IN MEAN RELATIVE SURVIVAL FOR STOCKS OF CONCERN: ANALYSES INCLUDING MAXIMUM CAPACITY
(percent)

Stock	Range of Survival Decrease by Case Number #1	#2	#3	#4	#5	#6	#7	Anticipated Passage Improvements (1988 to 2003)
Wells Pool Spring Chinook	1.3-1.6	1.3-1.6	1.2-1.7	1.3-2.0	1.2-1.9	1.3-1.7	1.3-1.7	38.3
Wells Pool Summer Chinook	1.5-2.1	1.2-2.0	1.1-2.2	0.9-2.0	0.7-2.0	1.6-2.0	1.0-2.0	69.6
Wells Pool Steelhead	-	-	-	0.9-1.2	0.9-1.1	-	-	42.2
Wells Pool Sockeye	1.7-1.9	1.7-1.8	1.7-1.8	1.7-2.0	1.6-1.7	1.8	1.7-1.8	43.2
Rocky Reach Pool Summer Chinook	-	1.0-1.2	1.3-1.9	0.7-1.2	-	0.7-1.2	1.1-1.4	37.1
Lower Monumental Pool Fall Chinook	2.3	2.0-2.6	2.2-2.9	2.2-2.3	1.9-2.6	2.3-2.5	2.0-2.6	24.0
John Day Pool Fall Chinook	1.3-2.0	1.4-2.0	1.7-2.3	1.2-2.1	1.4-1.9	1.4-2.1	1.5-2.2	1.8

As previously discussed with regard to addition of the COTP alone, the indicated impacts to John Day pool fall chinook are not of concern. However, fall chinook originating in the Lower Monumental pool (Lyons Ferry hatchery fish) would show a mean relative decrease in survival of from 1.9 to 2.9 percent. When compared with the 24.0 percent increase associated with fish passage improvements, the Intertie decisions projected to show the greatest adverse effect would be causing about a 10-percent relative decrease in the anticipated 24.0 percent improvement.

Based on further analyses, uncertainty associated with this level of impact may require BPA to draft mitigation measures. For example, BPA could propose limitations on the operations of some hydroelectric projects in order to increase downstream anadromous fish survival through the provision of spill tailored to the time and location of fish passage for the Lyons Ferry Hatchery releases of fall chinook. Such mitigation could be included in the Corps of Engineers' spill planning process. Transportation might offer an alternative means of mitigation. A percentage of Lyons Ferry chinook releases in the summer are currently transported on an experimental basis directly from the hatchery. It is possible this program could be expanded in the future to mitigate spill-related impacts. If the results of the study of current transport directly from the hatchery preclude additional transportation at this location, then transportation at Lower Monumental Dam might be provided upon completion of the fish bypass system that is scheduled for operation in 1991. Transportation could also be increased at McNary Dam as transport is currently provided to only a portion of the Lyons Ferry Hatchery fish being collected at McNary. Research on transportation has shown this option to be very effective for up-river stocks of subyearling fall chinook.

An additional mitigation alternative, increased production and releases of hatchery fish in the Lower Monumental Pool, would be a cost-effective alternative to spill-related mitigation. The impacts of the maximum level of Intertie expansion average less than 50,000 juvenile fish lost. The hatchery currently is expected to produce 6 million fish annually. While expanding production at Lyons Ferry Hatchery or another hatchery is speculative at this time, this small number of additional smolts could possibly be produced with minor production expansion and either transported to Lyons Ferry or used to displace Lyons Ferry outplantings at locations other than Lower Monumental Pool.

Analysis of Effects on Spawning and Emergence

The analysis of impacts on adult spawning and successful emergence of fry in the Hanford Reach was based on an inspection of flow data produced in the Systems Analysis Model (SAM). The goal of the analysis was to determine the extent to which Intertie decisions might alter flow rates in the Hanford Reach in a manner that could create greater difficulty in balancing spawning and emergence flows. The current studies indicate that neither capacity, policy, nor marketing provisions would have significant effects on the ability to coordinate fall and spring flows to assure successful spawning and emergence. In all cases, the potential for impact is slightly less than under the base case. Moreover, recent escapement levels and spawning distribution show that the need for balanced flow management may be lessened.

7.3 Resident Fish

In contrast to anadromous fish which migrate from rivers and streams to the ocean and back, resident fish remain in the river system and reservoirs throughout their life cycle. Consequently, they are not subject to the challenges of downstream and upstream passage experienced by anadromous fish. Nevertheless, certain aspects of hydro system operations have the potential to impact these species. Certain minimum flow levels are necessary to ensure successful spawning, incubation and emergence of resident fish species. Minimum flows of 3,500 cfs at Columbia Falls below Hungry Horse Dam are necessary to aid spawning, incubation, and emergence of kokanee and the rearing of other fish year around. Additionally, it is important to maintain flows below 4,500 cfs at Columbia Falls during the October through November period for kokanee spawning. Minimum flows of 4,000 cfs are necessary for the protection of resident fish in the Kootenai River below Libby Dam.

Changes in reservoir level can also affect resident fish. Lowered reservoir elevations can affect resident fish production by altering a number of physical and biological parameters. Lower reservoir levels reduce reservoir surface area, volume, shoreline length, area in the productive shoreline zone, volume in the layer of water with sufficient light for plant growth, and volumes in preferred temperature strata for trout. Large reservoir outflow volumes reduce hydraulic residence times and weaken thermal structure. These changes may result in reduced habitat for fish food organisms and resident fish populations. Lower reservoir elevations may affect both bottom dwelling invertebrates and zooplankton, which are the primary food sources for valuable species of game fish. Lower reservoir elevations during spawning and incubation periods of fish may reduce the amount of shoreline spawning habitat, cause redds and eggs to dry out, can expose them to freezing temperatures, and may limit access to tributary spawning streams.

Effects of Formula Allocation: The draft IDU EIS showed potential for significant impacts on both kokanee and trout production for the Hydro-First formula allocation option as a result of changes in stream flows. The Hydro-First option also showed potential for impacting the production of fish in the major storage reservoirs due to a loss of food supply resulting from reduced reservoir levels.

The current analysis of minimum flows at Columbia Falls and in the Kootenai River below Libby Dam indicate that the probability of these flows being met is 100 percent in nearly all circumstances. Reservoir elevation analyses at Libby, Hungry Horse, Dworshak, Albeni Falls, and Grand Coulee Dam show no significant impacts to resident fish would occur as a result of IAP formula allocation methods.

Effects of Firm Marketing: In the draft EIS studies, long-term firm contracts had no significant impact on kokanee or resident fish reproduction in streams. However, long-term firm contracts reduced reservoir levels in the year 2002 at Grand Coulee and Hungry Horse, potentially resulting in adverse impacts to resident fish in these reservoirs.

The results of the current studies are not thought to have significant effects on resident fish production at Libby, Albeni Falls, Grand Coulee, and Dworshak Reservoirs. The effects on resident fish of decreased September through November reservoir levels at Hungry Horse associated with marketing alternatives (both Federal marketing and Assured Delivery) cannot be quantified, yet could be adverse.

Effects of Intertie Capacity: The draft EIS concluded that no significant impact on resident fish production or aquatic productivity in the reservoirs or streams was expected to occur from the minor changes in reservoir elevation or flows resulting from any Intertie capacity upgrade.

Results from the current studies are similar to those presented in the draft EIS. Changes in average end-of-month reservoir elevations during the June through November period resulting from increases in Intertie capacity are less than one foot at all five reservoirs studied. No significant impacts to resident fish for any of the Intertie capacity levels would be expected.

Potential Techniques for Mitigating Impacts: The impacts to resident fish from the reduced reservoir levels projected for Hungry Horse during the critical growth months, September through November, may require mitigation. This could be accomplished by one or more of the following alternatives:

1. Placing operational constraints at the project to limit these drawdowns.

2. Enhancing the fishery in the reservoir by stocking catchable size trout each spring.

3. Instituting a combination of operational changes and fish supplementation; and,

4. Offsite mitigation such as stocking kokanee salmon in Flathead Lake.

The Fish and Wildlife Program addresses Hungry Horse operational impacts. Research is currently being conducted and, based on the knowledge gained, recommendations to protect resident fish are to be developed and considered for implementation.

7.4 Recreation

Federal hydro projects provide numerous opportunities for recreation both in the reservoirs themselves and in the areas downstream from the projects. Typically associated with the projects are water-related activities such as boating, swimming, water skiing, and fishing. In conjunction with these activities are other outdoor recreation opportunities including camping, picnicking, sightseeing, hiking, and other related activities.

Because many recreation activities are influenced by the project's reservoir elevation or downstream flows, reservoir operations which occur within the bounds specified by the project owners/operators may influence the amount, type, and quality of recreation experiences. Changes in the reservoir elevation or, to a lesser extent, project discharge resulting from Intertie decisions may result in impacts to recreation. In general, elevation changes would affect recreation in the reservoir while discharge changes would influence downstream recreation.

Maintaining reservoirs at full pool is most advantageous for recreation. Recreational facilities such as boat ramps, docks, and swimming areas are typically designed for optimal use at full pool. In addition, most reservoirs have the appearance of a natural lake when full, creating an appealing environment for recreation.

Downstream recreational activities such as fishing, swimming, rafting, and boating are influenced by project discharge. Marked short-term changes in project discharge generally reduce activity of fish and, consequently, impact fishing success. Rapid flow changes also present a safety hazard to downstream water users. At many reservoirs, constraints have been developed limiting the rate of change in project discharge to protect downstream parties. In addition, when possible, reservoir discharges are held constant and within ranges appropriate to enhance downstream fishing success during peak fishing periods.

Analysis. Potential impacts of Intertie decisions were assessed using data from the SAM studies. In order to determine and compare potential impacts of Intertie decisions on recreation at Federal storage reservoirs, a method of converting SAM output (reservoir elevations) to recreation impact was needed. For the draft EIS, reservoir elevations were used either as average end-of-month comparisons or in terms of changes in probabilities of being near full during the recreation season. It was assumed that if reservoir elevations did not change between alternatives, there would be no impact to recreation. Because most recreation at the projects of concern occurs during the summer months, the recreation analysis was confined to the June through August period in the draft EIS. For the current studies, the analysis was expanded to include end-of-May data.

Recreation downstream of reservoirs is also important. However, it is more difficult to assess potential impacts in this area because effects are primarily related to short-term fluctuations in flow. The SAM provides flow information on a monthly average basis. However, this information is not particularly useful in determining short-term flow changes. Because such short-term changes are highly dependent on specific, often short-term, operational constraints and conditions, these changes are not amenable to analysis using the SAM. Constraints have been developed at some projects which limit the rate of change in discharge. In some cases, short-term requirements are used to maintain flows at levels suitable for recreation use, particularly fishing. All projects will continue to be operated within existing constraints, although it may be possible for minimum and maximum flow levels to be reached more frequently as a result of Intertie decisions. Operations at Libby, Hungry Horse, Albeni Falls, and Dworshak should be minimally affected because those projects are currently operated to maximize peaking capability. Thus, the range in daily flows would not be expected to change at these projects as a result of Intertie decisions.

Effects of Formula Allocation. Studies for the draft EIS indicated that the only alternative with the potential to impact recreation was the Hydro-First formula allocation scheme. For this alternative, the mean end-of-June reservoir elevations were as much as about 4 feet lower than with the Pre-IAP alternative. Average end-of-month reservoir elevations for all other alternatives differed by only about one foot and would not adversely affect recreational use of the reservoirs.

The current study results are similar to those for the draft EIS. The Hydro-First alternatives, however, do not have as substantial an impact on reservoir elevations as occurred in the draft EIS studies. Average end-of-month reservoir elevations during the summer months do not vary from the Pre-IAP policy alternatives by more than one foot.

Effects of Firm Marketing. The draft EIS studies showed that firm marketing had no effect on summer reservoir elevations and, thus, no recreation impacts. In the current studies, summer reservoir elevations are slightly lower at Hungry Horse, the reservoir most affected by the Intertie decisions. Maximum summer mean end-of-month elevation changes of two to three feet occur at the end of August for the firm marketing cases. Libby, Albeni Falls, Grand Coulee, and Dworshak show substantially less impacts. More typical changes in average summer end-of-month reservoir elevations are less than one foot.

Changes in recreation indices for marketing actions are generally small. The maximum change from the Base Level Contract case occurs at Hungry Horse and does not exceed one percent.

Effects of Intertie Capacity. Both the draft EIS and current study results indicate that changes in Intertie capacity do not affect summer reservoir elevations and recreation.

Potential Techniques for Mitigating Impacts. No mitigation would be required for recreation. However, the National Park Service and BPA are cooperating on a study to develop estimated costs and conceptual designs which might form the basis for modifying recreational facilities in the Coulee Dam National Recreation Area to enable their use over a greater range of reservoir elevations. This study predates BPA's current analysis and is not considered as leading to mitigation for Intertie decisions. However, public policy may dictate modifying recreational facilities to better accommodate the fluctuating lake levels inherent to a power reservoir.

7.5 Cultural Resources

Cultural resources are defined as "the nonrenewable evidence of human occupation or activity as reflected in any district, site, building, structure, artifact, ruin, object, work of art, architecture, or natural feature that was important in human history at the national, state, or local level." Cultural resources have been identified at each of the five Federal storage reservoirs potentially impacted by changes in hydro system operations.

Cultural resources located in and around Federal storage reservoirs in the PNW have been affected by numerous activities including inundation, logging, agriculture, wave and wind erosion, off-road vehicle use, relic collecting, and vandalism. Within the current operating regime, changes in reservoir elevations can affect cultural resources in two ways: By changing the rate of erosion of cultural resource sites; and, by changing their accessibility to vandals and relic collectors. It is likely that most organic artifacts within the zone of pool fluctuations have already undergone substantial deterioration. Thus, the research potential of such sites may be limited.

Relic collecting and vandalism usually occur during the warmer months and require site accessibility. These activities are facilitated by increased erosion, weather, and pool fluctuations. Relic hunters often key activities to high-erosion conditions such as rapid and repeated drawdowns and increased storm conditions which expose more artifacts.

Analysis. Two measures were developed to estimate the effect of various Intertie actions on cultural resources. The first addresses changes in erosion potential of sites while the second quantifies the accessibility of sites for vandalism and relic collection. Because of limited cultural resource data for Hungry Horse and Dworshak reservoirs, a quantitative assessment of impacts was not done for these projects.

Effects of Formula Allocation. In the draft EIS studies, the Hydro-First policy alternative generally reduced the wave erosion index (up to 28 percent) and increased site accessibility when compared to the Pre-IAP alternative. These effects were apparent in all three study years analyzed. Some potential impacts would be expected based on the observed change in reservoir elevations. The Near-Term policy had no appreciable effect on cultural resources.

Analysis for the current studies does not show substantial potential impacts resulting from either the Proposed Policy or the Hydro-First policy alternatives. This is expected from the hydro system data because reservoir elevations are not as markedly affected by the Hydro-First policy in the current studies. Except in a few months in 1988 when differences are as much as about 10 percent at Libby, changes in the impact indices are generally less than five percent when compared to the Pre-IAP policy.

Effects of Firm Marketing. In the draft EIS, firm contracts produced variable results for cultural resource indices. The magnitude of change from the base case was generally less than 5 percent with a few changes of up to 10 percent. Changes in erosion and site accessibility indices were both positive and negative, depending on the project, month, and year.

Current study results indicate potential impacts resulting from firm marketing in the earliest year studied, 1988. This study year was added for the current studies, so comparable results are not available for the draft EIS studies. Increases in wave erosion indices of up to 40 percent at Libby occur as a result of firm marketing actions in 1988. These increases are accompanied by decreases in the site accessibility index of up to 15-20 percent. Results for 1993 also indicate potential impacts, depending on the time of year. However, the magnitude is less with maximum changes being in the 10-20 percent range. In general, major effects were confined to the Libby project in the first 2 years studied.

Effects of Intertie Capacity. The draft EIS results showed that changes in the size of the Intertie produced changes of less than 1 percent in the indices for both wave erosion and site accessibility.

Current studies support the results of the draft EIS. Changes in Intertie capacity have minimal effects on indices for wave erosion and site accessibility. These results are consistent with the fact that reservoir elevations do not change substantially as a result of Intertie expansions.

Potential Techniques for Mitigating Impacts. It is possible that increased reservoir fluctuations caused by Intertie decisions could adversely affect historic and archeological resources at Grand Coulee, Dworshak, Albeni Falls, Libby, and Hungry Horse reservoirs. 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, and the Washington, Idaho, and Montana State Historic Preservation Officers. This consultation will lead to one or more Memoranda of Agreement (MOA's) with appropriate parties and may lead to development of a comprehensive archeological plan (or supplement plan) for each reservoir.

7.6 Irrigation

Hydro operation planning is developed around flows that include irrigation withdrawals. These withdrawals were considered when calculating flows in the SAM runs. Changes in reservoir levels of projects located in the Columbia Basin Project require irrigators to move their pumps, necessitating coordination among irrigators and hydro system operators. Other than these effects, intertie policy, capacity, or firm marketing decisions would not affect irrigation. The potential for irrigation effects on recreation and fisheries seems to exist only at Grand Coulee. At this project a 1285 foot elevation at the end of May is a requirement necessary for irrigation needs. Inability to maintain this elevation might require drawdown of Banks Lake which could affect recreation and fisheries. The probability of being at or above this elevation was not affected by Intertie decisions.

7.7 Air Quality

Air quality impacts from the various alternatives under consideration are predicted from the projected changes in operations of thermal generating resources. Where thermal plant operations increase, air quality is degraded, and where thermal plant operations decrease, air quality improves. The effects of the various alternatives on thermal plant operations in the Pacific Northwest (which for the purposes of analysis includes some plants in Eastern Montana, Wyoming, and Nevada), California, and the Inland Southwest are described in 8.1 and 8.2 of this summary.

BPA performed analyses of air quality impacts of the projected changes in annual average generation from Pacific Northwest coal-fired generating plants on a site-specific basis, computing impacts within a 75 kilometer radius of each affected plant. For California, thermal plants are generally gas or oil fired, and many are within urban airsheds. For California, BPA computed projected cumulative effects of changes in generation for plants within the San Francisco, Los Angeles, and San Diego air basins, plus site-specific impacts for four plants which are in the Central Coast and Southeast Desert Basins, and are situated such that they would not be expected to have much cumulative air quality impact. The Inland Southwest plants are remote from each other and site-specific air quality analyses were used for each plant to determine air quality changes which would be expected from the projected changes in their operation. BPA looked at impacts on ambient sulfur dioxide, sulfate, total particulate, and, for the San Francisco, Los Angeles, and San Diego air basins, ozone on an annual average basis. In addition, when site-specific analyses were conducted, BPA looked at maximum concentrations of sulfur dioxide and total particulate on a 1-hour basis. The computed air quality changes were compared to ambient air quality standards and significant deterioration criteria to ascertain their degree of significance.

In addition, BPA looked at acid deposition and the impacts of supplying fuel to thermal generating plants to determine if the alternatives might have significant air quality impacts related to these factors.

In all cases, air quality impacts from the projected changes in thermal plant operations appear to be minor. The results of the air quality analysis can be characterized as showing tradeoffs of small air quality changes among regions as thermal generation is operated in one region to supply power to and displace thermal generation in another. The significance of a given air quality change is not uniform among the regions, however. Thermal generating plants in the Pacific Northwest and Inland Southwest are generally located in remote, comparatively unpopulated areas. Thermal generating plants located in the San Francisco, Los Angeles, and San Diego basins are in densely populated areas. A given change in air quality in these basins would result in greater total health impact than in remote areas because more people are exposed to the change.

7.8 New Resource Development

Several factors were examined regarding their potential impacts on the need for new resources in the PNW, PSW, ISW, and British Columbia. These factors are Intertie capacity, Intertie access, the type of firm contracts signed between the PNW and California, and the amount of electricity these contracts would represent. Firm contract cases considered are: (1) Base case, (2) Federal Marketing, (3) Assured Delivery, (4) Alternative #1, (5) Alternative #2, (6) 1350 MW Firm Displacement (FD) sale, and (7) firm resource development for export. The last four cases are variations on the Assured Delivery case. Alternatives #1 and #2 include different proportions of power sales, sales that convert to exchanges, and exchanges. Alternative #1 contains a larger power sale, a larger seasonal power exchange, and a smaller power sale that converts to an exchange. Alternative #2 has a larger power sale, a very large seasonal exchange, and no power sale that converts to an exchange. The 1350 MW FD sale includes 1350 MW of a firm displacement power sale and 1000 MW less of power sales that convert to exchanges, relative to the Assured Delivery case.

Increasing the capacity of the Intertie when, with the exception of existing firm contracts, only economy sales are allowed on the Intertie (Base Case) has little or no effect on the need for future resources in the PNW. The price and quantity of expected economy sales generally does not justify the cost of building new resources.

The introduction of new long-term firm contracts can affect the need for new resources in the PNW and in California. Relative to the Base Case and assuming a Maximum Intertie size, the Base Case and Federal Marketing have little additional impact on new resource development in the PNW or the PSW. In the Assured Delivery case, development of new resources occurs slightly faster than in the other two cases due to the larger magnitude of power sales. If these additional new resources were developed by BPA, WNP-1 and -3 currently represent the most cost-effective potential resource. However, if this need were generated by contracts between Pacific Northwest regional utilities (rather than BPA) and California, coal and small hydro resources likely would be developed. California would be expected to defer acquisition of significant amounts of power from combustion turbines and the re-furbishing of existing plants due to the availability of PNW energy to serve peak loads. Resource development in British Columbia would not be affected in any of these cases.

Alternatives #1 and #2 vary the relative amounts of bilateral sales and sales that convert to exchanges in the Assured Delivery case. These two alternative cases would cause accelerated development of new resources relative to the Assured Delivery case, largely due to the larger power sales. The seasonal power exchanges, however, are likely to partially mitigate the need to develop new resources. The overall mix of resources would not change.

If a 1350 MW FD sale were to replace the sales that convert to exchanges in the Assured Delivery case, then the impact on new resources would increase in the PNW. Assuming that a regional utility would continue to serve this sale once load-resource balance is reached, and, as required in the FD principles, BPA would not be obligated to develop resources to support the associated export sale, coal plants, small hydro, and some conservation would be developed earlier in the PNW than if the contract had converted to a capacity energy exchange. California and the ISW likely would defer development of baseload generation since the FD contract and other firm contracts in this scenario would be included in their resource planning as dependable resources.

Finally, if there were no restrictions on access of new resources to the Intertie, development of a variety of energy resources, including coal and hydro, would occur sooner than in the standard Assured Delivery case. This resource development for export case would most likely result in delays in resource development in the Southwest due to their ability to rely on the PNW.

In summary, in the PNW, an increased level of long-term sales accelerates the need for new resources, but tends to cause a deferral of acquisition in the Southwest. Exchanges, relative to direct sales, tend to defer the need for new resources in both regions. Unrestricted access to long-term transactions on the Intertie also results in an accelerated pace of development in the PNW and a deferral in the Southwest.

7.9 Use of Land and Nonrenewable Resources

In the PNW, Intertie capacity, formula allocation, and long-term firm marketing decisions would affect the use of land and nonrenewable resources, primarily through their effects on the operation and construction of coal plants. Increased Intertie capacity would lead to an increase of not more than 9% in coal consumption and land disturbance in the PNW, compared with existing Intertie capacity. Differences in coal consumption and land use vary among proposed policies governing formula allocation, but the differences among the three possible policies are small, generally less than 5%. At maximum Intertie capacity, both the Proposed Policy and the Hydro First options for Federal Marketing and Assured Delivery cases cause slight decreases in coal consumption and land use compared with the Pre-IAP option. Finally, at either existing, DC Upgrade, or maximum Intertie capacity, increased firm sales of electricity to California tends to cause small decreases in coal consumption and land use in the PNW. This result probably occurs due to the existence of exchange contracts that provide for some of the needs of PNW load.

In California, changes in Intertie capacity and marketing affect oil and gas consumption, rather than coal consumption. Compared with the existing capacity, increased Intertie capacity would reduce gas and oil consumption by no more than about 10% by 2003, depending on the amount of firm sales and Intertie expansion. The variation among different formula allocation proposals, for either existing or maximum Intertie size, is negligible, not exceeding 1 percent. Different assumptions about firm sales also affect oil and gas consumption. Federal Marketing generally increases oil and gas consumption in California, while Assured Delivery tends to decrease oil and gas consumption. The Assured Delivery case has a more negative impact on oil and gas consumption because it includes more power sales relative to power exchanges than the other cases. The magnitude of the variation among these options, however, does not exceed 1 percent.

Impacts on coal consumption and land use in the ISW generally do not differ from analogus impacts in California on oil and gas consumption. Compared with existing capacity, increased Intertie capacity would lead to a decrease in coal consumption and land use in the ISW of about 4%, as the PNW, rather than the coal plants of the ISW, supplied electricity to California. Alternative formula allocation options at any Intertie capacity would have little effect on coal consumption and land use in the ISW. Increased levels of firm sales to California would tend to cause a small decrease of less than 1 percent in coal consumption and land use in the ISW.

7.10 Water Quality and Consumption

Water is used by thermal generating plants for cooling, operation of scrubbers, ash disposal, and other purposes. Water used may be from ground or surface waters, and its use may reduce the supply available for other purposes. Withdrawal of surface waters can also result in adverse impacts on aquatic life as fish and other aquatic life forms may become entrained in the water pumped to the power plant, or impinged on screens at the water intakes. Polluted or heated water may also be discharged from the power plant.

BPA examined each of these potential effects for each thermal plant for which the analysis showed a change in generation larger than 10 aMW in any case. Water consumption impacts were related to aquifer recharge or pumpage or stream discharges as appropriate. Potential water discharge and entrainment problems were investigated on a plant-specific basis. BPA also examined the impacts of supplying fuel to thermal generating plants, and the degree to which acid deposition from thermal plants might affect water quality. Some serious impacts of operation of certain power plants were identified, such as entrainment of fish larvae and juveniles at two California plants, and overdraft of an aquifer at one Inland Southwest plant resulting in reduced groundwater quality. However, the effects of changes in water use and/or quality projected as a consequence of changes in annual thermal plant generation under the alternatives or combinations of alternatives in the EIS were minor.

7.11 Vegetation and Wildlife

Intertie capacity or policy decisions could potentially affect vegetation and wildlife in the PNW, British Columbia, California, and the ISW. These impacts would occur indirectly, through changes in operations which affect river flows and reservoir elevations, and air and water quality.

Final information is not available at this time to complete the Biological Assessment on Threatened and Endangered Species for the IDU EIS. Of the 49 facilities being evaluated for possible impacts to threatened and endangered species, analyses for 21 have been completed and no impacts identified. The remaining 28 are still being examined. A Biological Assessment will be written for the U.S. Fish and Wildlife Service when all 49 are completed.

8. Sensitivity Analyses

Throughout the public comment process on the draft IDU EIS and the Hydro Operations Information Paper there was a need identified to expand the analyses that BPA had done with respect to the types of conditions under which the impacts of various intertie access, intertie capacity and firm marketing alternatives were effected. Sensitivity analyses were run in order to vary these conditions and the results are presented below.

8.1 Economic Effects

8.1.a PSW Gas Price

BPA conducted an analysis to determine the sensitivity to assumptions concerning California gas prices of the results of the economic analysis of the benefits of adding the Third AC Intertie to the existing system, following completion of the DC Upgrade. In contrast to the benefit (1987 net present value) of $661 million achieved in BPA's original analysis, a decreased gas price resulted in a net present value loss of $388 million whereas an increased gas price produced a net present value benefit of $1.963 billion. These sensitivity analyses assumed the same conditions as the original analysis except that the BPA September 1987 low and high California gas price forecasts were used, respectively, in place of the BPA January 1987 medium California gas price forecast.

8.1.b PNW Loads

An analysis, similar to that just described for gas prices was conducted to determine the sensitivity of results to the use of different forecasted PNW loads. Use of BPA's July 1987 low load forecast resulted in a 1987 net present value benefit for the Third AC Intertie of $2.766 billion. Use of BPA's July 1987 high load forecast produced a 1987 net present value loss of $98 million.

8.1.c PSW Loads

Sensitivity of the economic analysis to California loads was tested by increasing and decreasing the CFM VI forecast by 2000 average MW over the life of the Third AC Project. Increased California loads produced a 1987 net present value benefit of $709 million. Decreased California loads produced a 1987 net present value benefit of $485 million.

8.2 Environmental Effects

Several studies were conducted in order to determine the sensitivity of study results to assumptions used in modeling the environmental effects of Intertie decisions. Typically three studies were run for each sensitivity case - the no-action base case (pre-IAP, existing Intertie, base level contracts), the proposed policy at existing Intertie size with base level contracts, and the proposed policy at the maximum Intertie size with base level contracts. Those parameters which were thought to have potential for additional adverse environmental effects were chosen for analysis. The sensitivity studies chosen were increased PSW gas prices, increased PSW loads, decreased PNW loads, and the new nonfirm rate cap. Additional studies were also conducted on an environmental coal dispatch alternative and two firm contract alternatives.

8.2.a PSW Gas Price

In order to analyze the potential effects of increased PSW gas prices, California market pricing was adjusted to reflect a high gas price forecast as opposed to the median price forecast used in the original studies. Higher gas prices result in relatively higher coal generation and PSW sales as a result of maximum Intertie development than the original studies. Results for the proposed IAP alternative did not change. Relative changes in reservoir levels were not affected by the change in gas prices. Sensitivity analyses increasing PSW gas prices do not affect relative changes in reservoir elevations under the proposed formula allocation method or maximum Intertie capacity.

8.2.b PSW Loads

In order to evaluate the effects of higher than expected PSW loads, studies were run with PSW loads increased by 2000 aMW. These study results are similar to the increased PSW gas price cases. Increases in coal generation and PSW sales resulting from maximum Intertie development are higher than in the original studies while changes due to formula allocation method are similar. Relative changes in reservoir levels are similar to the results of the original studies.

8.2.c PNW Loads

Three sensitivity cases were run which used a low PNW load forecast (approximately 3000 aMW firm surplus throughout the 20-year study period). In this case there is additional surplus firm energy available to "move" into the fall period and reservoir target elevations are adjusted accordingly. Changes in reservoir elevations using the proposed formula allocation method (as compared with the Pre-IAP method) are minimal. However, effects of increasing Intertie capacity are much greater when low PNW loads are assumed. Additional drafting of reservoirs occurs at maximum Intertie capacity, especially in the late fall and early winter. However, no adverse impacts to recreation would be expected from this operation. Cultural resources and resident fish could be adversely affected by these lower reservoir elevations.

8.2.d Environmental Coal Dispatch

These studies dispatched PNW coal plants in order of pollutant emissions with those having the lowest SO_2 emission levels being dispatched first. Such dispatch resulted in substantial reductions in both PNW coal generation and sales to the PSW with little change in hydro generation. Reservoir levels generally decreased; the greatest impacts occurred at Hungry Horse in the fall and winter months. These levels would generally affect resident fish and recreation negatively. Air pollution, water consumption and other environmental effects associated with thermal generation would increase from California and/or ISW generating plants while they would decrease from PNW coal-fired generation.

8.2.e FISHPASS Parameters

The range of variability for the comparative results from FISHPASS, associated with the uncertainty of the input parameters, was analyzed with several sensitivity analyses for the key FISHPASS parameters. For each of these sensitivity studies, the effect of a change in the input parameter on the apparent impact of adopting the proposed formula allocation and expanding the Intertie to maximum capacity was analyzed. These analyses assumed no expansion of firm marketing beyond the base case. The following sensitivity studies were performed:

1. Reservoir Mortality - Reservoir mortality was decreased and increased by 50 percent for all hydro projects.

2. Spill Efficiency - Spill efficiencies for passing fish around turbines was decreased and increased by 50 percent at all hydro projects.

3. Turbine Mortality - Turbine mortality was decreased and increased by 25 percent at all projects.

4. Subyearling Reservoir Mortality - A constant subyearling reservoir mortality was assumed for all projects in contrast to the flow dependent rate originally used. (There is some controversy as to whether or not subyearlings have a flow dependent reservoir mortality).

5. Transportation Survival - The survival of all transported fish was decreased by 50 percent. (This addresses the uncertainty regarding differences in Post-Bonneville Dam survival of transported and non-transported fish under an assumption that non-transported fish have a much greater post-Bonneville survival).

6. Fish Guidance Efficiency - Fish guidance efficiencies (both current and future projected) were decreased and increased by 25 percent at all hydro projects.

The results of the sensitivity studies are provided in Table 3 for 5 of the most critical and/or heavily impacted stocks.

8.2.f New Nonfirm Rate

Since the initial SAM studies were conducted, the nonfirm rate cap has been adjusted. In order to verify that this change would not affect the environmental consequences of Intertie decisions, three sensitivity studies were run using the new nonfirm rate cap. The new results were consistent with the original studies in that neither the proposed formula allocation method nor the maximum Intertie size had major effects on reservoir operations.

8.2.g Bypass Variations

The following sensitivity studies have been performed for changes in bypass installation:

1. An assumption of no addition of bypass systems at any of the hydro projects. (No Bypass)

2. An assumption of a 3 year delay in the addition of bypass systems at all hydro projects. (3-Year Delay)

3. An assumption of no addition of bypass systems at The Dalles and Ice Harbor (No Dalles/Ice Harbor Bypass)

4. An assumption of no addition of bypass systems at The Dalles, Ice Harbor and Lower Monumental. (No Dalles/Ice Harbor/Lower Monumental Bypass)

The results of the sensitivity studies are provided in Table 4.

Additional analyses on the effect of the assumptions on the change in the base case survival level in the future (i.e., benefits of bypass) is being performed and is not available at this time.

TABLE 3

THE MEAN RELATIVE DECREASES IN SURVIVAL OBTAINED IN THE ORIGINAL AND EACH OF THE FISHPASS SENSITIVITY ANALYSES 1/
(percent)

Pool	Stocks	Original Study	Low Resrv. Mort.	High Resrv. Mort.	Low Spill Effic.	High Spill Effic.	Low Turb. Mort.	High Turb. Mort.	Subyearling Reservoir Efficiency	Transportation Survival	Low Fish Guidance Efficiency	High Fish Guidance Efficiency
Wells	Spring Chinook	1.5	1.5	1.4	0.7	1.7	1.1	1.8	1.5	1.7	2.3	0.8
Wells	Summer Chinook	1.8	1.8	1.8	0.9	2.2	1.3	2.3	1.7	2.0	2.4	1.3
LWM	Fall Chinook	2.4	2.5	2.4	1.2	3.0	1.7	3.1	2.4	2.7	3.2	1.8
John Day	Fall Chinook	2.0	2.0	1.9	1.0	2.1	1.3	2.6	2.0	2.0	2.5	1.4
Lower Granite	Spring Chinook	0.03	0.1	0.0	0.0	0.1	0.03	0.03	0.03	0.1	0.2	0.0

1/ Decreases are due to adoption of the Proposed Formula Allocation and maximum capacity. No new firm sales were assumed. Average values for the years 1993, 1998, and 2003.

TABLE 4

EFFECT OF BYPASS VARIATIONS ON
THE MEAN RELATIVE DECREASE IN SURVIVAL DUE TO ADOPTION OF THE PROPOSED FORMULA ALLOCATION AND MAXIMUM EXPANSION BUT NO NEW FIRM CONTRACTS

Pool	Stocks	1	2	3	4	5
Wells	Spring Chinook	1.5	2.1	1.5	1.5	1.5
Wells	Summer Chinook	1.8	2.7	1.8	1.8	1.9
Lower Granite	Spring Chinook	0.03	0.2	0.03	0.1	0.1
Lower Monument	Fall Chinook	2.4	3.4	2.7	2.8	3.3
John Day	Fall Chinook	2.0	2.3	2.2	2.3	2.3

KEY:
1 - Original Study
2 - No Bypass
3 - 3-Year Delay
4 - No Dalles/Ice Harbor
5 - No Dalles/Ice Harbor/Lower Monumental

8.2.h Increased Power Sales and Power Exchanges

The effects of different contract combinations which might occur under the proposed LTIAP, in addition to the Federal Marketing and Assured Delivery cases in the original studies, were also examined. These studies included additional amounts of seasonal power exchanges and long-term firm sales with correspondingly less capacity/energy exchanges.

These additional contracts result in generally higher reservoir elevations in all years as compared to the base case. This is in contrast to the Assured Delivery and Federal Marketing cases which have higher reservoir elevations in the early years and somewhat lower elevations in the later years. No additional impacts were identified with the inclusion of these contracts.

9. Summary of Public Comments

9.1 Draft IDU EIS

A total of 116 comment letters were received on the IDU draft EIS during the extended comment period. The comments were sorted, categorized, and evaluated. Many of the comments resulted in revisions to the models and analyses which were documented in the Hydro Operations Information Paper.

The following is a summary of the comments received by topic. Additional information on the comments can be obtained from BPA and will be contained in their IDU Final EIS to be issued in April 1988.

General NEPA/Public Information Process

Several comments were received asking for an extension of the comment period; a 2-week extension was granted. Other comments included a request for a supplemental Draft EIS, the relationship of the IDU EIS to other actions, comments on the structure and format of the EIS, a request for more detailed information on the models, and several endorsements of the Draft EIS.

Purpose and Need

Comments addressed BPA's stated needs for the Intertie Access Policy, the purposes of the actions, and BPA's authority over the Intertie.

Capacity Alternatives

Comments were received on the characterization of the alternatives and were both critical and supportive of the DC Terminal Expansion and Third AC Intertie Projects.

Alternatives for Allocation of Intertie Access

This category, together with the Fish Impacts category, received the majority of the comments. Topics addressed include a request for an environmental dispatch alternative and an alternative providing unrestricted access to the Intertie, the allocation of Intertie sales in California, access for entities other than scheduling utilities, the analysis of the pre-IAP alternative, exchanges and capacity sales, BPA's obligation to serve loads, the term of assured delivery contracts, access to the Intertie for conservation power, access for new hydroelectric development, access for new resources based on consistency with the Northwest Power Planning Council's plans and programs, restrictions on new resource access based on fish and wildlife considerations, access for new resources restricted until the Intertie is upgraded to 7900 MW and conditioned on there being no impacts to BPA's power marketing plan, access for geothermal energy, the impact of the IAP on development of new transmission lines and generating resources, access for power from Canada and other extraregional power, and the relative priority of firm and nonfirm sales. Many of these comments are addressed by the "Revised Draft Long-Term Intertie Access Policy" issued by BPA in December 1987.

Environmental Effects of Decision Packages

Commentors suggested additional decision packages, questioned rate effects, and asked for additional documentation, analyses, and discussions.

Affected Environment

A few comments were received correcting or questioning the affected environment discussion in the draft EIS.

Power System Effects

Comments were received addressing hydro operations in the PNW, the analyses of the California market, the Inland Southwest market, new resources, BC Hydro operations, long-term firm contracts effects on the power system, the years chosen for the detailed analyses, and the operation of PNW coal plants.

Land Use and Nonrenewable Resource Effects

A few comments were received on this subject, including joint use of transmission lines, and resource tradeoffs.

Air Quality Effects

Comments addressed air quality tradeoffs between regions and between PNW coal plants, the relationship between Intertie sales and air pollution, and various technical points of the air quality discussion.

Water Quality and Fisheries Impacts Related to Thermal Plant Operations

A few comments were received requesting additional data and site-specific impact analyses be included on this subject.

Fish Effects

This was the second category receiving a large portion of the comments on the IDU EIS. Comments addressed the following topics: Fish protection provisions, mitigation, consultation with others, the modeling analyses, significance thresholds, new hydro development impacts, power system operations impacts, Native American treaty fishing rights, transportation of fish, and resident fish.

Subcategories of comments under fish protection provisions included: Consistency with the Northwest Power Planning Council's (NWPPC) Fish and Wildlife Program, the presumption of compliance with fishery conditions in the NWPPC Program, institutional issues, BPA's proposal of preemptive rights for resources harmful to the Fish and Wildlife Program, the terminology of the provisions, the suggestion to extend the provisions beyond the Columbia Basin, the enforceability of the provisions, and noncompliance remedies.

Comments on the modeling analyses addressed the need for additional fisheries impact information, additional analyses for long term firm contracts, the assumptions used in the analyses, the uncertainty of the model results, and the need for sensitivity analyses.

Comments on the significance thresholds addressed critical stocks and also included statements that the impacts are understated, and that a cumulative impact analysis is needed.

Vegetation and Wildlife Effects

Few comments addressed this section of the Draft EIS.

Recreation Effects

Concerns were expressed regarding Upper Columbia River impacts and the need for quantification.

Irrigation Effects

Comment was received regarding impacts to the planned second phase of the Columbia Basin Project.

Cultural Resource Effects

Comments addressed the level of analysis, the need for field surveys, and mitigation.

Economic Effects

Comments were received on the structure and format of the economic analysis, the impacts of the IAP and the Intertie upgrades on rates (in both the PNW and California), costs included in the analysis, the relationship of capacity contracts to the value of the Intertie upgrades, the availability and value of surplus capacity and energy in the PNW, economic impacts to other resources, the computer models used, the price and load data used, sensitivity analysis, and economic impacts on the PNW.

9.2 Hydro Operations Information Paper

The close of comment for the Hydro Operations Information Paper (HOIP), issued in November 1987, was December 31, 1987. Twenty-three comment letters were received on the HOIP during the comment period. Comments received have been categorized according to the issues addressed. Comments focused on a few specific issues as follows:

The need for BPA to prepare either a revised draft IDU EIS, a supplemental EIS dealing with Hydro Operations, or a draft EIS on the D.C. Terminal Expansion.

Several natural resources agencies requested that BPA reissue its revised draft IDU EIS, while some utility and utility representatives felt that BPA had done a sufficient job with the HOIP and should proceed directly to a final IDU EIS.

Need for additional mitigation measures.

The general feeling from regional natural resource agencies is that the benefits the region derives from implementation of the NPPC's Fish and Wildlife Program are not intended to offset future losses associated with proposed hydro system operations and transmission project construction; therefore, mitigation measures will be necessary for those environmental resources, including anadromous fish stocks, adversely affected by any of BPA's proposed actions.

Utilities and utility representatives made two general comments concerning the HOIP: First, that the effects of changing hydro system operations on environmental resources, including anadromous fish, were too insignificant to warrant additional mitigation measures; and second, that the Regional Power Council's Fish and Wildlife Program was developed in order to mitigate for the full existing operational capability of the hydro system, which would include those actions proposed by BPA.

Reliance on Mid-Columbia Bypass Installation Schedules.

Several commenters questioned the accuracy of the bypass installation schedules for the mid-Columbia projects. However, one utility representative was pleased that BPA took the bypass installation schedules and the effects of the bypass facilities themselves into account in the HOIP. There is some lack of agreement as to whether the installation schedules are accurate or not.

Use of the FISHPASS model.

As previously indicated in comments on the Draft EIS, several commenters felt that it was inappropriate to use the results of the FISHPASS model runs to make decisions regarding the effects of proposed BPA actions, including hydro operations and transmission system construction, on environmental resources, including anadromous fish. There is disagreement as to how the data from the FISHPASS model should be used or interpreted, i.e., whether the numbers produced are significant themselves or whether they should be used for comparative purposes only. Several commenters questioned the validity of the results using SAM output as FISHPASS input.

Adequacy of Economic Analysis.

Comments stated that there is not sufficient detail presented in the Hydro Operations Information Paper to reach the conclusion that installation and operation of the Third AC line will have a positive net present value over the 45 year study period. Another commenter stated that the HOIP presents no economic analysis of either the DC Expansion Project or the Third AC line. A third commenter stated that the HOIP seems to consider the economics of intertie expansion as being "cast in stone" and that the costs of the DC Expansion Project have not been revised in over a year with falling energy (oil and gas) prices.

10. Revisions in Modeling Techniques

10.1 General Analytic Structure

The basis for the findings presented in the Environmental Effects section is the Systems Analysis Model (SAM). The SAM simulates the operation of the Pacific Northwest power system through an economic dispatch of resources, in which power plants are scheduled for operation in order of increasing monetary costs; that is, the least-expensive first. Data input for SAM include extensive information on electrical loads and generating project characteristics and operating policies.

Values for how well thermal plants are expected to operate, how loads will grow, and stream flow conditions are randomly selected from probability distributions. This is done to simulate the variable nature of these events. SAM then produces an economic dispatch of resources to meet loads and sell surplus to California.

SAM provides several types of output, including data on projected operation of hydroelectric facilities. For each study scenario, a unique combination of decisions regarding formula allocation, firm marketing, and Intertie capacity is run through SAM a total of 200 times--each time with a random selection of loads, thermal plant performance, and water conditions. Each of the 200 runs of a study scenario covers a 20-year period (1987 to 2006) and is referred to as a "simulation". For purposes of the IDU analyses, data for 4 representative years (1988, 1993, 1998, and 2003) were analyzed. These years were selected to provide information on decision effects over a range of conditions (i.e., prior to Intertie expansion, prior to load/resource balance, at load/resource balance, and subsequent to load/resource balance).

Once SAM analysis is complete, the output data are analyzed by various statistical methods. These analyses provide information on reservoir elevations, flow rates, and spill amounts for selected hydroelectric projects. These data are used to estimate the effects of various Intertie decisions on the operation of the hydrosystem. Data on reservoir elevations are analyzed to determine potential impacts to fish residing in the region's large storage reservoirs, as well as the effects on recreational and cultural resources in and around the reservoirs. Data on flow and spill from SAM are used as input data for a second computer model--FISHPASS. The purpose of FISHPASS is to translate the hydroelectric operations data into impacts on the survival of juvenile anadromous fish migrating to the Pacific Ocean. The results and discussion of the findings for each of these analyses are presented in the Environmental Effects section.

10.2 Most Significant Changes in the Analysis Between Draft IDU EIS and Current Studies

Following the close of the comment period on the draft IDU EIS, BPA undertook an extensive review and analysis of comments received. Many of the comments were directed toward the modeling underlying the environmental analyses. These comments were carefully considered as BPA improved and refined the models. In addition, both the data for input and the assumptions were updated to assure that the models were current.

Three kinds of analytical changes were made since the draft IDU EIS: Logic changes in SAM that required recoding of the model in order for the logic to more accurately reflect how the hydro system is operated; changes in assumptions made since the draft IDU EIS and updated input data that reflected current available information. The results of the analyses are now interpreted in the context of benefits anticipated from the construction of Mid-Columbia bypass facilities. These benefits are expected to substantially reduce any impact of Intertie actions on anadromous fish stocks.

The following discussion identifies and discusses the changes that have been of greatest importance in terms of their effect on the study results. Additional changes of lesser consequence that have occurred in both the IDU models and the techniques of analysis since the completion of the draft EIS are discussed in Section 10.3 of this document and, in more detail, in Appendix B of the "Hydro Operations Information Paper."

10.2.a Mid-Columbia Bypass

The principle differences in analytical approach pertains to the context within which the effects on anadromous fish are interpreted. In the draft EIS, it was assumed that the mid-Columbia hydroelectric projects would not be installing bypass systems in the foreseeable future. The impacts on survival of migrating juvenile fish in the draft EIS were interpreted against the anticipation of fish stocks assuming no mid-Columbia bypass systems would be in place. Since release of the draft EIS, however, much progress has been made with regard to developing and implementing plans for installing bypass systems at these projects. The current studies assume that such systems would be constructed between 1989 and 1993. These bypass systems are expected to provide significant benefits to anadromous fish over the next 20 years. Run sizes for fish stocks of concern originating upstream of the mid-Columbia projects are expected to increase by about 40 percent between 1988 and 2003. The decrements in survival of 1-2 percent expected under some Intertie alternatives are judged not to be significant when viewed in the context of overall survival increases of approximately 40 percent for fish stocks in the mid-Columbia.

10.2.b McNary 100-Percent Flow Limitation

In earlier runs, SAM operated the hydroelectric system in a manner that exercised the right to draft reservoirs for nonfirm energy production at the first economic opportunity. In some cases, the logic in SAM caused the model to release large volumes of water from upstream storage projects. This raised flow levels above turbine capacity at downstream projects and caused significant amounts of forced spill. This operation was both damaging to fish (because of flow decreases in subsequent months) and resulted in a less economic operation than was probable.

Furthermore, such operation is inconsistent with BPA's actual operating procedures. Therefore, the model was revised to limit flows in the lower Columbia resulting from discretionary nonfirm sales to no more than 100 percent of the turbine capacity at McNary. The intent of this limitation was to limit the large amounts of forced spill resulting from discretionary nonfirm sales in winter through early summer.

10.2.c Variable Nonfirm Rate

At the time analyses were being developed for the draft EIS, BPA employed a fixed nonfirm energy rate. Hence, the draft EIS analyses assumed that BPA sales of nonfirm energy would occur at fixed rates (prices). The pricing logic in the model was subsequently changed to reflect the fact that BPA now has a variable nonfirm energy rate that better enables BPA to respond to changing market conditions. This leads to more sales and, therefore, more efficient use of hydro resources.

10.2.d Oil and Gas Price Forecast

As oil and gas price forecasts changed, model inputs were revised accordingly. Oil and gas prices affect California utilities' demand for energy imported from the PNW to displace operation of higher cost oil- and gas-fired generating plants. This, in turn, affects hydro operations. In the current analysis, the oil and gas price forecasts were changed (generally lower) to reflect BPA's January 1987 Gas Price Forecast, replacing the fall 1985 DRI Forecast used in the draft EIS.

10.2.e California Load Forecast

BPA has updated the California load forecast to reflect the most recent Common Forecasting Methodology (CFM VI), developed by the California Energy Commission. The CFM VI load forecast used in the current studies is higher than the CFM V used in the draft EIS. The combined effects of new gas price forecast and load/resource data have significantly changed the shape of the California demand curve in SAM.

10.2.f Grand Coulee Energy Content Curve (ECC)

The end-of-June reservoir elevation which would still allow Grand Coulee to be full at the end of July, the variable ECC, was as low as approximately 1,250 feet in the draft EIS under some water conditions. This is the lowest elevation to which the reservoir could be drafted to market nonfirm energy. This limit has been increased to 1,285 feet for the current studies based upon the intent of the Bureau of Reclamation, the project owner, to make such a change in its operating constraints.

10.3 Additional Changes in Analysis Between Draft IDU EIS and Current Studies

10.3.a System Analysis Model

10.3.a.1 Logic

SAM logic revisions involved changes in the rules for drafting reservoirs, limiting flow rates, integrating Canadian power system operations and restricting Intertie access when demand for access exceeds capacity.

10.3.a.2 Assumptions

System Analysis Model Revisions were made with respect to the following: Variable Nonfirm Rate; Water Budget; System Refill Criterion; New Firm Contracts; Study Years; Proposed Intertie Access Policy; Elimination of Planned Spill; Water Budget Extension; Mid-Columbia Bypass Systems; Sliding Scale Spill; Introduction of New Resources; Initialization of Centralia Coal Pile; Initialization of GM Shrum System; Albeni Falls Elevation Data; and Leakage and Lockage.

10.3.a.3 Input Data

The data used in the SAM have been updated in the following areas: oil and gas prices; California load forecasts; Grand Coulee Energy Content Curve; rule curves and constraints; variable and fixed operating costs of existing resources; rates for nonfirm and firm surplus; PNW load forecasts; fish spill plans; spill priority list; operation of Canadian Treaty reservoirs (Arrow and Mica); minimum flow constraints at Libby; Albeni Falls Energy Content Curve; and the schedule for construction of bypass systems at Federal projects.

10.3.b FISHPASS Model

10.3.b.1 Logic

There were no revisions in the logic used in FISHPASS between the draft EIS and the current analyses.

10.3.b.2 Assumptions

Assumptions were revised in the FISHPASS model regarding fish transportation data and the number of simulations run.

10.3.b.3 Input Data

The data used in FISHPASS have been updated in the following areas: fish guidance efficiencies; fish bypass facilities construction schedule; reservoir mortality; fish bypass efficiency of spill at Wells Dam; hatchery release data; wild and natural fish data; and flow modulation values.

1.5.5 CHANGES TO THE DRAFT EIS/EIR VOLUME 3A APPENDIX E - WETLANDS AND FLOODPLAINS CROSSED BY THE PREFERRED ALTERNATIVE

1. Appendix E

   Section 1.1.6 of this document describes current plans for minimizing impacts to floodplains and wetlands. Replace Appendix E in the Draft EIS/EIR with the following Wetlands and Floodplains Report that reflects the final preferred route.

APPENDIX E

WETLANDS AND FLOODPLAINS CROSSED BY THE PREFERRED ALTERNATIVE

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APPENDIX E

WETLANDS AND FLOODPLAINS CROSSED
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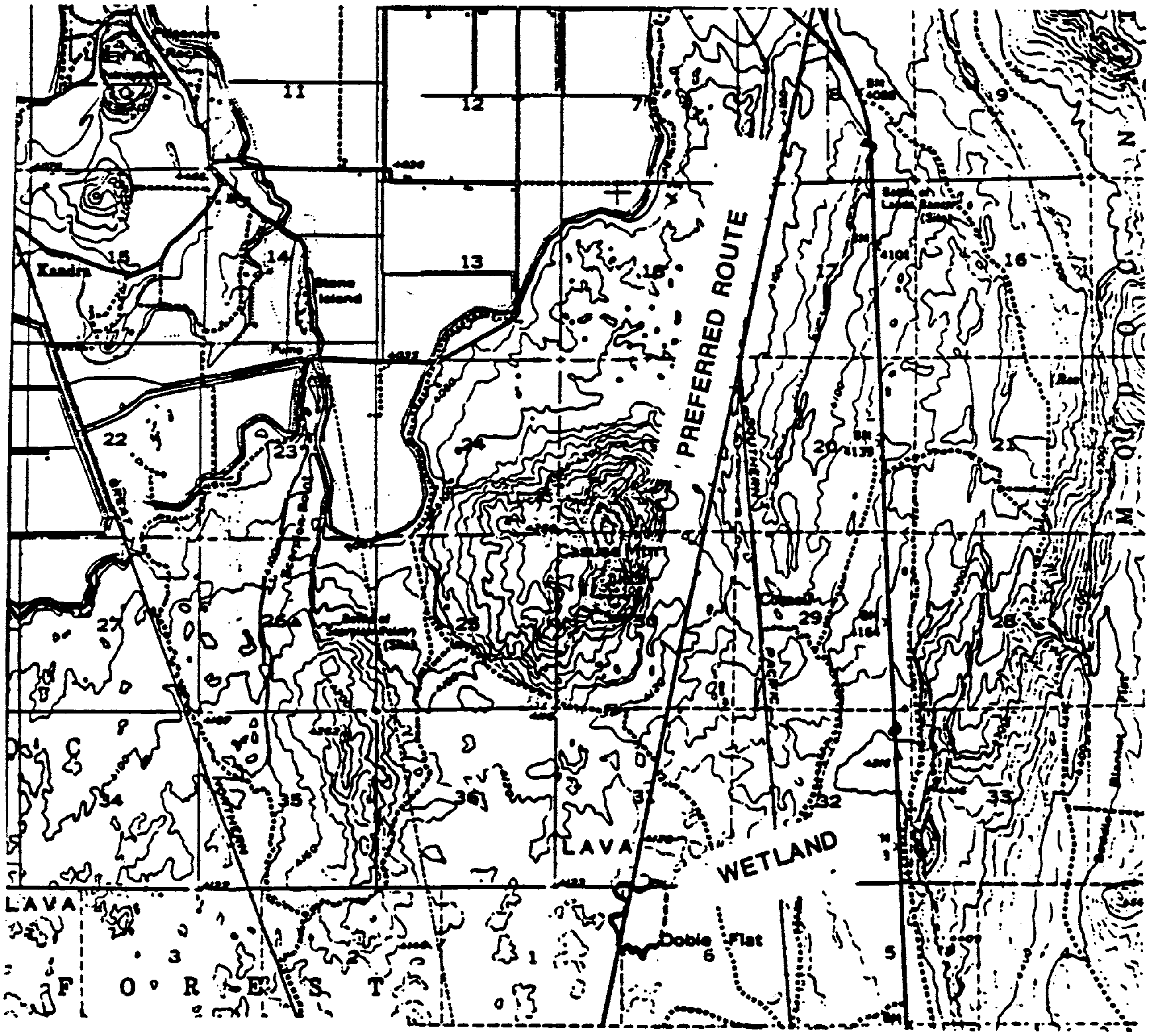
APPENDIX E

WETLANDS AND FLOODPLAINS CROSSED BY THE PREFERRED ALTERNATIVE

INTRODUCTION

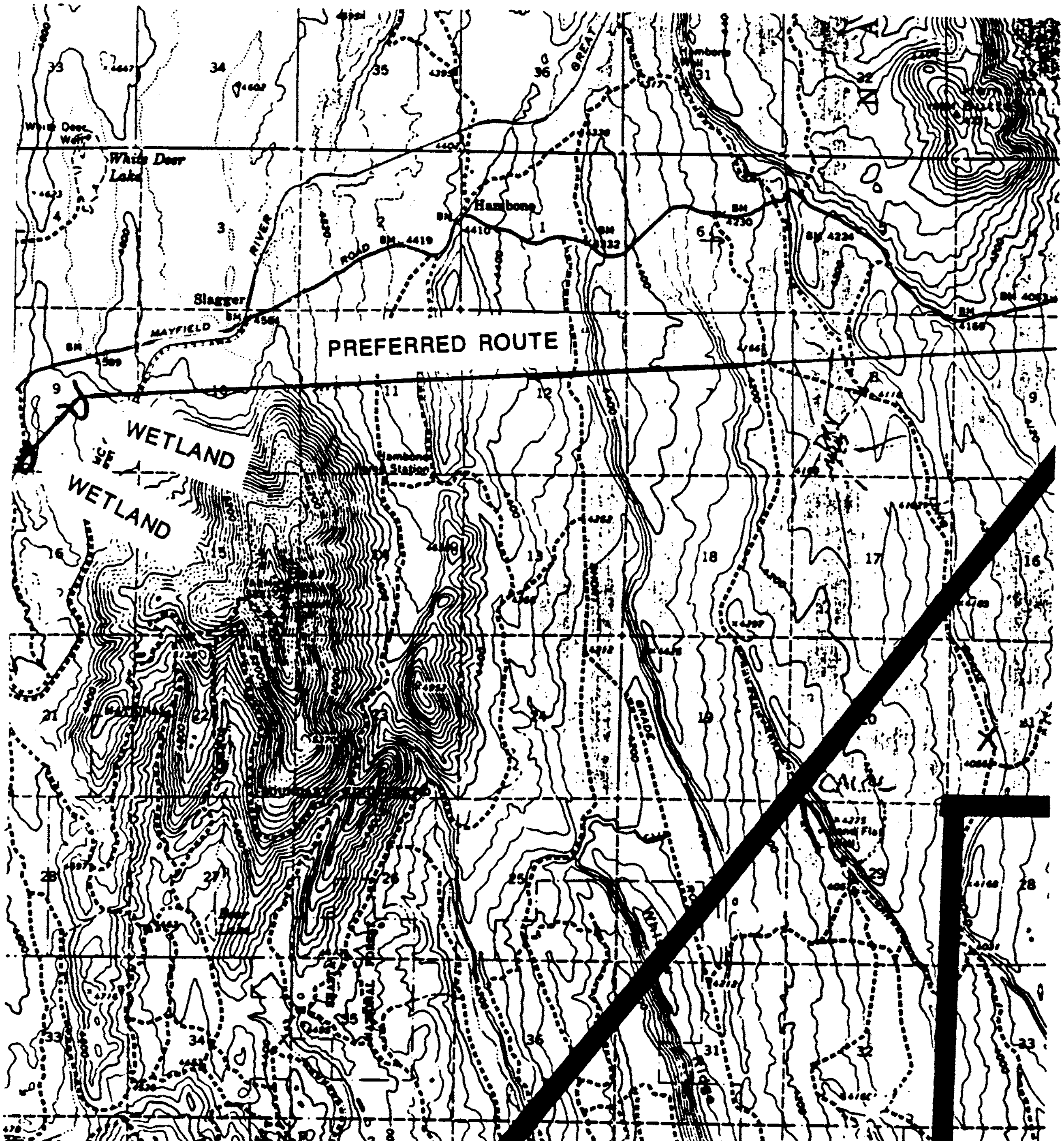
This appendix contains updated tables and figures that describe wetlands and floodplains crossed by the final preferred alternative. Tables E-1 through E-4 identify wetlands and floodplains potentially intersected by the preferred alternative. Figures E-1 to E-15 are maps of wetlands intersected by more than 500 feet of the reference centerline of the preferred alternative.

FIGURE E-1



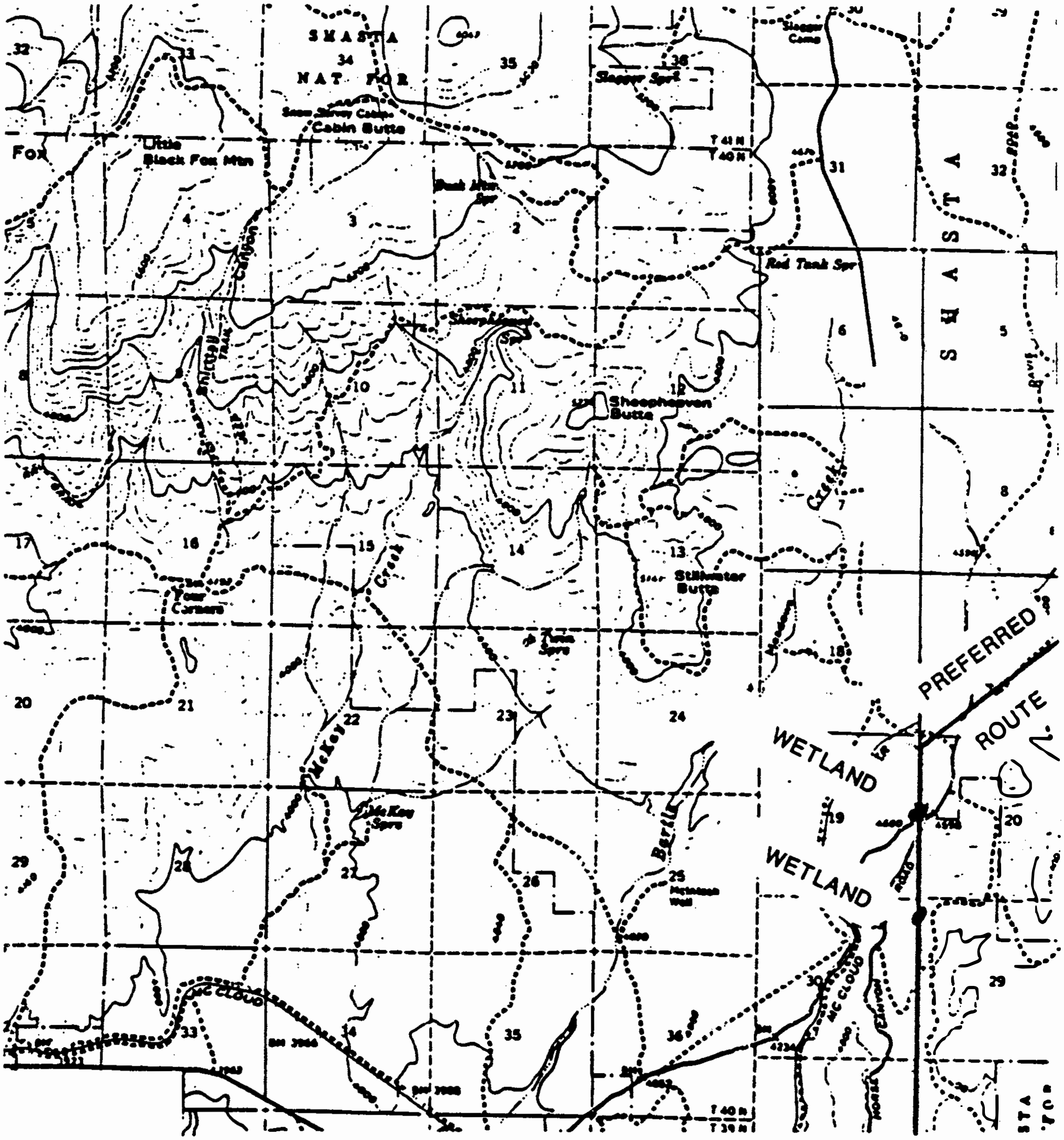
Tulelake USGS quad

FIGURE E-2



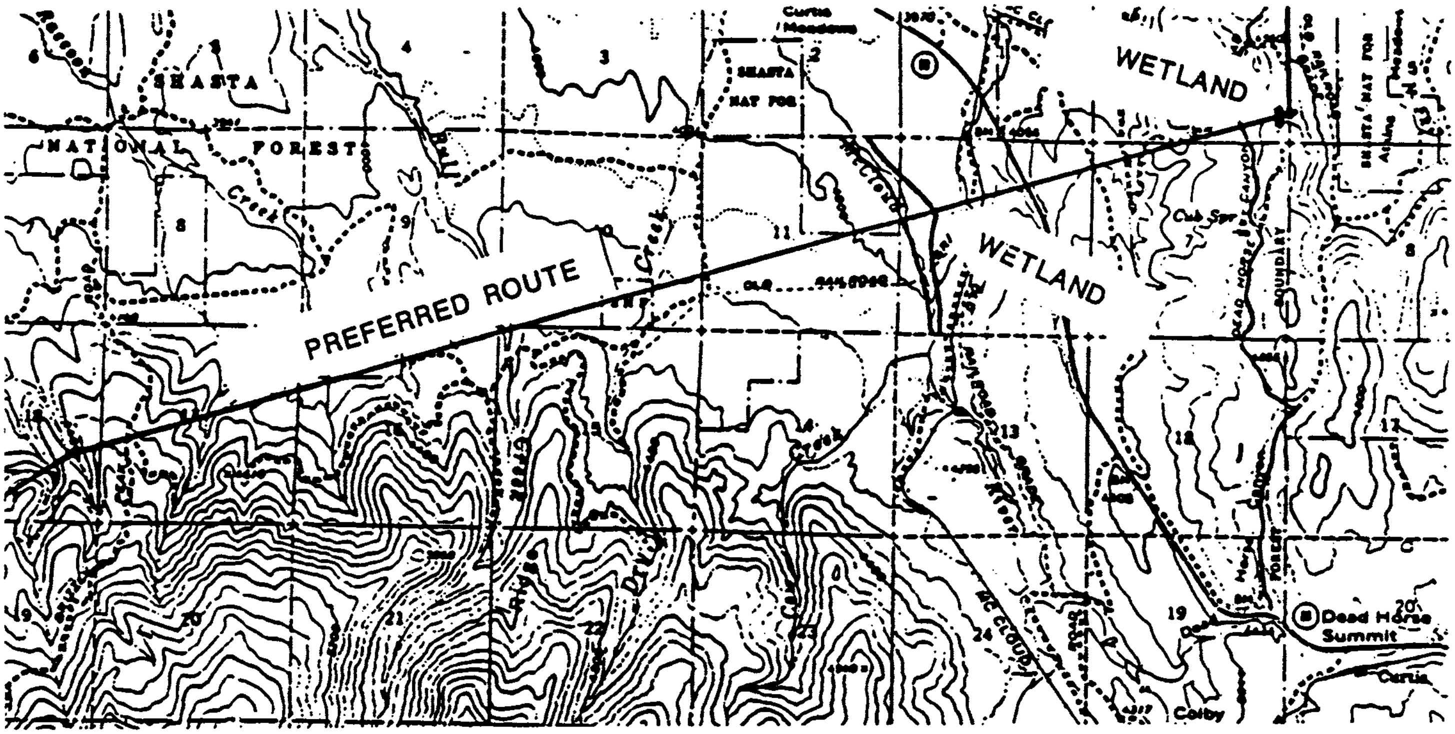
Hambone USGS quad

FIGURE E-3



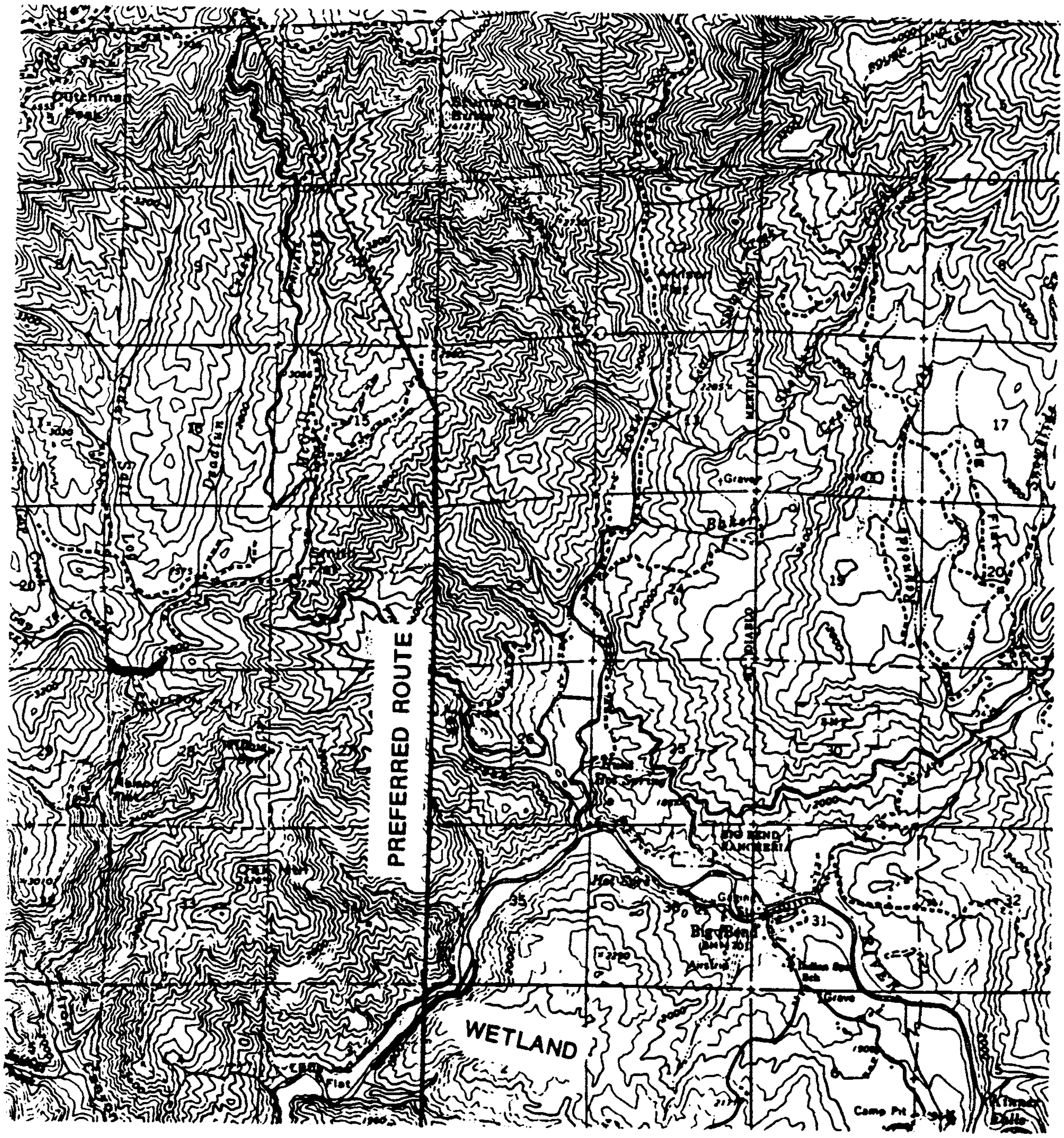
Bartle USGS quad

FIGURE E-4



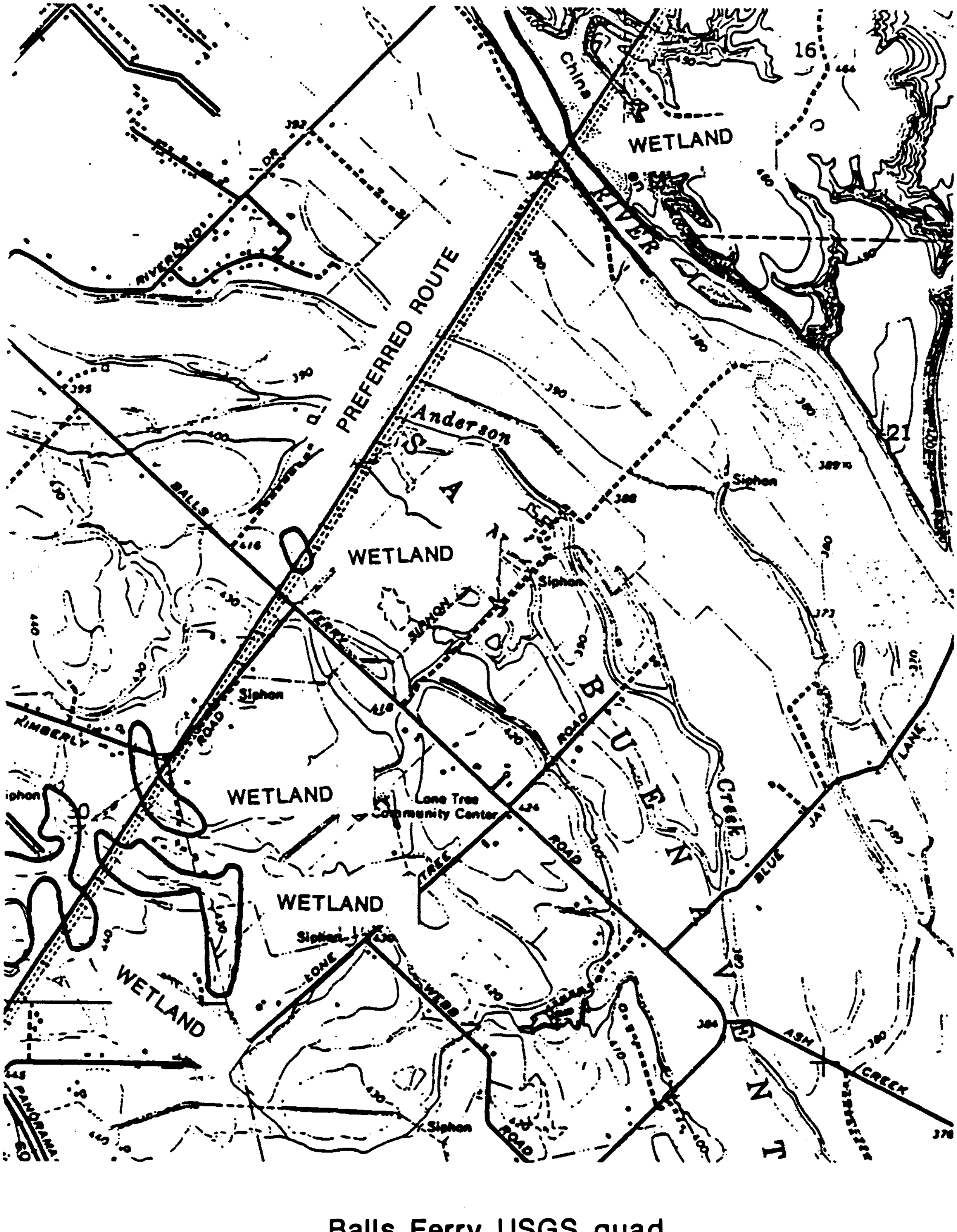
Big Bend USGS quad

FIGURE E-5



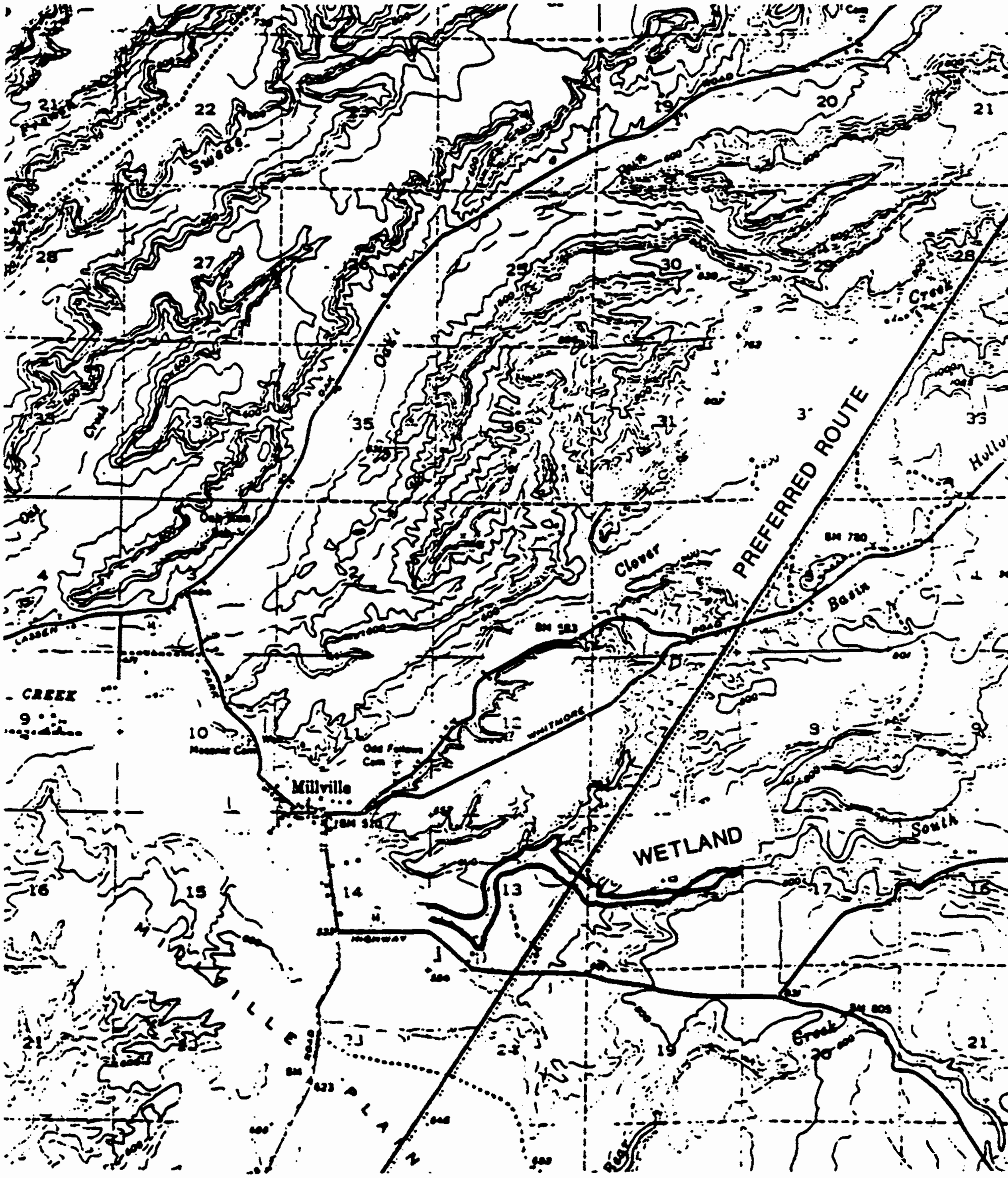
Big Bend USGS quad
(CONTINUED)

FIGURE E-6



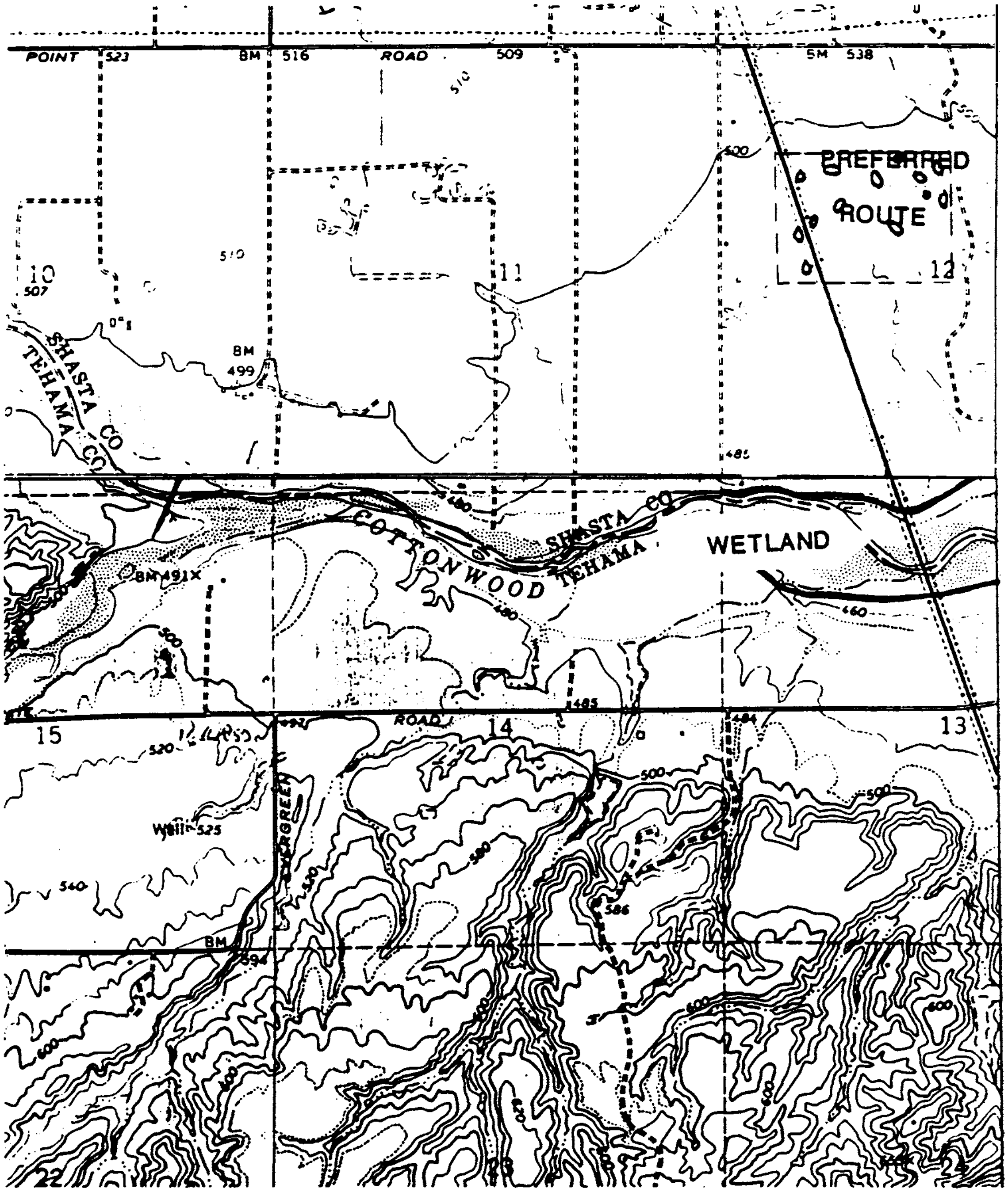
Balls Ferry USGS quad

FIGURE E-7



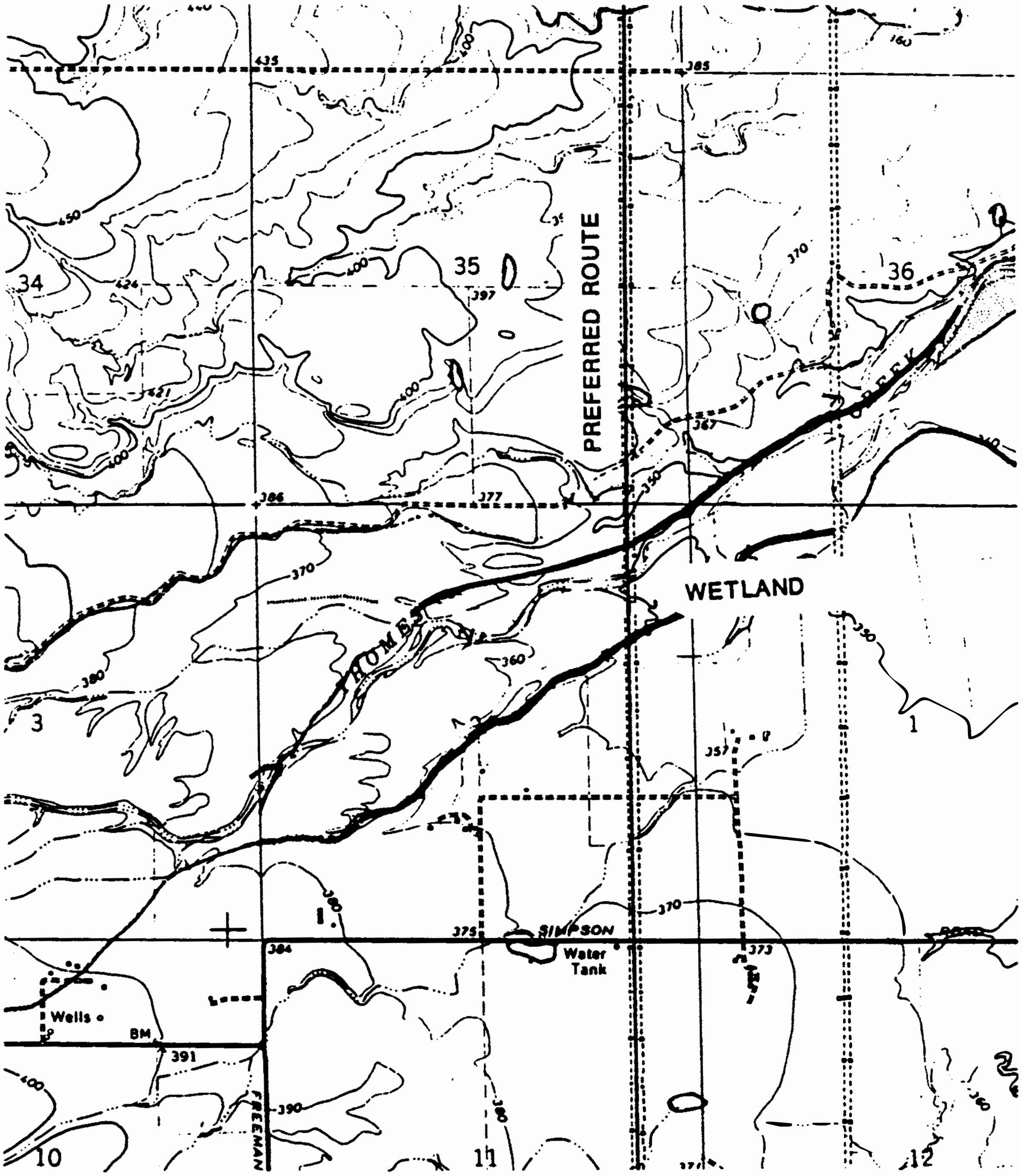
Millville USGS quad

FIGURE E-8



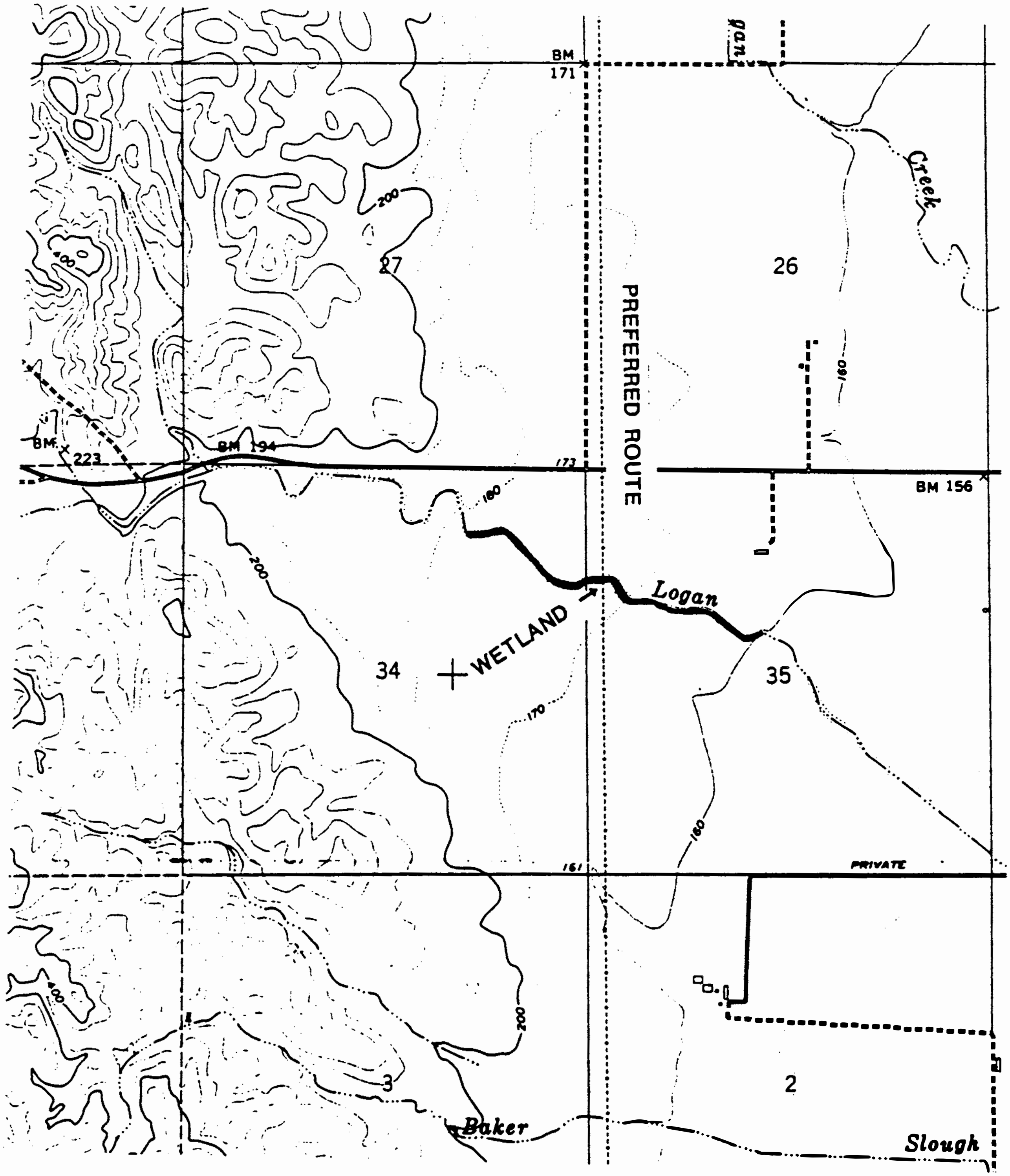
Olinda and Mitchell Gulch USGS quads

FIGURE E-9



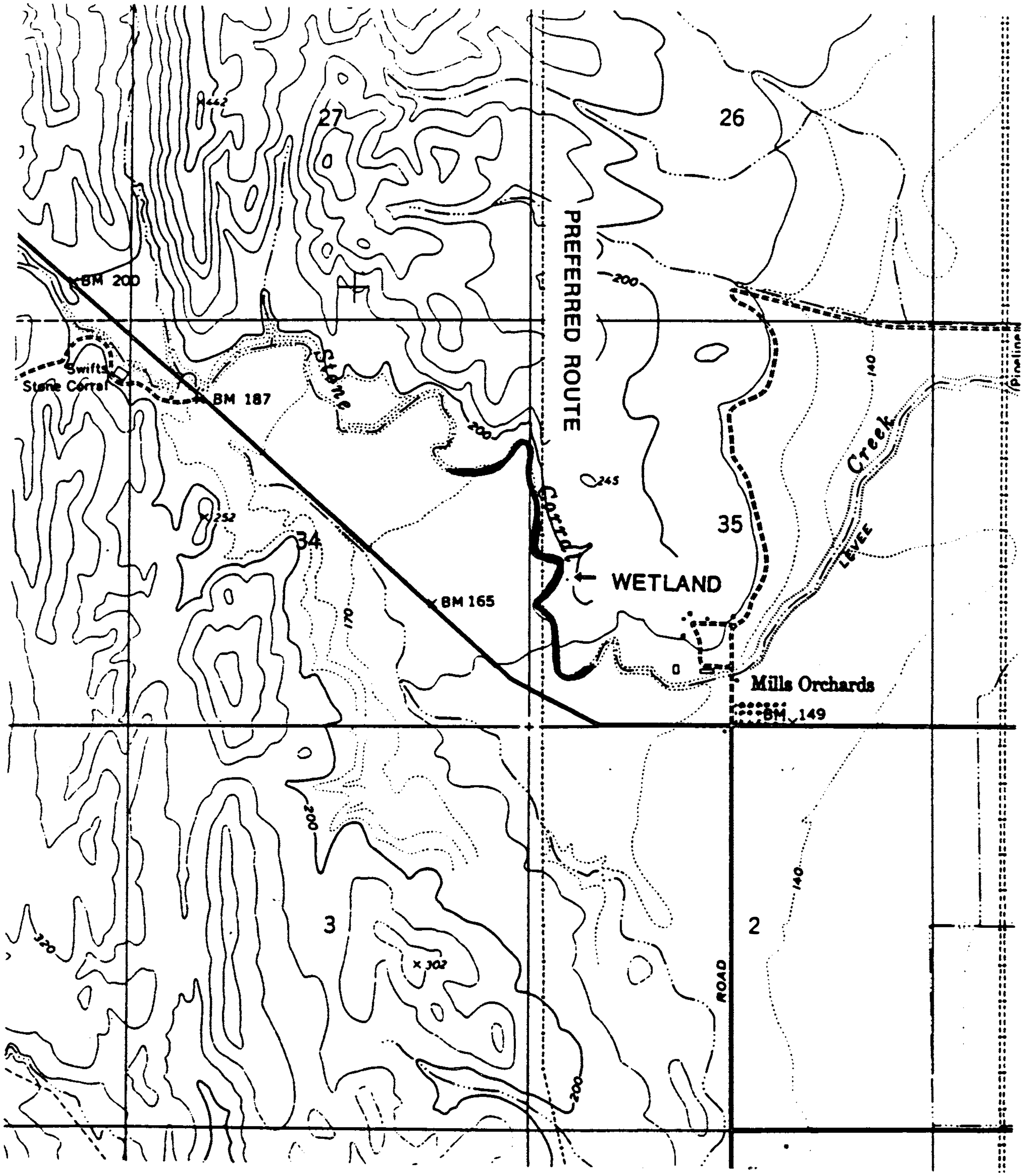
Henleyville USGS quad

FIGURE E-10



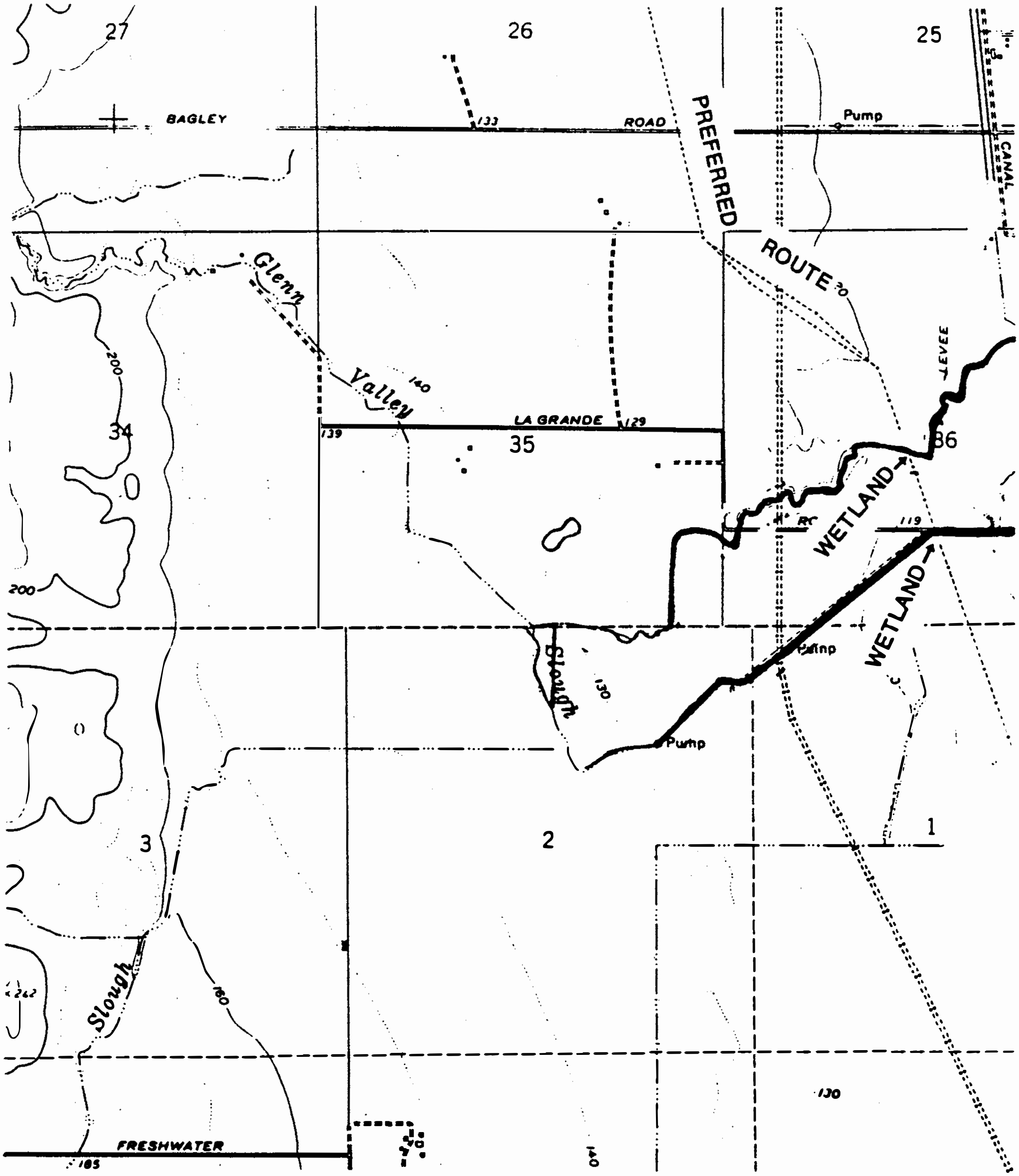
Logan Ridge USGS quad

FIGURE E-11



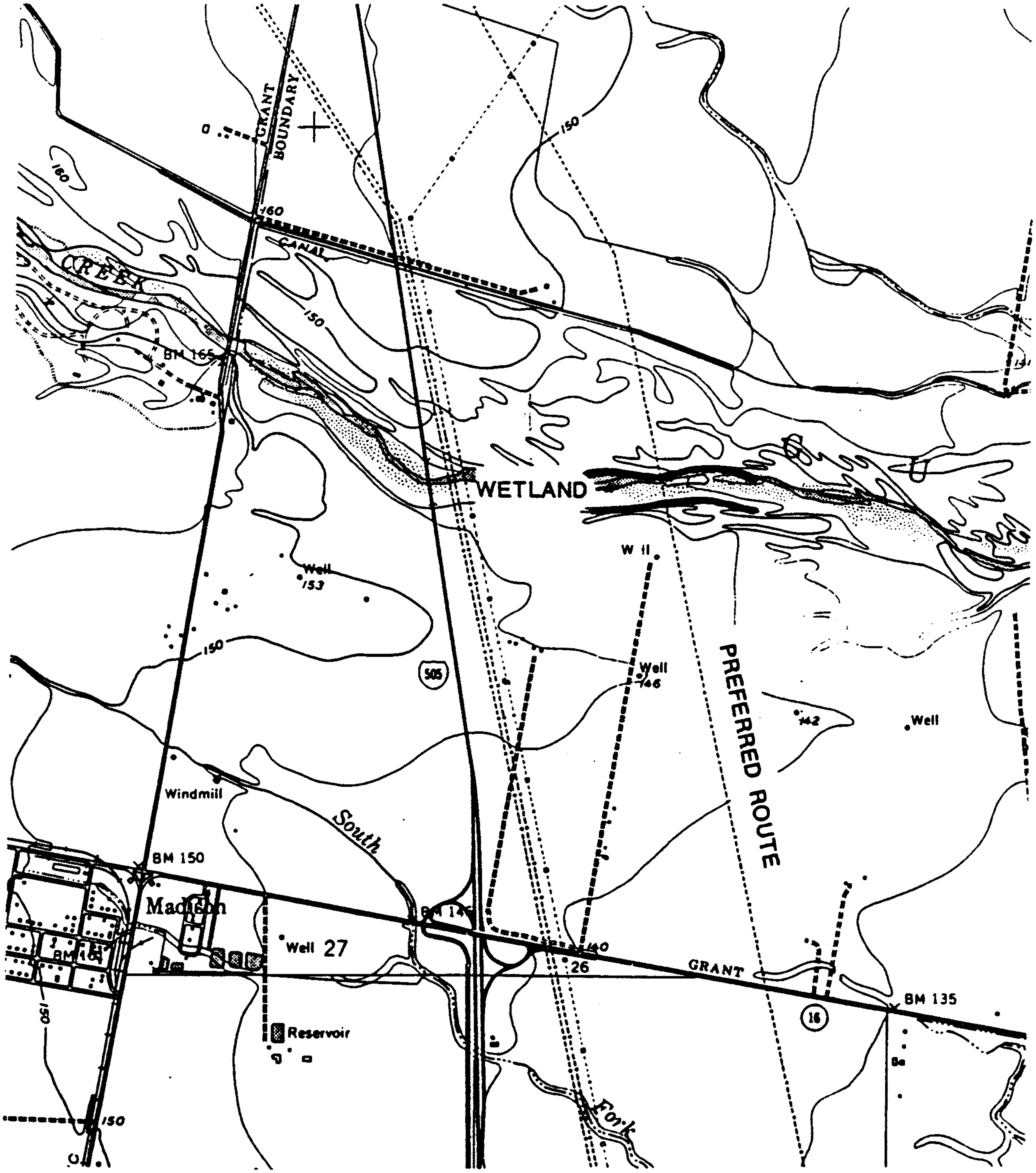
Sites USGS quad

FIGURE E-12



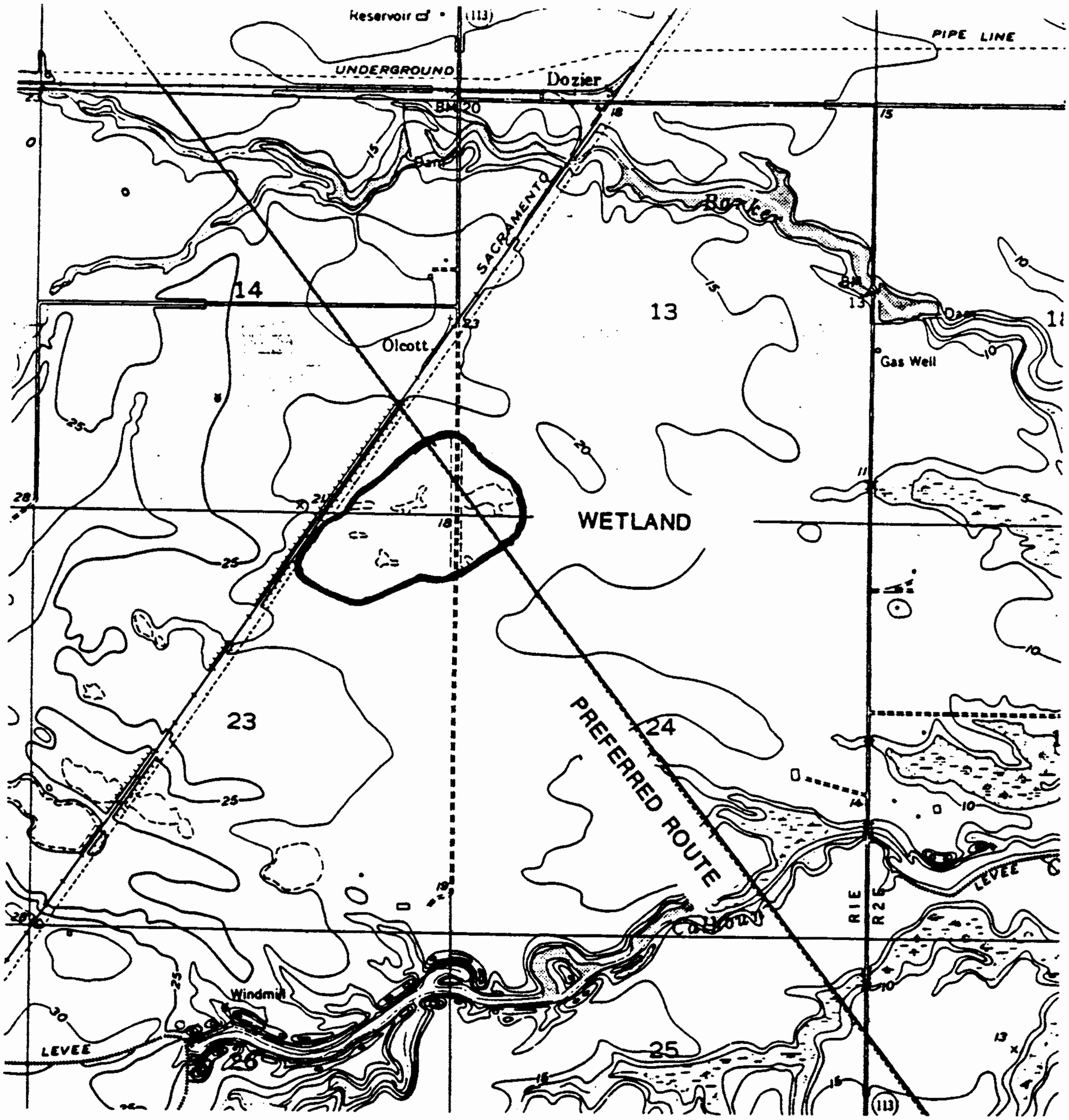
Manor Slough USGS quad

FIGURE E-13



Madison USGS quad

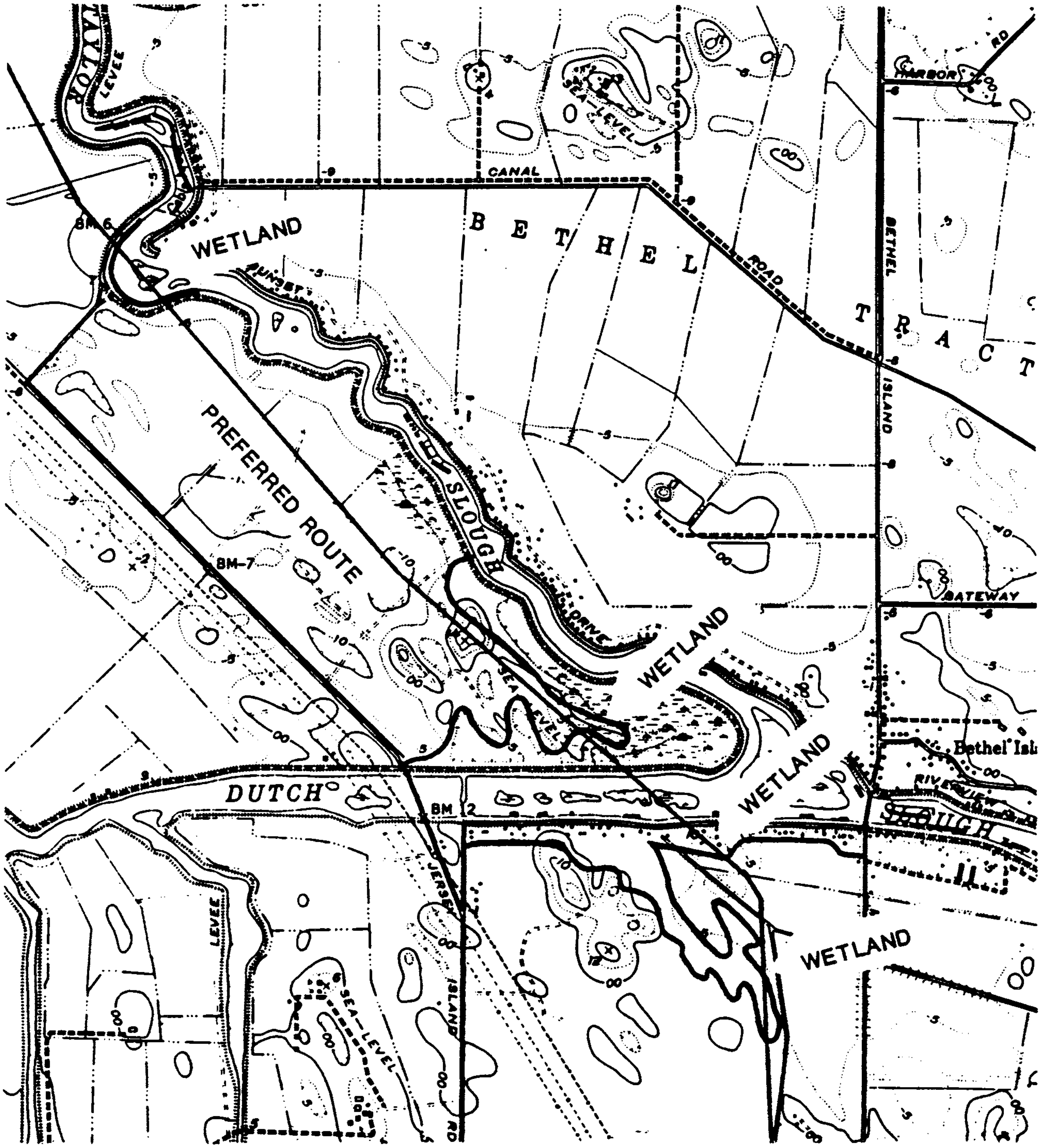
FIGURE E-14



Dozier USGS quad

VOL. 1 FINAL

FIGURE E-15



Jersey Island USGS quad

Table E-1. Wetlands[a] Potentially Intersected by the Preferred Alternative Excluding the Upgrade Segment (S-1A)

Segment	USGS Quad Name	Segment Mile Number[b]	County	Type of Wetland	Name/ Location of Wetland	Length Intersected by Reference Centerline (feet)	Potential for Avoidance During Siting[c]
Wetlands Intersected by Reference Centerline							
North 1	Malin	3.5	Klamath	Seasonal Lake	Unnamed/4 miles east of Malin	400 ft	H
North 1	Malin	0-3.5	Klamath	Scattered small meadows	None/East of Malin	<150 ft	H
N-10G	Tulelake	3.25	Modoc	Vernal Pool	None/East of Little Horse Mountain	5-700 ft	H
N-10J	Tulelake	1.0	Modoc	Creek	None/East of Lands Island	<150 ft	H
N-10J	Tulelake	2.1	Modoc	Vernal Pool	None/Southeast of Little Horse Mountain	<500 ft	H
N-10K	Tulelake	1.3	Modoc	Vernal Pool	None/East of Casuse Mountain	± 100 ft	H
N-10K	Tulelake	3.0-3.4	Modoc	Vernal Pool	Dobie Flat	1,100 ft of vernal pool mosaic	AFS
N-10M2(A1)	Timber Mountain	1.7-8	Modoc	Meadow	Unnamed/2 meadows south of Old Camp 1 and North of Siskiyou County line	±250 ft/meadow	H

Table E-1. Continued

Segment	USGS Quad Name	Segment Mile Number[b]	County	Type of Wetland	Name/ Location of Wetland	Length Intersected by Reference Centerline (feet)	Potential for Avoidance During Siting[c]
Wetlands Intersected by Reference Centerline (Continued)							
North 2B	Hambone	0.4	Siskiyou	Meadow	Unnamed/west and adjacent to West Lava Rim Road	150	H
North 2B	Hambone	1.3	Siskiyou	Meadow	Unnamed/south of Mayfield Road at BM 4169	300	H
North 2B	Hambone	3.7	Siskiyou	Meadow	Unnamed/West and adjacent to Short Grade Road	400	H
North 2B	Hambone	4.9	Siskiyou	Meadow	Unnamed/north of Hambone Station	200	H
North 2B	Hambone	6.7	Siskiyou	Meadow	Unnamed/west of McCloud River - Great Northern Rail Line	800	AFS
North 2B	Hambone	7.1	Siskiyou	Meadow	Unnamed/West of McCloud River - Great Northern Rail Line	500	AFS
N-7A1(A)	Bartle	30.5	Siskiyou	Meadow	N. and adjacent to McCloud-Mayfield Road	± 500 ft	H

Table E-1. Continued

Segment	USGS Quad Name	Segment Mile Number[b]	County	Type of Wetland	Name/ Location of Wetland	Length Intersected by Reference Centerline (feet)	Potential for Avoidance During Siting[c]
Wetlands Intersected by Reference Centerline (Continued)							
N-7A1(A)	Bartle	31.3	Siskiyou	Meadow	None/East of Deadhorse Canyon Road	$\pm$ 500 ft	H
N-7A1(A)	Big Bend	34.4	Siskiyou	Meadow	None/Old R&R Grade	$\pm$ 500 ft	AFS
N-7A1(A)	Big Bend	36.5	Siskiyou	Meadow and River	McCloud River	900 ft	AFS
N-71A(A)	Big Bend	37.8	Siskiyou	Creek	Dry Creek	<150 ft	H
N-7A1(A)	Big Bend	38.6	Siskiyou	Creek	Bull Creek	<150 ft	H
N-7A1(B)	Big Bend	1.8	Siskiyou	Creek	East Branch Raccoon Creek	<150 ft	H
N-7A1(B)	Big Bend	2.6	Siskiyou	Creek	West Branch Raccoon Creek	<150 ft	H
N-7A1(B)	Big Bend	3.3	Siskiyou	Creek	East Branch Shady Gulch	<150 ft	H
N-7A1(B)	Big Bend	3.5	Siskiyou	Creek	West Branch Shady Gulch	<150 ft	H
N-7A1(B)	Big Bend	4.7	Siskiyou	Creek	Tate Creek	<150 ft	H

Table E-1. Continued

Segment	USGS Quad Name	Segment Mile Number[b]	County	Type of Wetland	Name/ Location of Wetland	Length Intersected by Reference Centerline (feet)	Potential for Avoidance During Siting[c]
Wetlands Intersected by Reference Centerline (Continued)							
N-7A1(B)	Big Bend	5.2	Siskiyou	Creek	East Branch Red Ant Creek	<150 ft	H
N-7A1(B)	Big Bend	6.2	Siskiyou	Creek	West Branch Red Ant Creek	<150 ft	H
N-7A1(B)	Big Bend	8.0	Shasta	Creek	Star City Creek	<150 ft	H
N-7A1(B)	Big Bend	9.0	Shasta	Creek	Gold Creek	<150 ft	H
North-3J	Big Bend	0.1	Shasta	Creek	Pigeon Creek	<150 ft	H
North-3J	Big Bend	0.6	Shasta	Creek	Big Basin Creek	<150 ft	H
North-3J	Big Bend	1.3	Shasta	Creek	Dropoff Creek	<150 ft	H
North-3J	Big Bend	3.1	Shasta	Creek	Deer Creek	<150 ft	H
North-3J	Big Bend	4.3	Shasta	Creek	Hawkins Creek	<150 ft	H
N-3J	Big Bend	6.1	Shasta	Creek	McGill Creek	<150 ft	H
N-8A(3)	Big Bend	0.9	Shasta	Creek	Above Smith Flat	<150 ft	H
N-8A(3)	Big Bend	1.6	Shasta	Creek	Blue Jay Circle	<150 ft	H
N-8A(3)	Big Bend	3.6	Shasta	River and assoc. channel	Pit River upstream of Little Joe Flat	700 ft	AFS

Table E-1. Continued

Segment	USGS Quad Name	Segment Mile Number[b]	County	Type of Wetland	Name/ Location of Wetland	Length Intersected by Reference Centerline (feet)	Potential for Avoidance During Siting[c]
<u>Wetlands Intersected by Reference Centerline</u> (Continued)							
N-8C	Montgomery Creek	1.0	Shasta	Creek	Unnamed creek on flatwoods	<150 ft	H
North-4	Montgomery Creek		Shasta	Creek	Marble Creek	<150 ft	H
North-4	Montgomery Creek		Shasta	River	Pit River	400 ft	H
N-8A2(A)	Montgomery Creek	0.5	Shasta	River	Pit River	400 ft	H
N-8A2(A)	Montgomery Creek	2.5	Shasta	Creek	Hogback Creek	<150 ft	H
N-8A2(A)	Montgomery Creek	4.5	Shasta	Creek	Unnamed/Brush Patch	<150 ft	H
N-9A	Montgomery Creek	0.1	Shasta	Creek	Creek Draining Spring	<150 ft	H
N-9A	Montgomery Creek	0.8	Shasta	Meadow	South of Fender Ferry Road	300 ft	H
N-9C	Montgomery Creek	0.1	Shasta	Creek	Bear Canyon	<150 ft	H
N-9C	Montgomery Creek	1.7	Shasta	Creek	Branch of Cedar Creek	<150 ft	H
N-9C	Montgomery Creek	2.0	Shasta	Creek	Cedar Creek	<150 ft	H

Table E-1. Continued

Segment	USGS Quad Name	Segment Mile Number[b]	County	Type of Wetland	Name/ Location of Wetland	Length Intersected by Reference Centerline (feet)	Potential for Avoidance During Siting[c]
Wetlands Intersected by Reference Centerline (Continued)							
N-9D	Montgomery Creek	0.7	Shasta	Creek	Unnamed/North of Buzzard Roost Road	<150 ft	H
N-9D	Millville	3.0	Shasta	Creek	Little Cow Creek	<150 ft	H
N-9G	Millville	0	Shasta	Creek	Oak Run	<150 ft	H
N-9G	Millville	0.8	Shasta	Creek	Unnamed/Oak Flat	<150 ft	H
N-9G	Millville	1.0	Shasta	Creek	Tracy Circle	<150 ft	H
N-90	Balls Ferry	2.6	Shasta	Marsh	Unnamed/North of Lone Tree Road	500 ft	AFS
N-90	Balls Ferry	3.4	Shasta	Marsh	Unnamed/North of Lone Tree Road	500 ft	AFS
N-90	Balls Ferry	3.5	Shasta	Marsh	Unnamed/North of Lone Tree Road	500 ft	AFS
N-90	Balls Ferry	3.7	Shasta	Marsh	Unnamed/North of Lone Tree Road	500 ft	AFS
N-90	Balls Ferry	4.2	Shasta	Ditch	Anderson-Cottonwood Canal	<150 ft	H

Table E-1. Continued

Segment	USGS Quad Name	Segment Mile Number[b]	County	Type of Wetland	Name/ Location of Wetland	Length Intersected by Reference Centerline (feet)	Potential for Avoidance During Siting[c]
Wetlands Intersected by Reference Centerline (Continued)							
N-9J	Millville	0.1	Shasta	Creek	Price Hollow	<150 ft	H
N-9J	Millville	1.5	Shasta	Creek	Post Gulch	<150 ft	H
N-9J	Millville	3.5-4.5	Shasta	Vernal Pool	Vernal Pool/ Grassland mosaic north of Clover Creek	1.25 miles of mosaic mesa	H
N-9J	Millville	5.25-5.5	Shasta	Creek floodplain	Clover Creek	0.25 mile	H
N-9J	Millville	5.5-7.5	Shasta	Vernal Pool	Vernal pool/ Grassland mosaic south of Clover Creek	2.0 miles of mosaic	H
N-9J	Millville	8.25	Shasta	Creek	Basin Hollow	<150 ft	H
N-9J	Millville	10	Shasta	Creek and Meadow	South Cow Creek	600 ft	AFS
N-9J	Millville	10.0-10.6	Shasta	Vernal pool	Vernal pool/ Grassland mosaic on Millville Plains	0.6 miles of mosiac	H

Table E-1. Continued

Segment	USGS Quad Name	Segment Mile Number[b]	County	Type of Wetland	Name/ Location of Wetland	Length Intersected by Reference Centerline (feet)	Potential for Avoidance During Siting[c]
Wetlands Intersected by Reference Centerline (Continued)							
N-9J	Millville	10.8	Shasta	Creek	Unnamed creek/ South of Highway 44	<150 ft	H
N-9J	Millville	10.8-11.0	Shasta	Vernal pool	Vernal pool/ Grassland mosaic on Millville Plains	600 ft of mosaic	H
N-9J	Millville and Tuscan Butte	11.25	Shasta	Vernal pool	Vernal pool/ Grassland mosaic on Millville Plains	2.75 miles of mosaic	H
N-9J	Tuscan Butte	14.2	Shasta	Creek	Dry Creek	<150 ft	H
N-9N	Tuscan Butte	0.3	Shasta	Creek	Dry Creek	<150 ft	H
N-9O	Tuscan Butte	0-.8	Shasta	Vernal pool	Vernal pool/ Grassland mosaic on Mesa Northeast of Sacramento River	0.8 miles	H
N-9O	Tuscan Butte	1.4	Shasta	River	Sacramento River	500 ft	AFS
N-9O	Tuscan Butte	1.9	Shasta	Ditch	Unnamed	<150 ft	H

Table E-1. Continued

Segment	USGS Quad Name	Segment Mile Number[b]	County	Type of Wetland	Name/ Location of Wetland	Length Intersected by Reference Centerline (feet)	Potential for Avoidance During Siting[c]
Wetlands Intersected by Reference Centerline (Continued)							
N-90	Tuscan Butte	2.3	Shasta	Creek	Anderson	<150 ft	H
Olinda Sub-station	Olinda	0	Shasta	Vernal pools	Unnamed	2,000 ft of mosaic	N
S-8B	Jersey Island	0.6-1.2	Solano/ Sacramento	River	Sacramento River	3,000 ft	AFS
S-8C	Jersey Island	3.5	Sacramento/ Contra Costa	River	San Joaquin	775 ft	AFS
S-8E1(A)	Jersey Island	1.5	Contra Costa	Slough	Taylor Slough	850 ft	AFS
S-8E1(A)	Jersey Island	2.9-3.2	Contra Costa	Marsh	Unnamed/North and South of Dutch Slough	600 ft	AFS
S-8E1(A)	Jersey Island	3.3	Contra Costa	Slough	Dutch Slough	700 ft	AFS
S-8E1(A)	Jersey Island	4.2	Contra Costa	Marsh	Unnamed/South of Dutch Slough	500 ft	AFS
South 1	Woodward Isl.	5.2	Contra Costa	Slough	Rockslough	200 ft	H

Table E-1. Continued

Segment	USGS Quad Name	Segment Mile Number[b]	County	Type of Wetland	Name/ Location of Wetland	Length Intersected by Reference Centerline (feet)	Potential for Avoidance During Siting[c]
<u>Wetlands Intersected by Reference Centerline</u> (Continued)							
South 1	Woodward Isl.	6.5	Contra Costa	Slough	Werner Dredger Cut	500 ft	AFS
South 1	Woodward Isl.	1.3	Contra Costa	Slough	Mokelumne Aqueduct	200 ft	H
South-1	Woodward Isl.	4.0	Contra Costa	Slough	Indian Slough	600 ft	AFS
South-1	Woodward Isl.	4.3	Contra Costa and San Joaquin	River	Old River	600 ft	AFS
S-8J2	Clifton Court	3.5	Contra Costa and San Joaquin	River	Old River	400 ft	AFS
S-8J2	Clifton Court	5.6	Contra Costa	Canal	West Canal	500 ft	AFS
S-8J2	Clifton Court	6.7	Contra Costa	Canal	Delta Mendota	300 ft	AFS
S-9D	Clifton Court Forebay	0.8	Alameda	Canal	North of Delta Mendota Canal	<100	H

Table E-1. Continued

Segment	USGS Quad Name	Segment Mile Number[b]	County	Type of Wetland	Name/ Location of Wetland	Length Intersected by Reference Centerline (feet)	Potential for Avoidance During Siting[c]
Wetlands Intersected by Reference Centerline (Continued)							
S-9D	Clifton Court Forebay	1.0	Alameda	Canal	North of Delta Mendota Canal	<100	H
S-9G	Clifton Court Forebay	0.25	Alameda	Canal	North of Delta Mendota Canal	<100	H
S-9G	Clifton Court Forebay	0.3	Alameda	Canal	North of Delta Mendota Canal	<100	H
S-9G	Clifton Court Forebay	1.0	Alameda	Reservoir	Reservoir on Mountain House Creek	200	H
South 2	Clifton Court Forebay	0.1	Alameda	Canal	Delta-Mendota Canal	175	H
South 2	Clifton Court Forebay	1.6	Alameda	Canal	California Aquaduct	150	H
South 2	Midway	1.8	Alameda	Creek	Unnamed/Southeast of Altamont Speedway	<150 ft	H

Table E-1. Continued

Segment	USGS Quad Name	Segment Mile Number[b]	County	Type of Wetland	Name/ Location of Wetland	Length Intersected by Reference Centerline (feet)	Potential for Avoidance During Siting[c]
Wetlands Intersected by Reference Centerline (Continued)							
South 2	Midway	2.3	Alameda	Creek	Run Creek	<150 ft	H
South 2	Midway	2.8	Alameda	Creek	Unnamed/North of Southern Pacific RR	<150 ft	H
South 2	Midway	3.1	Alameda	Creek	Unnamed/Midway	<150 ft	H

[a] Based upon United Stated Fish and Wildlife Service National Wetland Inventory maps, United States Geologic Survey topographic maps, and aerial photographs.
[b] Mile numbers are counted from the north end of each route segment.
[c] H = High potential for complete avoidance during siting.
AFS = Additional field study needed during siting of actual transmission line features.
N = Not avoidable.

Table E-2. Floodplains[a] Exceeding 500 Feet Intersected by the Preferred Alternative Excluding the Upgrade Segment (S-1A)

Segment	USGS Quad Name	Segment Mile Number[b]	County	Type of Floodplain	Name/ Location of Floodplain	Length Intersected by Reference Centerline (feet)	Potential for Avoidance During Siting[c]
N-9J	Millville	10	Shasta	Creek	South Cow Creek	± 600 ft	H
N-90	Tuscan Butte	1.2-1.6	Shasta	River	Sacramento River	0.5 miles	L
N-90	Tuscan Butte	1.8	Shasta	Ditch	Unnamed	500 ft	H
N-90	Tuscan Butte	2.1	Shasta	Creek	Anderson	1,000 ft	L
N-13A	Cottonwood	5.9	Shasta	Creek	Unnamed/ Tributary to Cottonwood Creek	600 ft	H
S-8B	Jersey Island	*	Sacramento	Delta	Sacramento/San Joaquin River Delta	Entire	L
S-8C	Jersey Island	*	Sacramento	Delta	Sacramento/San Joaquin River Delta	Entire	L
S-8E1	Jersey Island	*	Sacramento	Delta	Sacramento/San Joaquin River Delta	Entire	L

Table E-2. Continued

Segment	USGS Quad Name	Segment Mile Number[b]	County	Type of Floodplain	Name/ Location of Floodplain	Length Intersected by Reference Centerline (feet)	Potential for Avoidance During Siting[c]
S-8Alt.1	Jersey Isl.	*	Sacramento	Delta	Sacramento/San Joaquin River Delta	Entire	L
S-8E1(A)	Brentwood	*	Sacramento	Delta	Sacramento/San Joaquin River Delta	Entire	L
South 1	Woodward Isl.	*	Sacramento	Delta	Sacramento/San Joaquin River Delta	Entire	L
S-8J2	Woodward Isl. and Clifton Court Forebay	*	Sacramento	Delta	Sacramento/San Joaquin River Delta	Entire	L
S-8J	Clifton Court Forebay	Up to mile 7.3	Sacramento	Delta	Sacramento/San Joaquin River Delta	Entire	L

* Entire length of segment on indicated quad within floodplain.
[a] Based upon Federal Emergency Management Agency flood insurance rate maps.
[b] Mile numbers are counted from the north end of each route segment.
[c] H = High potential for complete avoidance during siting.
L = Low potential for complete avoidance during siting.

TABLE E-3

WETLANDS[1/] INTERSECTED BY THE UPGRADE SEGMENT OF THE PREFERRED ALTERNATIVE

USGS QUAD	Nearest Towers (WAPA NOS)	County	Type of Wetland	Name/Location of Wetland	Length Intersected by Reference Centerline (ft.)	Potential Impacts Tower Siting	Potential Impacts Construction Disturbance
Olinda	23/5-23/1	Shasta	Vernal Pool	Grassland-vernal pool mosaic/North of Cottonwood Creek	3,500 of mosaic	No	Yes
Mitchell Gulch	24/4-24/2	Shasta/ Tehama	Creek	Cottonwood Creek/South of Evergreen Road	1,700	Yes	Yes
Hooker	25/1-26/2	Tehama	Intermittent Creeks	4 intermittent creeks/ between Cottonwood and South Fork Cottonwood Creeks	± 100/creek	No	Yes
Hooker	26/2-26/3	Tehama	Creek Riparian	South Fork Cottonwood Creek	225	No	Yes
Hooker	27/2-31/4	Tehama	Intermittent Creeks	9 intermittent creeks, some within wide gravel channels/north of Hooker Creek	± 100/creek	No	Yes
Hooker	31/4-31/5	Tehama	Creek	Hooker Creek/South of South Fork Cottonwood Creek	± 100	No	Yes
Hooker	32/2-32/3	Tehama	Creek	Blue Tent Creek/South of Hooker Creek, with <u>Cryptantha crinata</u>	± 100	No	Yes
Hooker and Red Bluff West	32/3-33/4	Tehama	Intermittent Creeks	4 unnamed creeks/between Blue Tent and Dibble Creeks	± 100/creek	No	Yes
Red Bluff West	33/4-36/2	Tehama	Creek	3 branches of Dibble Creek/West of Red Bluff	± 100/creek	No	Yes
Red Bluff West	38/1-38/2	Tehama	Creek	Brickyard Creek/North of Pine Creek, West of Red Bluff	± 100	No	Yes
Red Bluff West	39/3-39/4	Tehama	Creek	Pine Creek/West of Red Bluff	± 100	No	Yes
Red Bluff West	39/5-40/1	Tehama	Creek	Reeds Creek/West of Red Bluff	± 100	No	Yes
Red Bluff West	41/1-41/2	Tehama	Creek	Unnamed creek/between Red Bank and Reeds Creek	± 100	No	Yes
West of Gerber	41/1-41/4	Tehama	Vernal Pools	Grassland-vernal pool mosaic/between Red Bank Road and Red Bank Creek	1,850 of mosaic	No	Yes
West of Gerber	42/3-42/4	Glenn	Creek	Red Bank Creek/West of Gerber	± 100	No	Yes
West of Gerber	42/4-43/2	Glenn	Vernal Pool	Grassland-vernal pool mosaic/South of Red Bank Creek	800 of mosaic	No	Yes
West of Gerber	43/2-44/2	Glenn	Vernal Pool	Grassland-vernal pool mosaic/South of Red Bank Creek	4,500 of mosaic	No	Yes
West of Gerber	44/2-44/3	Glenn	Creek	Coyote Creek, North Branch	± 100	No	Yes
West of Gerber	44/5-45/1	Glenn	Creek	Coyote Creek, South Branch	± 100	No	Yes
West of Gerber	45/1-46/1	Glenn	Vernal Pool	Grassland-vernal pool mosaic/North and adjacent to Oat Creek	3,400 of mosaic	No	Yes
West of Gerber	45/5-46/1	Glenn	Creek	Oat Creek	± 100	No	Yes
West of Gerber	46/4-47/2	Glenn	Vernal Pool	Grassland-vernal pool mosaic/North of Willow Creek	3,000 of mosaic	No	Yes
West of Gerber	47/2	Glenn	Creek	Willow Creek	± 100	No	Yes
West of Gerber	47/2-48/3	Glenn	Vernal Pool	Grassland-vernal pool mosaic	6,600 of mosaic	No	Yes
West of Gerber	49/1	Glenn	Creek	Elder Creek	± 100	No	Yes
West of Gerber	49/2-49/3	Glenn	Vernal Pool	Large vernal pool/South of Elder Creek	350	No	Yes
West of Gerber	49/2-50/1	Glenn	Vernal Pool	Grassland-vernal pool mosaic/South of Elder Creek	4,000 of mosaic	No	Yes
West of Gerber	50/4	Glenn	Creek	McClure Creek	± 100	No	Yes
Henleyville	51/1-52/4	Tehama	Vernal Pool	Grassland-vernal pool mosaic/North of Thomes Creek	8,550 of mosaic	No	Yes
Henleyville	52/5-53/2	Tehama	Creek	Thomes Creek	950	Yes	Yes
Henleyville	54/4-55/1	Tehama	Vernal Pool	Grassland-vernal pool mosaic/North of Burch Creek	2,100 of mosaic	No	Yes
Henleyville	54/5-55/5	Tehama	Creeks	2 intermittent creeks/ North of Burch Creek	± 100/creek	No	Yes
Henleyville	55/5-56/1	Tehama	Creek	Burch Creek	± 100	No	Yes
Henleyville	56/3-64/5	Tehama	Creeks	6 intermittent creeks/ North of Stoney Creek	± 100/creek	No	Yes

1/ Based upon United States Fish and Wildlife Service's National Wetland Inventory maps, United States Geologic Survey Topographic maps, and aerial photographs.

USGS QUAD	Nearest Towers (WAPA NOS)	County	Type of Wetland	Name/Location of Wetland	Length Intersected by Reference Centerline (ft.)	Potential Impacts Tower Siting	Potential Impacts Construction Disturbance
Henleyville	58/3-59/2	Tehama	Vernal Pool	Grassland-vernal pool mosaic/South of Chittenden Road	3,400 of mosaic	No	Yes
Henleyville	59/4	Tehama	Vernal Pool	Grassland-vernal pool mosaic/North of North Fork of Hall's Creek	850	No	Yes
Black Butte Dam	63/4-64/1	Tehama	Vernal Pool	Grassland-vernal pool mosaic/North of Stoney Creek	1,800 of mosaic	No	Yes
Black Butte Dam	64/2-64/5	Tehama	Vernal Pool	Grassland-vernal pool mosaic/North of Stoney Creek	2,300 of mosaic	No	Yes
Black Butte Dam	64/5	Glenn	Creek	Stoney Creek	500	No	Yes
Fruto NE	68/2-69/2	Glenn	Creek	North Fork Walker Creek (2 branches)	± 100/ branch	No	Yes
Fruto NE	68/4	Glenn	Vernal Pool	Grassland-vernal pool mosaic near Walker Creek	700 of mosaic	No	Yes
Fruto NE	70/4-71/2	Glenn	Creeks	2 branches of South Fork Walker Creek	± 100/ branch	No	Yes
Fruto NE	75/1	Glenn	Creek	Wilson Creek	500	No	Yes
Logan Ridge	88/2	Glenn	Creek	Logan Creek	± 100	Yes	Yes
Logan Ridge	90/5	Glenn	Creek	Hunters Creek	± 100	No	Yes
Logan Ridge and Sites	93/2-96/2	Colusa	Creeks	4 intermittent creeks/ South of Hunters Creek	± 100/creek	No	Yes
Sites	97/2	Colusa	Creek	Funks Creek	± 100	No	Yes
Sites	100/2	Colusa	Creek	Stone Corral Creek	1,000	Yes	Yes
Manor Slough	105/3	Colusa	Creek	Lurline Creek	± 100	No	Yes
Manor Slough	106/5	Colusa	Creek	Glenn Valley Creek and Manor Slough	± 100/creek	Yes	Yes
Williams	109/2	Colusa	Creek	Freshwater Creek	± 100	No	Yes
Williams	110/4	Colusa	Creek	Salt Creek	± 100	No	Yes
Cortina Creek	113/3 & 114/3	Colusa	Creek	Spring Creek, 2 Branches	± 100/creek	No	Yes
Cortina Creek	116/1	Colusa	Creek	Cortina Creek	± 100	No	Yes
Cortina Creek	116/4-119/1	Colusa	Creeks	5 intermittent creeks/ Chanisal Creek and 4 unnamed creeks	± 100/creek	No	Yes
Cortina Creek	120/2 & 121/1	Colusa	Creek	Sand Creek & South Branch Sand Creek	± 100/creek	No	Yes
Cortina Creek	121/4	Colusa	Creek	Wiskey Creek	± 100	No	Yes
Cortina Creek	122/3	Colusa	Creek	North Fork Elk Creek	± 100	No	Yes
Wildwood School	124/1	Colusa	Creek	Elk Creek	± 100	No	Yes
Wildwood School	125/4	Colusa	Creek	Salt Creek	200	No	Yes
Wildwood School	127/4	Colusa	Creek	Petroleum Creek	100	No	Yes
Wildwood School	128/2	Yolo	Creek	Little Buckeye Creek	± 100	No	Yes
Wildwood School	129/2	Yolo	Creek	Buckeye Creek	± 100	No	Yes
Wildwood School	130/4-131/2	Yolo	Creek	Mushoak & South Fork Creeks	± 100/creek	No	Yes
Bird Valley	133/3-134/1	Yolo	Creek	Middle and South Forks Bird Creek	± 100/creek	No	Yes
Bird Valley	136/1 & 136/4	Yolo	Creek	2 canals on Hungry Hollow	± 50/canal	No	Yes
Madison	145/3	Yolo	Creek	Cache Creek	400	Yes	Yes
Winters	152/1	Yolo	Slough	Union School Slough	100	No	No
Winters	155/3-155/4	Yolo	Slough	Dry Slough	100/slough	No	No
Winters	157/1	Yolo-Solano	Creek	Putah Creek	400	No	Yes
Allendale		Solano	Canals	Several Canals South of Putah Creek	100/canal	No	No
Dixon	167/1	Solano	Marsh	Unnamed/South of Southern Pacific Rail Line	350	No	Yes
Dixon	167/2	Solano	Vernal Pool	Grassland-vernal pool mosaic/South of Southern Pacific Rail Line	1,550 of mosaic	No	Yes
Dozier	168/3 & 171/1	Solano	Canal	2 canals North of Barker Slough	100/canal	No	No
Dozier	171/1-172/2	Solano	Vernal Pool	Grassland-vernal pool mosaic/North of Barker Slough	5,450 of mosaic	Yes	No
Dozier	172/4-174/4	Solano	Vernal Pool	Grassland-vernal pool mosaic/North of Barker Slough	10,450 of mosaic	No	Yes
Dozier	174/4-174/5	Solano	Lake	Othes Lake (2 Branches)	650	No	No
Dozier	174/5	Solano	Vernal Pool	South and adjacent to Othes Lake	400	No	Yes
Dozier	174/5-175/3	Solano	Vernal Pool	Grassland-vernal pool complex North of Olcutt Lake	3,200 of mosaic	Yes	Yes
Dozier	175/4	Solano	Vernal Pool	Olcutt Lake	1,700	Yes	Yes
Dozier	175/5-176/4	Solano	Vernal Pool	Grassland-vernal pool mosaic/South of Olcutt Lake	5,300 of mosaic	No	Yes
Dozier	176/4	Solano	Slough/Marsh	Calhoun Cut (2 Branches)	450	No	Yes

TABLE E-3 (CONTINUED)

USGS QUAD	Nearest Towers (WAPA NOS)	County	Type of Wetland	Name/Location of Wetland	Length Intersected by Reference Centerline (ft.)	Potential Impacts Tower Siting	Potential Impacts Construction Disturbance
Dozier	177/1	Solano	Vernal Pool	Between branches of Calhoun Cut	1,400 of mosaic	No	Yes
Birds Landing	177/2-179/4	Solano	Vernal Pool	Grassland-vernal pool mosaic/South of Calhoun Cut	13,550 of mosaic	No	Yes
Rio Vista	182/2-183/3	Solano	Creeks	3 forks of creek in Watson Hollow	100/creek	No	Yes
Rio Vista		Solano	Creeks	Several intermittent creeks west of Rio Vista	100/creek	No	Yes

TABLE E-4

FLOODPLAINS[1/] INTERSECTED BY THE UPGRADE SEGMENT OF THE PREFERRED ALTERNATIVE

USGS QUADS	Nearest Towers (WAPA NOS)	County	Type of Floodplain	Name/ Location of Floodplain	Length Intersected by Reference Centerline (ft.)	New Towers in Floodplain
Mitchell Gulch	24/2-24/4	Shasta/ Tehama	Creek	Cottonwood Creek	1,600	Yes
Hooker	26/2-26/4	Tehama	Creek	South Fork Cottonwood Creek	1,400	No
Hooker	29/2-29/3	Tehama	Creek	Unnamed/South of South Fork Cottonwood Creek	425	No
Hooker	29/3-29/4	Tehama	Creek	Unnamed/South of South Fork Cottonwood Creek	410	No
Hooker	30/2-30/3	Tehama	Creek	Unnamed/North and Adjacent to Bassler Road	750	No
Hooker	31/4-31/5	Tehama	Creek	Hooker Creek	650	No
Red Bluff West	33/4-34/1	Tehama	Creek	Dibble Creek North	750	No
Red Bluff West	35/1-35/2	Tehama	Creek	Dibble Creek Central	1,150	No
Red Bluff West	36/1-36/2	Tehama	Creek	Dibble Creek South	625	No
Red Bluff West	38/1-38/2	Tehama	Creek	Brickyard Creek	1,050	No
Red Bluff West	39/3-39/4	Tehama	Creek	Pine Creek	850	No
Red Bluff West	39/5-40/1	Tehama	Creek	Reeds Creek	350	No
West of Gerber	42/3-42/4	Tehama	Creek	Red Bank Creek	300	No
West of Gerber	44/2-44/3	Tehama	Creek	Coyote Creek, North Branch	300	No
West of Gerber	44/5-45/1	Tehama	Creek	Coyote Creek, South Branch	325	No
West of Gerber	45/5-46/1	Tehama	Creek	Oat Creek	200	No
West of Gerber	47/2	Tehama	Creek	Willow Creek	850	No
Henleyville	52/5-53/2	Tehama	Creek	Thomes Creek	2,000	Yes
Henleyville	55/5-56/1	Tehama	Creek	Burch Creek	825	No
Henleyville	60/4	Tehama	Creek	Unnamed	375	No
Henleyville	62/1	Tehama	Creek	Unnamed	300	No
Black Butte Dam	64/5	Glenn	Creek	Stoney Creek	900	No
Black Butte Dam	66/1	Glenn	Creek	Hambright Creek	1,100	No
Fruto NE	68/2	Glenn	Creek	North Fork Walker Creek (North Branch)	500	No
Fruto NE	69/2	Glenn	Creek	North Fork Walker Creek (South Branch)	300	No
Fruto NE	70/4	Glenn	Creek	South Fork Walker Creek (North Branch)	500	No
Fruto NE	71/1	Glenn	Creek	South Fork Walker Creek (South Branch)	250	No
Fruto NE	75/1	Glenn	Creek	Wilson Creek	800	No
Stone Valley	77/1	Glenn	Creek	White Cabin, North Branch	600	No
Stone Valley	77/2	Glenn	Creek	White Cabin, South Branch	900	No
Stone Valley	78/1	Glenn	Creek	Coral Creek	1,250	No
Stone Valley	80/1-80/4	Glenn	Creeks	Salt Gulch & French Creek	3,950	Yes
Stone Valley	81/2-81/4	Glenn	Creek	Hayes Hollow	2,050	No
Stone Valley	83/1-84/3	Glenn	Creek	South Fork Willow Creek	5,500	Yes
Logan Ridge	88/2	Glenn	Creek	Logan Creek	900	Yes
Logan Ridge	90/5	Glenn	Creek	Hunters Creek	1,475	No
Sites	95/4	Colusa	Creek	Unnamed Creek/North of Funks Creek	500	No
Sites	97/2	Colusa	Creek	Funks Creek	400	No
Sites	100/3	Colusa	Creek	Stones Creek	2,200	Yes
Manor Slough	105/3	Colusa	Creek	Lurline Creek	700	Yes
Manor Slough	106/5	Colusa	Creek	Glenn Valley Creek	450	No
Manor Slough	107/1	Colusa	Slough	Manor Slough	150	Yes
Williams	109/2	Colusa	Creek	Freshwater Creek	350	No
Williams	110/4	Colusa	Creek	Salt Creek	350	No
Cortina Creek	113/3	Colusa	Creek	Spring Creek	50	No
Cortina Creek	114/3	Colusa	Creek	Spring Creek	50	No
Cortina Creek	116/1	Colusa	Creek	Cortina Creek	500	No
Cortina Creek	116/4-119/1	Colusa	Creeks	5 intermittent creeks/Chanisal Creek and 4 north of it	±50/ creek	No
Cortina Creek	120/2	Colusa	Creek	Sand Creek	700	No
Cortina Creek	121/1	Colusa	Creek	South Branch Sand Creek	200	No
Cortina Creek	121/4	Colusa	Creek	Wiskey Creek	600	Yes
Cortina Creek	122/3	Colusa	Creek	North Fork Elk Creek	150	No
Wildwood School	124/1	Colusa	Creek	Elk Creek	650	No
Wildwood School	125/4	Colusa	Creek	Salt Creek	250	No
Wildwood School	127/4	Colusa	Creek	Petroleum Creek	150	No
Wildwood School	129/2	Yolo	Creek	Buckeye Creek	650	No
Wildwood School	130/4	Yolo	Creek	Mushoak Creek	100	No
Wildwood School	131/2	Yolo	Creek	South Fork Creek	300	No
Bird Valley	134/1	Yolo	Creek	South Fork Bird Creek	200	No
Zamora	136/1-136/4	Yolo	Floodplain	Hungry Hollow	3,450	No
Zamora	139/4	Yolo	Floodplain	Hungry Hollow	1,500	No
Zamora & Madison	139/5-145/2	Yolo	Floodplain	Hungry Hollow	24,500	Yes
Madison	145/2-145/4	Yolo	Creek	Cache Creek	2,000	Yes
Madison	145/5-148/1	Yolo	Floodplain	South of Cache Creek	12,450	Yes
Madison	149/5	Yolo	Floodplain	Unnamed	1,100	Yes
Madison	152/3-153/1	Yolo	Floodplain	Unnamed, South of Union School Slough	4,100	No
Madison	155/3-155/4	Yolo	Slough	Dry Slough (2 branches)	100/branch	No
Winters	157/1	Yolo	Creek	Putah Creek	400	No
Winters	158/1	Solano	Floodplain	Unnamed	750	Yes

1/ Based on Federal Emergency Management Agency's flood insurance rate maps.

USGS QUADS	Nearest Towers (WAPA NOS)	County	Type of Floodplain	Name/ Location of Floodplain	Length Intersected by Reference Centerline (ft.)	New Towers in Floodplain
Allendale	159/4	Solano	Floodplain	Vaughn Canal	1,200	No
Allendale	160/1-162/5	Solano	Floodplain	Unnamed	14,100	Yes
Allendale	165/2	Solano	Canal	Sweaney Creek Canal	175	No
Dozier	168/3-171/1	Solano	Canal	2 canals north of Barker Slough	150/canal	No
Dozier	174/3-174/5	Solano	Slough	Othes Lake	2,650	No
Dozier	175/4	Solano	Vernal Pool	Olcutt Lake	2,150	Yes
Dozier	177/1	Solano	Slough	Calhoun Cut (5 Branches)	2,250 Total	No
Birds Landing	179/3	Solano	Floodplain	South of Calhoun Cut "The Big Ditch"	900	No
Birds Landing	179/5	Solano	Floodplain	South of The Big Ditch	250	No
Rio Vista	182/2	Solano	Creek	North Branch Watson Hollow	350	No
Rio Vista	182/4	Solano	Creek	Central Branch Watson Hollow	800	No
Rio Vista	183/3	Solano	Creek	South Branch Watson Hollow	650	No

1.5.6 CHANGES TO THE DRAFT EIS/EIR VOLUME 3A - COTP TECHNICAL APPENDICES

1. The following appendices are added to Volume 3A:

Appendix F	U. S. Fish and Wildlife Service Mitigation Policy
Appendix G	COTP Standard Road Designs
Appendix H	Cultural Resources Memorandum of Agreement

APPENDIX F

U. S. FISH AND WILDLIFE SERVICE MITIGATION POLICY

federal register

Friday
January 23, 1981

Part III

Department of the Interior

Fish and Wildlife Service

U.S. Fish and Wildlife Service Mitigation Policy

[As corrected in the Federal Register of February 4, 1981]

U.S. FISH AND WILDLIFE SERVICE MITIGATION POLICY

I. PURPOSE

This document establishes policy for U.S. Fish and Wildlife Service recommendations on mitigating the adverse impacts of land and water developments on fish, wildlife, their habitats, and uses thereof. It will help to assure consistent and effective recommendations by outlining policy for the levels of mitigation needed and the various methods for accomplishing mitigation. It will allow Federal action agencies and private developers to anticipate Service recommendations and plan for mitigation measures early, thus avoiding delays and assuring equal consideration of fish and wildlife resources with other project features and purposes. This policy provides guidance for Service personnel but variations appropriate to individual circumstances are permitted.

This policy supersedes the December 18, 1974, policy statement entitled "Position Paper of the Fish and Wildlife Service Relative to Losses to Fish and Wildlife Habitat Caused by Federally Planned or Constructed Water Resource Developments" and the Service River Basin Studies Manual Release 2.350 entitled "General Bureau Policy on River Basin Studies."

II. AUTHORITY

This policy is established in accordance with the following major authorities: (See Appendix A for other authorities.)

Fish and Wildlife Act of 1956 (16 U.S.C. 742(a)–754). This Act authorizes the development and distribution of fish and wildlife information to the public, Congress, and the President, and the development of policies and procedures that are necessary and desirable to carry out the laws relating to fish and wildlife including: (1) ". . . take such steps as may be required for the development, advancement, management, conservation, and protection of the fisheries resources;" and (2) ". . . take such steps as may be required for the development, management, advancement, conservation, and protection of wildlife resources through research . . . and other means."

Fish and Wildlife Coordination Act (16 U.S.C. 661–667(e)). This Act authorizes the U.S. Fish and Wildlife Service, National Marine Fisheries Service (NMFS), and State agencies responsible for fish and wildlife resources to investigate all proposed Federal undertakings and non-Federal actions needing a Federal permit or license which would impound, divert, deepen, or otherwise control or modify a stream or other body of water and to make mitigation and enhancement recommendations to the involved Federal agency. "Recommendations . . . shall be as specific as practicable with respect to features recommended for wildlife conservation and development, lands to be utilized or acquired for such purposes, the results expected, and shall describe the damage to wildlife attributable to the project and the measures proposed for mitigating or compensating for these damages." In addition, the Act requires that wildlife conservation be coordinated with other features of water resource development programs.

Determinations under this authority for specific projects located in estuarine areas constitute compliance with the provisions of the Estuary Protection Act. (See Appendix A.)

Watershed Protection and Flood Prevention Act (16 U.S.C. 1001–1009). This Act allows the Secretary of the Interior to make surveys, investigations, and ". . . prepare a report with recommendations concerning the conservation and development of wildlife resources . . ." on small watershed projects.

National Environmental Policy Act of 1969 (42 U.S.C. 4321–4347). This Act and its implementing regulations (40 CFR Part 1500–1508) requires that the U.S. Fish and Wildlife Service be notified of all major Federal actions affecting fish and wildlife resources and their views and recommendations solicited. Upon completion of a draft Environmental Impact Statement, the Service is required to review it and make comments and recommendations, as appropriate. In addition, the Act provides that "the Congress authorizes and directs that, to the fullest extent possible . . . all agencies of the Federal Government shall . . . identify and develop methods and procedures . . . which will ensure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking along with economic and technical considerations."

III. SCOPE

A. Coverage

This policy applies to all activities of the Service related to the evaluation of impacts of land and water developments and the subsequent recommendations to mitigate those adverse impacts except as specifically excluded below. This includes: (1) investigations and recommendations for all actions requiring a federally issued permit or license that would impact waters of the U.S.; (2) all major Federal actions significantly affecting the quality of the human environment; and (3) other Federal actions for which the Service has legislative authority or executive direction for involvement including, but not limited to: coal, minerals, and outer continental shelf lease sales or Federal approval of State permit programs for the control of discharges of dredged or fill material.

B. Exclusions

This policy does not apply to threatened or endangered species. The requirements for threatened and endangered species are covered in the Endangered Species Act of 1973 and accompanying regulations at 50 CFR Parts 17, 402, and 424. Under Section 7 of the Endangered Species Act, as amended, all Federal agencies shall ensure that activities authorized, funded, or carried out by them are not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. Mitigating adverse impacts of a project would not in itself be viewed as satisfactory agency compliance with Section 7. Furthermore, it is clear to the Service that Congress considered the traditional concept of mitigation to be inappropriate for Federal activities impacting listed species or their critical habitat.

This policy does not apply to Service recommendations for Federal projects completed or other projects permitted or licensed prior to enactment of Service authorities (unless indicated otherwise in a specific statute) or specifically exempted by them and not subject to reauthorization or renewal. It also does not apply where mitigation plans have already been agreed to by the Service, except where new activities or changes in current activities would result in new impacts or where new authorities, new scientific information, or developer failure to implement agreed upon recommendations make it necessary. Service personnel involved in land and water development investigations will make a judgment as to the applicability of the policy for mitigation plans under development and not yet agreed upon as of the date of final publication of this policy.

Finally, this policy does not apply to Service recommendations related to the enhancement of fish and wildlife resources. Recommendations for measures which improve fish and wildlife resources beyond that which would exist without the project and which cannot be used to satisfy the appropriate mitigation planning goal should be considered as enhancement measures. The Service strongly supports enhancement of fish and wildlife resources. The Service will recommend that all opportunities for fish and wildlife resource enhancement be thoroughly considered and included in project plans, to the extent practicable.

IV. DEFINITION OF MITIGATION

The President's Council on Environmental Quality defined the term "mitigation" in the National Environmental Policy Act regulations to include: "(a) avoiding the impact altogether by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (e) compensating for the impact by replacing or providing substitute resources or environments." (40 CFR Part 1508.20(a–e)).

The Service supports and adopts this definition of mitigation and considers the specific elements to represent the desirable sequence of steps in the mitigation planning process. (See Appendix B for definitions of other important terms necessary to understand this policy.)

V. MITIGATION POLICY OF THE U.S. FISH AND WILDLIFE SERVICE

The overall goals and objectives of the Service are outlined in the Service Management Plan and an accompanying Important Resource Problems document which describes specific fish and wildlife problems of importance for planning purposes. Goals and objectives for Service activities related to land and water development are contained in the Habitat Preservation Program Management Document. The mitigation policy was designed to stand on its own; however, these documents will be consulted by Service personnel to provide the proper perspective for the Service mitigation policy. They are available upon request from the Director, U.S. Fish and Wildlife Service, Washington, D.C. 20240.

A. General Policy

The mission of the U.S. Fish and Wildlife Service is to:

PROVIDE THE FEDERAL LEADERSHIP TO CONSERVE, PROTECT AND ENHANCE FISH AND WILDLIFE AND THEIR HABITATS FOR THE CONTINUING BENEFIT OF THE PEOPLE.

The goal of Service activities oriented toward land and water development responds to Congressional direction that fish and wildlife resource conservation receive equal consideration and be coordinated with other features of Federal resource development and regulatory programs through effective and harmonious planning, development, maintenance and coordination of fish and wildlife resource conservation and rehabilitation in the United States, its territories and possessions. The goal is to:

CONSERVE, PROTECT AND ENHANCE FISH AND WILDLIFE AND THEIR HABITATS AND FACILITATE BALANCED DEVELOPMENT OF THIS NATION'S NATURAL RESOURCES BY TIMELY AND EFFECTIVE PROVISION OF FISH AND WILDLIFE INFORMATION AND RECOMMENDATIONS.

Fish and wildlife and their habitats are public resources with clear commercial, recreational, social, and ecological value to the Nation. They are conserved and managed for the people by State, Federal and Indian tribal Governments. If land or water developments are proposed which may reduce or eliminate the public benefits that are provided by such natural resources, then State and Federal resource agencies and Indian tribal agencies have a responsibility to recommend means and measures to mitigate such losses. *Accordingly:*

IN THE INTEREST OF SERVING THE PUBLIC, IT IS THE POLICY OF THE U.S. FISH AND WILDLIFE SERVICE TO SEEK TO MITIGATE LOSSES OF FISH, WILDLIFE, THEIR HABITATS, AND USES THEREOF FROM LAND AND WATER DEVELOPMENTS.

In administering this policy, the Service will strive to provide information and recommendations that fully support the Nation's need for fish and wildlife resource conservation as well as sound economic and social development through balanced multiple use of the Nation's natural resources. The Service will actively seek to facilitate needed development and avoid conflicts and delays through early involvement in land and water development planning activities in advance of proposals for specific projects or during the early planning and design stage of specific projects.

This should include early identification of resource areas containing high and low habitat values for important species and the development of ecological design information that outlines specific practicable means and measures for avoiding or minimizing impacts. The former can be used by developers to site projects in the least valuable areas. This could possibly lower total project costs to development interests. These actions are part of good planning and are in the best public interest.

The early provision of information to private and public agencies in a form which enables them to avoid or minimize fish and wildlife losses as a part of initial project design is the preferred form of fish and wildlife conservation.

B. U.S. Fish and Wildlife Service Mitigation Planning Goals by Resource Category

The planning goals and guidelines that follow will be used to guide Service recommendations on mitigation of project impacts. Four Resource Categories are used to indicate that the level of mitigation recommended will be consistent with the fish and wildlife resource values involved.

The policy covers impacts to fish and wildlife populations, their habitat and the human uses thereof. However, the primary focus in terms of specific guidance is on recommendations related to habitat value losses. In many cases, compensation of habitat value losses should result in replacement of fish and wildlife populations and human uses. But where it does not, the Service will recommend appropriate additional means and measures.

RESOURCE CATEGORY 1

a. Designation Criteria

Habitat to be impacted is of high value for evaluation species and is unique and irreplaceable on a national basis or in the ecoregion section.

b. Mitigation Goal

No Loss of Existing Habitat Value.

c. Guideline

The Service will recommend that all losses of existing habitat be prevented as these one-of-a-kind areas cannot be replaced. Insignificant changes that do not result in adverse impacts on habitat value may be acceptable provided they will have no significant cumulative impact.

RESOURCE CATEGORY 2

a. Designation Criteria

Habitat to be impacted is of high value for evaluation species and is relatively scarce or becoming scarce on a national basis or in the ecoregion section.

b. Mitigation Goal

No Net Loss of In-Kind Habitat Value.

c. Guideline

The Service will recommend ways to avoid or minimize losses. If losses are likely to occur, then the Service will recommend ways to immediately rectify them or reduce or eliminate them over time. If losses remain likely to occur, then the Service will recommend that those losses be compensated by replacement of the same kind of habitat value so that the total loss of such in-kind habitat value will be eliminated.

Specific ways to achieve this planning goal include: (1) physical modification of replacement habitat to convert it to the same type lost; (2) restoration or rehabilitation of previously altered habitat; (3) increased management of similar replacement habitat so that the in-kind value of the lost habitat is replaced, or (4) a combination of these measures. By replacing habitat value losses with similar habitat values, populations of species associated with that habitat may remain relatively stable in the area over time. This is generally referred to as in-kind replacement.

Exceptions: An exception can be made to this planning goal when: (1) different habitats and species available for replacement are determined to be of greater value than those lost, *or* (2) in-kind replacement is not physically or biologically attainable in the ecoregion section. In either case, replacement involving different habitat kinds may be recommended provided that the total value of the habitat lost is recommended for replacement (see the guideline for Category 3 mitigation below).

RESOURCE CATEGORY 3

a. Designation Criteria

Habitat to be impacted is of high to medium value for evaluation species and is relatively abundant on a national basis.

b. Mitigation Goal

No Net Loss of Habitat Value While Minimizing Loss of In-Kind Habitat Value.

c. Guideline

The Service will recommend ways to avoid or minimize losses. If losses are likely to occur, then the Service will recommend ways to immediately rectify them or reduce or eliminate them over time. If losses remain likely to occur, then the Service will recommend that those losses be compensated by replacement of habitat value so that the total loss of habitat value will be eliminated.

It is preferable, in most cases, to recommend ways to replace such habitat value losses in-kind. However, if the Service determines that in-kind replacement is not desirable or possible, then other specific ways to achieve this planning goal include: (1) substituting different kinds of habitats, or (2) increasing management of different replacement habitats so that the value of the lost habitat is replaced. By replacing habitat value losses with different habitats or increasing management of different habitats, populations of species will be different, depending on the ecological attributes of the replacement habitat. This will result in no net loss of total habitat value, but may result in significant differences in fish and wildlife populations. This is generally referred to as out-of-kind replacement.

RESOURCE CATEGORY 4

a. Designation Criteria

Habitat to be impacted is of medium to low value for evaluation species.

b. Mitigation Goal

Minimize Loss of Habitat Value.

c. Guideline

The Service will recommend ways to avoid or minimize losses. If losses are likely to occur, then the Service will recommend ways to immediately rectify them or reduce or eliminate them over time. If losses remain likely to occur, then the Service may make a recommendation for compensation, depending on the significance of the potential loss.

However, because these areas possess relatively low habitat values, they will likely exhibit the greatest potential for significant habitat value improvements. Service personnel will fully investigate these areas' potential for improvement, since they could be used to mitigate Resource Category 2 and 3 losses.

C. Mitigation Planning Policies

1. State-Federal Partnership

a. The U.S. Fish and Wildlife Service will fully coordinate activities with those State agencies responsible for fish and wildlife resources, the National Marine Fisheries Service (NMFS) and the Environmental Protection Agency (EPA) related to the investigation of project proposals and development of mitigation recommendations for resources of concern to the State, NMFS or EPA.

b. Service personnel will place special emphasis on working with State agencies responsible for fish and wildlife resources, NMFS and EPA to develop compatible approaches and to avoid duplication of efforts.

2. Resource Category Determinations

a. The Service will make Resource Category determinations as part of the mitigation planning process. Such determinations will be made early in the planning process and transmitted to the Federal action agency or private developer to aid them in their project planning, to the extent practicable.

b. Resource Category determinations will be made through consultation and coordination with State agencies responsible for fish and wildlife resources and other Federal resource agencies, particularly the National Marine Fisheries Service and the Environmental Protection Agency, whenever resources of concern to those groups are involved. Where other elements of the public, including development groups, have information that can assist in making such determinations, the Service will welcome such information.

c. All Resource Category determinations will contain a technical rationale consistent with the designation criteria. The rationale will: (1) outline the reasons why the evaluation species were selected; (2) discuss the value of the habitat to the evaluation species; and (3) discuss and contrast the relative scarcity of the fish and wildlife resource on a national and ecoregion section basis.

Note.—If the State agency responsible for fish and wildlife resources wishes to outline scarcity on a more local basis, U.S. Fish and Wildlife Service personnel should assist in developing such rationale, whenever practicable.

d. When funding, personnel, and available information make it practicable, specific geographic areas or, alternatively, specific habitat types that comprise a given Resource Category should be designated in advance of development. Priority for predesignation will be placed on those areas that are of high value for evaluation species and are subject to development pressure in the near future. Such predesignations can be used by developers or regulators to determine the least valuable areas for use in project planning and siting considerations.

e. The following examples should be given special consideration as either Resource Category 1 or 2:

(1) Certain habitats within Service-identified Important Resource Problem (IRP) areas. Those IRPs dealing with threatened or endangered species are not covered by this policy. (See Scope)

(2) Special aquatic and terrestrial sites including legally designated or set-aside

areas such as sanctuaries, fish and wildlife management areas, hatcheries, and refuges, and other aquatic sites such as floodplains, wetlands, mudflats, vegetated shallows, coral reefs, riffles and pools, and springs and seeps.

3. Impact Assessment Principles

a. Changes in fish and wildlife productivity or ecosystem structure and function may not result in a biologically adverse impact. The determination as to whether a biological change constitutes an adverse impact for which mitigation should be recommended is the responsibility of the Service and other involved Federal and State resource agencies.

b. The net biological impact of a development proposal (or alternatives) is the difference in predicted biological conditions between the future with the action and the future without the action. If the future without the action cannot be reasonably predicted and documented by the project sponsor, then the Service analysis should be based on biological conditions that would be expected to exist over the planning period due to natural species succession or implementation of approved restoration/improvement plans or conditions which currently exist in the planning area.

c. Service review of project impacts will consider, whenever practicable:

(1) The total long-term biological impact of the project, including any secondary or indirect impacts regardless of location; and (2) any cumulative effects when viewed in the context of existing or anticipated projects.

d. The *Habitat Evaluation Procedures* will be used by the Service as a basic tool for evaluating project impacts and as a basis for formulating subsequent recommendations for mitigation subject to the exemptions in the Ecological Services Manual (100 ESM 1). When the *Habitat Evaluation Procedures* do not apply, then other evaluation systems may be used provided such use conforms with policies provided herein.

e. In those cases where instream flows are an important determinant of habitat value, consideration should be given to the use of the Service's Instream Flow Incremental Methodology to develop instream flow mitigation recommendations, where appropriate.

f. Where specific impact evaluation methods or mitigation technologies are not available, Service employees shall continue to apply their best professional judgment to develop mitigation recommendations.

4. Mitigation Recommendations

a. The Service may recommend support of projects or other proposals when the following criteria are met:

(1) They are ecologically sound;

(2) The least environmentally damaging reasonable alternative is selected;

(3) Every reasonable effort is made to avoid or minimize damage or loss of fish and wildlife resources and uses;

(4) All important recommended means and measures have been adopted with guaranteed implementation to satisfactorily compensate for unavoidable damage or loss consistent with the appropriate mitigation goal; and

(5) For wetlands and shallow water habitats, the proposed activity is clearly water dependent and there is a demonstrated public need.

The Service may recommend the "no project" alternative for those projects or other proposals that do not meet all of the above criteria and where there is likely to be a significant fish and wildlife resource loss.

b. Recommendations will be presented by the Service at the earliest possible stage of project planning to assure maximum consideration. The Service will strive to provide mitigation recommendations that represent the best judgment of the Service, including consideration of cost, on the most effective means and measures of satisfactorily achieving the mitigation planning goal. Such recommendations will be developed in cooperation with the Federal action agency or private developer responsible for the project, whenever practicable, and will place heavy reliance on cost estimates provided by that Federal action agency or private developer.

c. The Service will recommend that the Federal action agency include designated funds for all fish and wildlife resource mitigation (including, but not limited to, Service investigation costs, initial development costs and continuing operation, maintenance, replacement, and administrative costs) as part of the initial and any alternative project plans and that mitigation funds (as authorized and appropriated by Congress for Federal projects) be spent concurrently and proportionately with overall project construction and operation funds throughout the life of the project.

Note.—Prevention of losses may necessitate expenditure of funds at an earlier stage of project planning. This is acceptable and preferred.

d. Service mitigation recommendations will be made under an explicit expectation that these means and measures: (1) would be the ultimate responsibility of the appropriate Federal action agency to implement or enforce; and (2) would provide for a duration of effectiveness for the life of the project plus such additional time required for the adverse effects of an abandoned project to cease to occur.

e. Land acquisition in fee title for the purpose of compensation will be recommended by the Service *only* under one or more of the following three conditions:

(1) When a change in ownership is necessary to guarantee the future conservation of the fish and wildlife resource consistent with the mitigation goal for the specific project area; *or*

(2) When other means and measures for mitigation (see Section 5 below) will not compensate habitat losses consistent with the mitigation goal for the specific project area; *or*

(3) When land acquisition in fee title is the most cost-effective means that may partially or completely achieve the mitigation goal for the specific project area.

Service recommendations for fee title land acquisition will seek to identify mitigation lands with marginal economic potential.

f. First priority will be given to recommendation of a mitigation site within the planning area. Second priority will be given to recommendation of a mitigation site in proximity to the planning area within the same ecoregion section. Third priority will be given to recommendation of a mitigation site elsewhere within the same ecoregion section.

g. Service personnel will fully support a variety of uses on mitigation lands where such uses are compatible with dominant fish and wildlife uses and, for Federal wildlife refuges, are consistent with the provisions of the Refuge Recreation Act and the National Wildlife Refuge Administration Act. However, it may be in the best public interest to recommend limiting certain uses that would significantly decrease habitat value for species of high public interest. In such cases, the Service may recommend against such incompatible uses.

h. Measures to increase recreation values will not be recommended by Service personnel to compensate for losses of habitat value. Recreation use losses not restored through habitat value mitigation will be addressed through separate and distinct recommended measures to offset those specific losses.

i. The guidelines contained in this policy do not apply to threatened or endangered species. However, where both habitat and endangered or threatened species impacts are involved, Service personnel shall fully coordinate Environment efforts with Endangered Species efforts to provide timely, consistent, and unified recommendations for resolution of fish and wildlife impacts, to the extent possible. More specifically, Environment and Endangered Species personnel shall coordinate all related activities dealing with investigations of land and water developments. This includes full use of all provisions that can expedite Service achievement of "one-stop shopping," including coordinated early planning involvement, shared permit review activities, consolidated permit reporting, and consolidated flow of pre-project information to developers, consistent with legislative mandates and deadlines.

j. The Service will place high priority on and continue to develop and implement procedures for reducing delays and conflicts in permit related activities. Such procedures will include, but not be limited to:

(1) Joint processing of permits.

(2) Resource mapping.

(3) Early provision of ecological design information.

(4) Involvement in Special Area Management Planning.

k. The Service will encourage predevelopment compensation actions by Federal action agencies which can be used to offset future unavoidable losses for lands or waters not adequately protected by an existing law, policy, or program.

Banking of habitat value for the express purpose of compensation for unavoidable future losses will be considered to be a mitigation measure and not an enhancement measure. Withdrawals from the mitigation "bank" to offset future unavoidable losses will be based on habitat value replacement, not acreage or cost for land purchase and management.

5. Mitigation Means and Measures

Mitigation recommendations can include, but are not limited to, the types of actions presented below. These means and measures are presented in the general order and priority in which they should be recommended by Service personnel with the exception of the "no project" alternative. (See Section 4(a)).

a. Avoid the impact

(1) Design project to avoid damage or loss of fish and wildlife resources including management practices such as timing of activities or structural features such as multiple outlets, passage or avoidance structures and water pollution control facilities.

(2) Use of nonstructural alternative to proposed project.

(3) No project.

b. Minimize the impact

(1) Include conservation of fish and wildlife as an authorized purpose of Federal projects.

(2) Locate at the least environmentally damaging site.

(3) Reduce the size of the project.

(4) Schedule timing and control of initial construction operations and subsequent operation and maintenance to minimize disruption of biological community structure and function.

(5) Selective tree clearing or other habitat manipulation.

(6) Control water pollution through best management practices.

(7) Time and control flow diversions and releases.

(8) Maintain public access.

(9) Control public access for recreational or commercial purposes.

(10) Control domestic livestock use.

c. Rectify the impact

(1) Regrade disturbed areas to contours which provide optimal fish and wildlife habitat or approximate original contours.

(2) Seed, fertilize and treat areas as necessary to restore fish and wildlife resources.

(3) Plant shrubs and trees and other vegetation to speed recovery.

(4) Control polluted spoil areas.

(5) Restock fish and wildlife resources in repaired areas. Fish stocking or introductions will be consistent with the Service Fish Health Policy (January 3, 1978).

d. Reduce or eliminate the impact over time

(1) Provide periodic monitoring of mitigation features to assure continuous operation.

(2) Assure proper training of project personnel in the operations of the facility to preserve existing or restored fish and wildlife resources at project sites.

(3) Maintain or replace equipment or structures so that future loss of fish and wildlife resources due to equipment or structure failure does not occur.

e. Compensate for impacts

(1) Conduct wildlife management activities to increase habitat values of existing areas, with project lands and nearby public lands receiving priority.

(2) Conduct habitat construction activities to fully restore or rehabilitate previously altered habitat or modify existing habitat suited to evaluation species for the purpose of completely offsetting habitat value losses.

(3) Build fishery propagation facilities.

(4) Arrange legislative set-aside or protective designation for public lands.

(5) Provide buffer zones.

(6) Lease habitat.

(7) Acquire wildlife easements.

(8) Acquire water rights.

(9) Acquire land in fee title.

6. Follow-up

The Service encourages, supports, and will initiate, whenever practicable, post-project evaluations to determine the effectiveness of recommendations in achieving the mitigation planning goal. The Service will initiate additional follow-up studies when funds are provided by the Federal action agency.

In those instances where Service personnel determine that Federal agencies or private developers have not carried out those agreed upon mitigation means and measures, then the Service will request the responsible Federal action agency to initiate corrective action.

APPENDIX A—OTHER AUTHORITIES AND DIRECTION FOR SERVICE MITIGATION RECOMMENDATIONS

LEGISLATIVE

Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq.). The 1977 amendments require the Fish and Wildlife Service ". . . upon request of the Governor of a State, and without reimbursement, to provide technical assistance to such State in developing a Statewide (water quality planning) program and in implementing such program after its approval." In addition, this Act requires the Service to comment on proposed State permit programs for the control of discharges of dredged or fill material and to comment on all Federal permits within 90 days of receipt.

Federal Power Act of 1920, as amended (16 U.S.C. 791(a), 803, 811). This Act authorizes the Secretary of the Interior to impose conditions on licenses issued for hydroelectric projects within specific withdrawn public lands. The Secretary is given specific authority to prescribe fishways to be constructed, maintained, and operated at the licensee's expense.

Estuary Protection Act (16 U.S.C. 1221–1226). This Act requires the Secretary of the Interior to review all project plans and reports for land and water resource development affecting estuaries and to make recommendations for conservation, protection, and enhancement.

Coastal Zone Management Act of 1972 (16 U.S.C. 1451–1464). This Act requires the Secretary of Commerce to obtain the views of Federal agencies affected by the program, including the Department of the Interior, and to ensure that these views have been given adequate consideration before approval of Coastal Zone Management Plans. The Service provides the Department's views about fish and wildlife resources. Pursuant to the Coastal Zone Management Act Amendments of 1980 (Pub. L. 96-464) the Department of Interior provides comments on Federal grants to help States protect and preserve coastal areas because of their ". . . conservational, recreational, ecological or aesthetic values." The 1980 Amendments also authorize the Department of Interior to enter into Special Area Management Planning to ". . . provide for increased specificity in protecting natural resources, reasonable coast dependent economic growth . . . and improved predictability in government decisionmaking."

Water Bank Act (16 U.S.C. 1301-1311). This Act requires that the Secretary of Agriculture ". . . shall consult with the Secretary of Interior and take appropriate measures to insure that the program carried out . . . is in harmony with wetlands programs administered by the Secretary of the Interior."

Wild and Scenic Rivers Act (16 U.S.C. 1271-1287). This Act requires the Secretary of the Interior to comment on such proposals. The Fish and Wildlife Service provides the Department's views with regard to fish and wildlife resources.

Geothermal Steam Act of 1970 (30 U.S.C. 1001-1025). This Act requires that the Fish and Wildlife Service recommend to the Secretary those lands that shall not be leased for geothermal development by reason of their status as ". . . a fish hatchery administered by the Secretary, wildlife refuge, wildlife range, game range, wildlife management area, waterfowl production area, or for lands acquired or reserved for the protection and conservation of fish and wildlife that are threatened with extinction."

Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.). This Act requires the Department of the Interior to regulate surface mining and reclamation at existing and future mining areas. The Fish and Wildlife Service provides the Department with technical assistance regarding fish and wildlife aspects of Department programs on active and abandoned mine lands, including review of State regulatory submissions and mining plans, and comments on mining and reclamation plans.

Outer Continental Shelf Lands Act Amendments of 1978 (43 U.S.C. 1801). This Act requires the Secretary of the Interior to manage an environmentally sound oil and natural gas development program on the outer continental shelf. The Fish and Wildlife Service provides recommendations for the Department regarding potential ecological impacts before leasing in specific areas and contributes to environmental studies undertaken subsequent to leasing.

Mineral Leasing Act of 1920, as amended (30 U.S.C. 185). This Act authorizes the Secretary of the Interior to grant rights-of-way through Federal lands for pipelines transporting oil, natural gas, synthetic liquids or gaseous fuels, or any other refined liquid fuel. Prior to granting a right-of-way for a project which may have a significant impact on the environment, the Secretary is required by this Act to request and review the applicant's plan for construction, operation, and rehabilitation of the right-of-way. Also, the Secretary is authorized to issue guidelines and impose stipulations for such projects which shall include, but not be limited to, ". . . requirements for restoration, revegetation and curtailment or erosion of surface land; . . . requirements designed to control or prevent damage to the environment (including damage to fish and wildlife habitat); and . . . requirements to protect the interests of individuals living in the general area of the right-of-way or permit who rely on the fish, wildlife and biotic resources of the area for subsistence purposes."

Cooperative Unit Act (16 U.S.C. 753(a)-753(b)). This Act provides for cooperative programs for research and training between the Fish and Wildlife Service, the States, and universities.

Airport and Airway Development Act (49 U.S.C. 1716). This Act requires the Secretary of Transportation to ". . . consult with the Secretary of the Interior with regard to the effect that any project . . . may have on natural resources including, but not limited to, fish and wildlife, natural, scenic, and recreation assets, water and air quality, and other factors affecting the environment . . .".

Department of Transportation Act (49 U.S.C. 1653(f)). This Act makes it national policy that ". . . special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites . . .." and requires that the Secretary of Transportation ". . . cooperate and consult with the Secretary of the Interior in developing transportation plans and programs that include measures to maintain or enhance the natural beauty of the lands traversed." The Department of Transportation projects using protected lands cannot be approved unless there are no feasible and prudent alternatives to avoid such use and, if none, all possible measures to minimize harm have been considered.

EXECUTIVE

President's Water Policy Message (June 6, 1978). This Message directs the Secretary of the Interior to promulgate procedures for determination of measures to mitigate losses of fish and wildlife resources.

Water Resources Council's *Final Rules: Principles and Standards for Water and Related Land Resources Planning—Level C* (September 29, 1980). These rules reiterate the importance of participation in the development planning process by interested Federal agencies, including the Department of the Interior. This participation includes review, coordination, or consultation required under various legislative and executive authorities. Under these rules, "Consideration is to be given to mitigation (as defined in 40 CFR 1508.20) of the adverse effects of each alternative plan. Appropriate mitigation is to be included where suitable as determined by the agency decisionmaker. Mitigation measures included are to be planned for at least concurrent and proportionate implementation with other major project features, except where such concurrent and proportionate mitigation is physically impossible. In the latter case, the reasons for deviation from this rule are to be presented in the planning report, and mitigation is to be planned for the earliest possible implementation. Mitigation for fish and wildlife and their habitat is to be planned in coordination with Federal and State fish and wildlife agencies in accordance with the Fish and Wildlife Coordination Act of 1958 (16 U.S.C. 661-664) (sic)."

Executive Order 11990—Protection of Wetlands (May 24, 1977). This Executive Order requires that each Federal agency ". . . take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for: (1) acquiring, managing and disposing of Federal lands and facilities; and (2) providing federally undertaken, financed or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation and licensing activities." Relevant wetland concerns and values include, but are not limited to, maintenance of natural systems and long-term productivity of existing flora and fauna, habitat diversity, hydrological utility, fish, wildlife, timber, and food. Under this Order, a developmental project in a wetland may proceed only if no practicable alternatives can be ascertained and if the proposal . . . includes all practicable measures to minimize harm to the wetland that may result from its use."

Executive Order 11988—Floodplain Management (May 24, 1977). This Executive Order requires that Federal agencies take floodplain management into account when formulating or evaluating water or land use plans and that these concerns be reflected in the budgets, procedures, and regulations of the various agencies. This Order allows developmental activities to proceed in floodplain areas only when the relevant agencies have ". . . considered alternatives to avoid adverse effects and incompatible development in the floodplains . . ." or when, in lieu of this, they have ". . . designed or modified their actions in order to minimize potential harm to or within the floodplain . . .".

Executive Order 11987—Exotic Organisms (May 24, 1977). This Executive Order requires that Federal agencies shall restrict, to the extent permitted by law, the introduction of exotic species into the lands or waters which they own, lease, or hold for purposes of administration, and encourage the States, local governments, and private citizens to do the same. This Executive Order also requires Federal agencies to restrict, to the extent permitted by law, the importation of exotic species and to restrict the use of Federal funds and programs for such importation. The Secretary of the Interior, in consultation with the Secretary of Agriculture, is authorized to develop by rule or regulation a system to standardize and simplify the requirements and procedures appropriate for implementing this Order.

NATIONAL/INTERNATIONAL TREATIES

Federal Trust Responsibility to Indian Tribes. This responsibility is reflected in the numerous Federal treaties with the Indian tribes. These treaties have the force of law. Protection of Indian hunting and fishing rights necessitates conservation of fish and wildlife and their habitat.

Convention Between the United States and Japan (September 19, 1974). This Treaty endorses the establishment of sanctuaries and fixes preservation and enhancement of migratory bird habitat as a major goal of the signatories.

Convention Between the United States and the Union of Soviet Socialist Republics Concerning the Conservation of Migratory Birds and Their Environments (November 8, 1978). This Treaty endorses the establishment of sanctuaries, refuges, and protected areas. It mandates reducing or eliminating damage to all migratory birds. Furthermore, it provides for designation of special areas for migratory bird breeding, wintering, feeding, and molting, and commits the signatories to ". . . undertake measures necessary to protect the ecosystems in these areas . . . against pollution, detrimental alteration and other environmental degradation." Implementing legislation, Pub. L. 95–616, was passed in the United States in 1978.

Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (April 15, 1941). This Treaty has several provisions requiring parties to conserve certain wildlife resources and their habitats.

Convention Between the United States and Great Britain (for Canada) for Protection of Migratory Birds (August 1, 1916, as amended January 30, 1979). This Treaty provides for a uniform ". . . system of protection for certain species of birds which migrate between the United States and Canada, in order to assure the preservation of species either harmless or beneficial to man." The Treaty prohibits hunting insectivorous birds, but allows killing of birds under permit when injurious to agriculture. The 1979 amendment allows subsistence hunting of waterfowl outside of the normal hunting season.

APPENDIX B—OTHER DEFINITIONS

"*Compensation,*" when used in the context of Service mitigation recommendations, means full replacement of project-induced losses to fish and wildlife resources, provided such full replacement has been judged by the Service to be consistent with the appropriate mitigation planning goal.

"*Ecoregion*" refers to a large biogeographical unit characterized by distinctive biotic and abiotic relationships. An ecoregion may be subclassified into domains, divisions, provinces, and sections. A technical explanation and map is provided in the "Ecoregions of the United States" by Robert G. Bailey, published by the U.S. Forest Service, 1978.

"*Ecosystem*" means all of the biotic elements (i.e., species, populations, and communities) and abiotic elements (i.e., land, air, water, energy) interacting in a given geographic area so that a flow of energy leads to a *clearly* defined trophic structure, biotic diversity, and material cycles. (Eugene P. Odum, 1971, *Fundamentals of Ecology*)

"*Evaluation species*" means those fish and wildlife resources in the planning area that are selected for impact analysis. They must currently be present or known to occur in the planning area during at least one stage of their life history except where species not present (1) have been identified in fish and wildlife restoration or improvement plans approved by State or Federal resource agencies, or (2) will result from natural species succession over the life of the project. In these cases, the analysis may include such identified species not currently in the planning area.

There are two basic approaches to the selection of evaluation species: (1) selection of species with high public interest, economic value or both; and (2) selection of species to provide a broader ecological perspective of an area. The choice of one approach in lieu of the other may result in a completely different outcome in the analysis of a proposed land or water development. Therefore, the objectives of the study should be clearly defined before species selection is initiated. If the objectives of a study are to base a decision on potential impacts to an entire ecological community, such as a unique wetland, then a more ecologically based approach is desirable. If, however, a land or water use decision is to be based on potential impacts to a public use area, then species selection should favor animals with significant human use values. In actual practice, species should be selected to represent social, economic and broad ecological views because mitigation planning efforts incorporate objectives that have social, economic, and ecological aspects. Species selection always should be approached in a manner that will optimize contributions to the stated objectives of the mitigation planning effort.

Most land and water development decisions are strongly influenced by the perceived impacts of the proposed action on human use. Since economically or socially important species have clearly defined linkages to human use, they should be included as evaluation species in all appropriate land and water studies. As a guideline, the following types of species should be considered:

- Species that are associated with Important Resource Problems as designated by the Director of the Fish and Wildlife Service (except for threatened or endangered species).

• Other species with monetary and non-monetary benefits to people accruing from consumptive and nonconsumptive human uses including, but not limited to, fishing, hunting, bird-watching and educational, aesthetic, scientific or subsistence uses.

An analysis based only on those species with directly identifiable economic or social value may not be broad enough to adequately describe all of the ramifications of a land and water use proposal. If it is desirable to increase the ecological perspective of an assessment, the following types of species should be considered:

• Species known to be sensitive to specific land and water use actions. The species selected with this approach serve as "early warning" or indicator species for the affected fish and wildlife community.

• Species that perform a key role in a community because of their role in nutrient cycling or energy flows. These species also serve as indicators for a large segment of the fish and wildlife community, but may be difficult to identify.

• Species that represent groups of species which utilize a common environmental resource (guilds). A representative species is selected from each guild and predicted environmental impacts for the selected species are extended with some degree of confidence to other guild members.

"Federal action agency" means a department, agency or instrumentality of the United States which plans, constructs, operates or maintains a project, or which plans for or approves a permit, lease, or license for projects or manages Federal lands.

"Fish and wildlife resources" means birds, fishes, mammals, and all other classes of wild animals and all types of aquatic and land vegetation upon which wildlife is dependent.

"Habitat" means the area which provides direct support for a given species, population, or community. It includes all environmental features that comprise an area such as air quality, water quality, vegetation and soil characteristics and water supply (including both surface and groundwater).

"Habitat value" means the suitability of an area to support a given evaluation species.

"Important Resource Problem" means a clearly defined problem with a single important population or a community of similar species in a given geographic aree as defined by the Director of the Fish and Wildlife Service.

"In-kind replacement" means providing or managing substitute resources to replace the habitat value of the resources lost, where such substitute resources are physically and biologically the same or closely approximate those lost.

"Loss" means a change in fish and wildlife resources due to human activities that is considered adverse and:

(1) reduces the biological value of that habitat for evaluation species;

(2) reduces population numbers of evaluation species;

(3) increases population numbers of "nuisance" species;

(4) reduces the human use of those fish and wildlife resources; or

(5) disrupts ecosystem structure and function.

Changes that improve the value of existing habitat for evaluation species are not to be considered losses, i.e., burning or selective tree harvesting for wildlife management purposes. In addition, reductions in animal populations for the purpose of harvest or fish and wildlife managment will not be considered as losses for the purpose of this policy.

"Minimize" means to reduce to the smallest practicable amount or degree.

"Mitigation banking" means habitat protection or improvement actions taken expressly for the purpose of compensating for unavoidable losses from specific future development actions. It only includes those actions above and beyond those typically taken by Congress for protection of fish and wildlife resources.

"Out-of-kind replacement" means providing or managing substitute resources to replace the habitat value of the resources lost, where such substitute resources are physically or biologically different from those lost.

"Planning area" means a geographic space with an identified boundary that includes:

(1) The area identified in the study's authorizing document;

(2) The locations of resources included in the study's identified problems and opportunities;

(3) The locations of alternative plans, often called "project areas;" and

(4) The locations of resources that would be directly, indirectly, or cumulatively affected by alternative plans, often called the "affected area."

"Practicable" means capable of being done within existing constraints. The test of what is practicable depends upon the situation and includes consideration of the pertinent factors, such as environment, cost, or technology.

"Project" means any action, planning or approval process relating to an action that will directly or indirectly affect fish and wildlife resources.

"Replacement" means the substitution or offsetting of fish and wildlife resource losses with resources considered to be of equivalent biological value. However, resources used for replacement represent loss or modification of another type of habitat value. Replacement actions still result in a loss of habitat acreage and types which will continually diminish the overall national resource base. It should be clearly understood that replacement actions never restore the lost fish and wildlife resource—that is lost forever.

Dated: January 13, 1981.

Cecil Andrus,

Secretary of the Department of the Interior.

[FR Doc. 81-1886 Filed 1-22-81; 8:45 am]

BILLING CODE 4310-55-M

APPENDIX G

COTP STANDARD ROAD DESIGNS

POWERLINE ACCESS ROADS

Design Criteria:

1. Road Closure Devices: Standard F.S. Gate
   Earth Barriers (Permanent Closures)
   Obliterate (only in unusual circumstances)
   Include standard warning signs & panels

2. Road Bed: Width 14' to 16' maximum
   1' slough widening maximum (optional)
   See attachment - Page A-17.

3. Road Template (Determined by Classification):

   Normal: Outsloped without ditch
   Subsurface Water Condtions: Inslope with 1' ditch
   Cut-Fill slopes (depends on classification)

   Cuts: Solid — 1/2:1 for less than 15' cuts, 1/4:1 if higher

   Rippable — 3/4:1 for less than 15' cuts, 1/2:1 if higher

   Flatter slope options to be used where rock seams approximately parallel the natural slope.

   Fills: 1¼:1 to 1-1/3:1

   See attached Typical Section, page A-17.

4. Turnouts: Place on switchbacks and blind curves and other locations as needed. Blind curves may need double lane or turnouts to meet stopping sight distance criteria. See Exhibit 4, page 7.
   Width - 10 ft.
   Length - Minimum 50' full widening with 25' tapers.
   Spacing - Collector roads - 800 ft. maximum.
   Local Roads - 1320 ft. maximum.

5. Curve Widening - Determine curve widening using critical/design vehicle requirements and the minimum lane width graph. (See attachment - exhibit #8, on page A-9.)

6. Switchbacks: 50' minimum radius, grades in accordance with attachment 24,32--2,3,4. 6% maximum.

7. Intersections: Approval by the will be required for all intersections with an intersection angle less than 60°. Review and approval during location and prior to survey will prevent design approval delays.

8. Turnarounds: As a minimum, design a turnaround near the end of dead-end roads. See exhibit for J- hole turnaround - page A-11.

9. Drainage: Cross drainage - culverts (minimum 18" diameter). Driveable drainage dips (surface water inerceptors) are not to be constructed on grades greater than 8%. On grades over 8%, special design considerations such as surfacing and insloping may be required.
Use standard for spacing and template of dips.
See attached Culvert Inlet Basin TYPICAL SECTIONS on pages A-16 and A-17.

10. Disposal of Waste Materials: Dumping of excess excavation on fill slopes or side slopes or by placement outside the construction limits will not be done unless approved by the Forest Service.
Designed use and disposal of excess excavation in construction of turnouts is preferred.

11. Road R-O-W Clearing: 5' from cut shoulder or 3' from top of cut. 10' from fill shoulder or to a point where fill on trees is 2'; whichever is greater. Additional clearing will be allowed where needed for layer placed fills, culverts, etc.

(Probable Construction Items - below:)

Clearing Slash Disposal - Total disposal
Pile & Burn

Preserve all merchantable timber
Nonmerchantable timber to be decked for fuelwood.

12. Vertical Alignment: Desired grade 6% or less. Steeper grades only where alternatives are not viable.
Maximum sustained grades - 8%.
Pitches (300 feet or less) - 12% -- not to exceed two per mile.
Final approval of grades in excess of these will be made (prior to approval of design)

Desired minimum grade - 2% (to facilitate drainage)
Vertical Sight Distance - See exhibits 2 and 2a

13. Horizontal Alignment: 60' radius curves - review and approval required on curves with less than 50' radius.

14. Surfacing: Depends on classification of materials and operating season intended use. Pit-run or crushed aggregate surfacing and/or dust pallatives may be required to prevent excessive roadway surface loss from water erosion or dusting, and to provide a stable roadway during periods of inclement weather.

15. Reconstruction Design Standards: Spot reconstruction will be treated the same as new construction.
To avoid loss of stable slopes, generally, increased width will be gained by lowering grade; however, cut bank disturbance may be appropriate on a case by case basis to improve alignment, grade or to avoid stream impacts.

APPENDIX H

CULTURAL RESOURCES MEMORANDUM OF AGREEMENT

Memorandum of Agreement
among the
Western Area Power Administration,
Transmission Agency of Northern California,
California State Historic Preservation Officer,
Oregon State Historic Preservation Officer,
and
The Advisory Council on Historic Preservation
Regarding the
California-Oregon Transmission Project

WHEREAS, the Transmission Agency of Northern California (TANC), a joint powers agency formed under the laws of California, serves as Project Manager on behalf of a diverse group of publicly- and privately-owned utilities and the Western Area Power Administration (Western) who are proposing to construct the California-Oregon Transmission Project (Project); and,

WHEREAS, the Project and its potential associated facilities consists of: (1) construction of a new 500-kV transmission line from the Oregon border area to the Redding, California area, (2) reconstruction of an existing 230-kV transmission line from the Redding area to the Tracy Substation in California, (3) construction of a new 500-kV transmission line from the Tracy Substation to the Tesla Substation, (4) possible construction of a new 500-kV cross-tie from the Redding area to the Round Mountain Substation in California, (5) construction of new 500-kV substations in southern Oregon and the Redding area, (6) expansion of the existing Tracy Substation, and (7) construction of access roads; and,

WHEREAS, TANC has been designated the lead agency under the California Environmental Quality Act (CEQA) for ensuring that the Project complies with CEQA; and,

WHEREAS, Western has been designated the lead Federal agency for ensuring that the Project complies with the National Environmental Policy Act and Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA); and,

WHEREAS, Western and TANC are working together to prepare a joint environmental document which will satisfy the requirements of both Federal and State environmental laws and regulations; and,

WHEREAS, Western has determined that the Project may have an effect upon properties listed in or eligible for inclusion in the National Register of Historic Places and has requested the comments of the Advisory Council on Historic Preservation (Council) pursuant to Section 106 of the National Historic Preservation Act (16 U.S.C. 470) and its implementing regulations "Protection of Historic and Cultural Properties" (36 CFR Part 800); and,

Authenticated Copy

Robert Fink Feb 24 1987
Date

Chief, Western Division of Project Revie
Advisory Council on Historic Preservatic

WHEREAS, corridor selection and facility design consist of three phases: (1) Regional Study, (2) Alternative Route Selection, and (3) Preferred Route Selection; and,

WHEREAS, the Regional Study and Alternative Route Selection have been completed;

NOW, THEREFORE, Western, TANC, the California and Oregon State Historic Preservation Officers (SHPO), and the Council agree that the undertaking will be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

Western in cooperation with TANC will ensure that the project is implemented in accordance with the following stipulations:

I. TANC will ensure that historic and cultural properties are identified, their significance evaluated, and that potential effects on historic and cultural properties are considered during the Project by implementing the measures specified in the "Cultural Resources Work Plan" (Attachment 1) as amended by this agreement.

II. The joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) prepared by Western and TANC will be provided to the SHPOs, the Council, the USDA Forest Service (USFS) and the Bureau of Land Management (BLM) for review. The EIS/EIR will document the consideration given to cultural resources in selecting a preferred alternative and will identify future plans for survey and treatment of cultural resources. The final EIS/EIR will respond to all comments received and will be provided to the above parties.

III. TANC will implement a cultural resource survey of the final alignment prior to construction. A survey and assessment report will be prepared subsequent to the survey which will describe the findings of the survey, evaluate the significance of reported cultural resources based on the criteria found in 36 CFR 60.4, assess the impacts of the proposed project on cultural resources, and provide recommendations for mitigation of impacts to cultural resources. The recommendations in this report will constitute TANC's draft Historic Property Management Plan (HPMP) for the Project.

IV. Based upon the information and recommendations provided by the cultural resource survey and assessment and the draft HPMP, Western and TANC, in consultation with the California and Oregon SHPOs, USFS, and BLM, will (1) determine the eligibility for inclusion in the National Register of Historic Places for all cultural resource sites within the survey area, (2) determine the effect of the Project on cultural resources, and (3) agree upon the final HPMP for the Project.

a. If Western and the SHPOs cannot reach agreement regarding the eligibility of sites in their respective states, Western will request a formal determination of eligibility from the Keeper of the National Register.

b. The reviewing parties (SHPOs, U.S. Forest Service, Bureau of Land Management) will provide their comments to Western within 30 days of receipt of the draft HPMP. Failure of the reviewing parties to comment within 30 days shall not prevent Western and TANC from implementing the HPMP.

c. Western will ensure that the comments of the reviewing parties are incorporated into the final HPMP whenever reasonable and feasible.

d. The final HPMP will be provided to the Council for review. The Council will provide any comments it may have within 10 working days of receipt of the final HPMP.

V. The preferred method of treatment of historic and cultural properties will be avoidance. New lines will be designed in so far as is technically, economically, and environmentally feasible to avoid or minimize the placement of transmission line structures, ancillary facilities, and new access easements within the boundaries of historic and cultural properties.

VI. Western and TANC anticipate that total avoidance of historic properties will not be possible. Therefore, the HPMP will include a data recovery program (DRP). The DRP will include a single, comprehensive, research design for all work to be conducted in accordance with this Agreement. The research design will be based on current archaeological, historical, and, where appropriate, ethnographic research concerns in the study area, applicable portions of any State Historic Preservation Plans and shall take into account the standards, principles, and recommendations embodied in the Council's "Treatment of Archaeological Properties: A Handbook," Parts I and III.

VII. Western and TANC will consult with landowners and land managers when data recovery is proposed at a site on their land.

VIII. Western and TANC will ensure that all site avoidance and mitigation measures in the HPMP plan are included as specifications in the construction contracts.

IX. All reports resulting from the implementation of data recovery shall be submitted to the SHPOs and the land managers for review and comment. Western and TANC will ensure that any comments received are considered and incorporated, as appropriate, into the final reports. Copies of the final reports will be provided to the SHPOs, the Council, the USFS, BLM, the Bureau of Indian Affairs, the California Native American Heritage Commission, and other appropriate Native American groups.

X. TANC will ensure that prior to initiation of construction activities in the area of a historic or cultural property all avoidance or mitigation measures to be carried out in each such area have been completed.

XI. Western and TANC will ensure that an archaeologist is available for consultation throughout the construction of the Project.

XII. In the event the Project design is amended after the HPMP is finalized, and the amendment results in the deletion, addition, or rerouting of any portion of the Project, Western will consult with the appropriate SHPO regarding the need for additional historic property identification and evaluation work and that, as necessary, the steps specified in Stipulations I through VI of this Agreement are completed.

XIII. If previously undiscovered archaeological property is encountered during construction, all work that may have an adverse effect on the property will cease until such time as Western and TANC have consulted with the appropriate SHPO to evaluate the property and, if necessary, design and implement mitigation measures. The evaluation of the discovery will occur within 5 calendar days.

XIV. Western and TANC shall ensure that construction contractors are informed that historic properties are located in and near the project area and that these properties are protected by Federal law.

XV. Should Western, TANC, and the California and/or Oregon SHPO be unable to agree upon mutually acceptable programs and approaches for implementing the provisions of this Programmatic Memorandum of Agreement (PMOA), Western will consult further with the Council to resolve issues at dispute in accordance with 36 CFR 800.6(b)(7).

XVI. Pursuant to 36 CFR 800.6(c)(4) if a signatory to this PMOA determines that the terms of this PMOA cannot be met or believes a change is necessary, the signatory shall immediately request the consulting parties to consider whether an amendment of the Agreement is necessary. Amendments will be executed in the same manner as the original PMOA.

Execution of this Memorandum of Agreement evidences that Western has afforded the Council a reasonable opportunity to comment on the undertaking and its effects on historic properties and that Western has taken into account the effects of its undertaking on historic properties.

Historic Preservation Officer
Western Area Power Administration

3/11/86
Date

Chairman, Transmission Agency of
Northern California

3/26/86
Date

California State Historic Preservation Officer

7/10/86
Date

Oregon State Historic Preservation Officer

8.11.86
Date

Executive Director
Acting Advisory Council on Historic Preservation

12/10/86
Date

Chairman
Advisory Council on Historic Preservation

12 DEC 86
Date

Volume 3B - Los Banos-Gates Technical Appendices

1.6 CHANGES TO THE DRAFT EIS/EIR VOLUME 3B - LOS BANOS-GATES TECHNICAL APPENDICES

1. Page J-5

   Section 2.4, Paragraph 1.
   Add the following to the end of the paragraph: "Wilderness Study Areas are managed as a Class II regardless of the class rating until such time as Congress acts, at which time a wilderness area would automatically be a Class 1."

2. Appendix M

   Add the attached Appendix M, which is an analysis of agricultural impacts related to the South of Tesla reinforcements that may be needed should the Los Banos-Gates Project be deferred or not built. The Appendix is referred to in the report on the reinforcements in Section 1.3 of this Final EIS/EIR.

APPENDIX M

Analysis of Agricultural Impacts: South of Tesla Reinforcements Project for Deferral of the Los Banos-Gates Transmission Project.

This section describes the impacts that the proposed reconductoring of the Panoche-Gates 230 kV transmission line would have on agricultural resources. Such impacts are determined by identifying the typical cropping pattern along the affected transmission line, designating the appropriate number of new towers to each crop, and then quantifying costs by various impact categories.

A typical cropping pattern was developed from the California Department of Water Resources Guijarral Hills Land Use Map and from a field survey conducted in the area in March 1987. In order of relative frequency, the following crops were identified: cotton, processing tomatoes, wine grapes, lettuce, wheat, and cantaloupe melons. Gross returns per acre for each crop were calculated based on weighted four-year average prices for 1982-1985 as reported in Fresno County Agricultural Crop Reports and on "best management yields" which can result from optimum management under favorable climatic conditions.

Transmission line impacts have previously been identified for PG&E by Resources International (RI) in the study on "The Effects of Electrical Transmission Lines and Towers on Agriculture," 1978. That study describes both short- and long-term impacts. However, because PG&E plans to remove one tower and restore the associated site for each new tower installed in this project, no additional significant long-term impacts are expected to occur. Thus, only short-term impacts were evaluated. These include costs of yield losses during the construction period, additional irrigation costs associated with construction and pull-and-tension sites, cost of reconditioning soil following construction, cost of yield reductions due to soil compaction, cost of reestablishing perennial crops, and cost of perennial crop yield reductions from date of replanting to date of full production.

Impacts to agricultural resources are summarized in Table M-1. The basis for each impact category calculation is given in footnotes. These impacts were evaluated based on information provided by PG&E and on numerous assumptions previously used by RI in assessing transmission line impacts. As shown, the major impacts are due to construction site and soil compaction yield losses and to additional irrigation costs. By crop, the major impacts occur in lettuce, tomatoes, and cotton. The total estimated economic impact to agricultural resources of the proposed Panoche-Gates reconductoring project is $15,800.

Gates-Coalinga 70 kV Line Construction

This section describes the impacts that constructing a 70 kV wood pole transmission line along three different potential routes from Gates-Coalinga No. 2 would have on agricultural resources. Such impacts are determined by identifying typical cropping patterns along the proposed number of new poles to each crop, and then quantifying costs by various impact categories.

Typical cropping patterns were developed from the 1986 California Department of Water Resources Guijarral Hills Land Use Map and from a field survey conducted in the area in August 1987. In order of decreasing frequency, principal land uses along the proposed routes are cotton, lettuce, tomatoes, grain, and native vegetation which represent 72 percent of land uses, followed by fallow field crop land, non-irrigated grain, pistachios, idle land, and carrots, which represent an additional 24 percent of land use.

A comparison of land uses in 1986 versus 1979 along the proposed routes is shown in Table M-2. Over those seven years, field crop acreage has declined by 37 percent, vegetable crop acreage has increased by 244 percent, and tree crops have increased by 281 percent. Specifically, the acreage of cotton, irrigated grain, alfalfa seed, safflower, potatoes, and melons has declined and the acreage of tomatoes, lettuce, carrots, broccoli, dry beans, dryland grain, and pistachios has increased. Thus, the trend in this area is to plant fewer acres to lower value field crops and more acres to higher value vegetable and tree crops.

Transmission line impacts have previously been identified by Resources International in the study "The Effects of Electrical Transmission Lines and Towers on Agriculture," 1978. That study describes both short- and long-term impacts. Short-term impacts occur solely as a result of construction activity. Some short-term impacts may affect farming operations and crop yields only during the construction period, while other short-term impacts may affect crop production for 2-12 years after construction depending on crop type, the effects of soil compaction, perennial crop reestablishment, and tree crop recovery from pruning.

Eight categories of short-term impacts on agriculture were evaluated:

1. Estimated cost of cropping area losses during transmission line construction.

   Losses of cropping area can occur at the site of pole construction, between sites of pole construction, in areas used as access roads to construction sites, and at pull-and-tension sites.

2. Estimated cost of additional irrigation operations during construction.

3. Estimated cost of construction site reconditioning due to construction activity.

4. Estimated cost of yield reductions from soil compaction due to construction activity.

5. Estimated cost of perennial crop reestablishment due to construction activity.

6. Estimated cost of perennial crop loss during period of reestablishment.

7. Estimated cost of crop loss from tree pruning during construction.

8. Estimated cost of additional equipment operations during the construction period.

Because all construction activity will be conducted within the confines of existing farm roads, except for an estimated .75-mile section along Route Alternatives 1 and 1A where there is no apparent farm road, it is estimated that there will be no significant impacts to agricultural resources caused by short-term impact Categories 1-7. For the .75-mile section (along the southern border of Section 26, Township 20 S., Range 16 E., west of the canal) of Route Alternatives 1 and 1A without a farm road, it is assumed construction activity would be conducted between the currently idle crop land to the north and the adjacent native vegetation land to the south, which would result in negligible impacts caused by short-term impact Categories 1-7.

Construction activity conducted along farm roads has the potential to cause short-term impact Category 8 impacts. These impacts would result from the following: 1) additional farm equipment time required to maneuver around construction sites when making turns at field boundaries; and 2) additional time required to make up to a four-mile detour (the perimeter of one section) by farm equipment or pickups moving between fields in the event construction activity completely blocked farm roads.

However, PG&E expects construction activity that would interfere with field operations at any one site to be relatively brief and transitory in nature. As a result, the probability of construction activity occurring at the same time as field equipment operations at any one site is estimated to be very low. In addition, PG&E does not expect construction activity to completely block farm roads. Therefore, it is estimated that there will be no significant impacts caused by short-term Category 8. Thus, the construction of the 70 kV wood pole line along any of the proposed three routes is expected to have no short-term impacts on agricultural resources.

Long-term impacts are those expected to affect various agricultural resources during the entire life of the proposed 70 kV wood pole line. Five categories of long-term transmission line impacts on agriculture were evaluated:

1. Estimated cost of cropping area losses within and around poles.

2. Estimated cost of additional irrigation operations.

3. Estimated cost of additional equipment operations around transmission towers.

4. Estimated cost of additional weed control operations.

5. Estimated cost of additional agricultural aircraft operations.

Since all transmission line structures will be sited on field boundaries and will be single wood poles, it is estimated that there will be no significant impacts to agricultural resources caused by long-term impact Categories 1-4. However, the proposed transmission line will have an impact on agricultural aircraft operations along specific sections of the proposed routes.

As obstacles to normal agricultural aircraft operations, transmission towers, poles, and lines increase hazards to aerial applicators and increase flying time and the amount of material required to adequately treat (e.g., spray, see, fertilize, apply dry materials to) a particular field. Clean-up passes are normally required around towers and may be required between poles or towers, depending on the crop involved and other factors. Depending on the operator, agricultural aircraft may be flown beneath high-voltage transmission line conductors when applying material on low profile crops (except rice) if conductor height is sufficient. according to statistics provided by the California Agricultural Aircraft Association (CAAA), when pilots fly underneath lines flying time can increase from 19-40 percent compared to unobstructed fields, depending on the number and orientation (parallel versus diagonal) of transmission line towers.

Previous studies and experience have shown that growers have generally been charged for additional materials expended in performing clean-up passes around transmission lines, but not for any additional flying time required. As a result, the estimated cost of additional aerial applications in this analysis is based on estimated additional material costs only. These additional material costs are based on the extra material required to make two full clean-up passes between adjacent poles (an area of approximately one acre) for each normal aerial application during the growing season. Costs are calculated for a 50-year period and expressed in construction-year dollars using a four percent discount rate.

However, fields can be completely "blocked" by transmission lines when 1) vertical clearance is insufficient due to conductor sag and/or the presence of high-profile crops (e.g., mature corn, tree crops); 2) materials are normally applied at or near conductor height (e.g., fertilizing, seeding); and 3) local distribution lines, canal banks, etc., are co-located along transmission lines. CAAA statistics show that in fields with "blocked" ends flying times can increase 21-60 percent depending on the skill and experience of the pilot and the general requirements of the particular job.

There are two situations where the proposed transmission line will not increase costs of agricultural aircraft operations: 1) where transmission lines currently exist; and 2) where the crop direction parallels newly proposed transmission lines and no other transmission lines otherwise interfere with previously unobstructed aerial operations for a given field. In sections of the proposed routes where transmission poles and lines already exist, the proposed 70 kV project would result in the construction of higher poles and lines. However, it is estimated that this replacement will not increase costs of agricultural aircraft operations. Further, where crop direction parallels transmission lines, aerial operations can also be conducted parallel to transmission lines without additional impacts. In the absence of crop direction information, it is generally assumed that the crop direction is perpendicular to proposed transmission lines.

For each route the costs of additional aircraft operations are summarized by crop in Table M-3. These costs represent the only impacts on agricultural resources of the proposed Gates-Coalinga No. 2 70 kV wood pole transmission lines. As shown, Route Alternative 1A route has the greatest impact, followed by Route Alternative 1 and Route Alternative 2. The impact on Route 2 is substantially lower because existing impacts are already high due to the frequency of existing transmission lines.

TABLE M-1

Agricultural Impacts

Crop	Number[1] of Towers	Number[2] of Towers Raised	Yield[3] Loss	Irrig.[4] Const.	Irrig.[5] PT	Recondition[6]	Compaction[7] Loss	Reestablish[8]	Perrenial[9] Loss	Totals
Cotton	16	5	$1,150	$1,210	$105	$225	$ 855	$ --	$ --	$ 3,545
Tomatoes, processing	10	3	1,338	1,188	105	135	1,020	--	--	3,786
Grapes, wine	5	2	338	408	36	52	318	716	802	2,670
Lettuce, spring and fall	4	1	1,946	627	55	45	1,485	--	--	4,158
Wheat	3	1	90	88	8	45	80	--	--	311
Melons, cantaloupe	2	1	532	319	28	45	406	--	--	1,330
Totals	40	13	$5,394	$3,840	$337	$547	$4,164	$716	$802	$15,800

[1]Assume five towers per mile.

[2]Assume one-third of towers will be moved and raised.

[3](Construction area + allocated pull-and-tension site = access road = equivalent area of influence) x (gross return/acre). Assume gross return/acre as follows: cotton - $924; processing tomatoes - $1,836; wine grapes -$1,485; cantaloupe - $2,189; wheat - $434; lettuce (double crop, spring and fall) - ($3,330 = $4,680) = $8010.

[4]Assume towers are 300 feet from an irrigation ditch and producers use furrow irrigation. Cost/tower = $\frac{52D\ (3N + 2)}{5280}$ + 22N where D = total distance ditch pulled, N = number of irrigations. Manual-move sprinkler irrigated crop impacts would be less.

[5]Same as [4] except each site allocated among 13 towers.

[6]($230/acre) x (acres replanted/tower). Acres replanted/tower = (construction area + allocated pull and tension site + access road - area permanently out of production at new tower).

[7]Year 1 - 50% loss, year 2 - 30% loss, year 3 - 20% loss. Future costs discounted at 4%/year. Loss/tower = (acres replanted) x (gross return/acre)(.941).

[8](Acres replanted/tower) x ($1,475/acre) + $190/tower.

[9]Perennial recovery yield loss = (acres replanted) x (gross return/acre) x (discounted sum of annual yield losses until crop reaches full production).

TABLE M-2

LAND USES ALONG PROPOSED ROUTES
(PERCENTAGE OF TOTAL LAND USE)

Crop	1979	1986	Change From 1979
Cotton	45	25	-20
Lettuce	1	15	+14
Tomatoes	10	13	+ 3
Grain	12	12	- 3
Native Vegetation	9	9	0
Fallow Field Crop Land	2	6	+ 4
Dryland Grain	0	5	+ 5
Pistachios	0	4	+ 4
Idle Crop Land	0	3	+ 3
Carrots	0	3	+ 3
Beans, Dry	1	3	+ 2
Vineyard	2	2	0
Melons	2	1	- 1
Almonds	1	1	0
Peppers	0	0	0
Broccoli	0	1	+ 1
Alfalfa Seed	5	0	- 5
Safflower	9	0	- 9
Potatoes	0.3	0	- 0.3

TABLE M-3

Agricultural Impacts

Land Use	Aerial Impacts Per Pole ($)	ROUTE ALTERNATIVE 2 Total No. Poles	ROUTE ALTERNATIVE 2 No. Poles Impacted	ROUTE ALTERNATIVE 2 Impact ($)	ROUTE ALTERNATIVE 1A Total No. Poles	ROUTE ALTERNATIVE 1A No. Poles Impacted	ROUTE ALTERNATIVE 1A Impact ($)	PREFERRED ROUTE Total No. Poles	PREFERRED ROUTE No. Poles Impacted	PREFERRED ROUTE Impact ($)
Tomatoes	645	34	7	4,515	17	9	5,805	16	6	3,870
Lettuce[1]	6,020	14	3	18,060	28	15	90,300	32	11	66,220
Cotton	430	69	15	6,450	38	21	9,030	34	12	5,160
Peppers	2,150	1	0	0	3	2	4,300	4	1	2,150
Fallow Field Crops	0	14	3	0	17	9	0	9	3	0
Native Vegetation	0	5	1	0	4	1	0	2	1	0
Pistachios	0	0	0	0	6	3	0	6	2	0
Idle Land	0	0	0	0	7	4	0	4	1	0
Farmsteads	0	0	0	0	1	1	0	0	0	0
Non-Irrigated Grain	220	0	0	0	10	6	1,320	12	4	880
Grain	667	5	1	667	10	6	4,002	29	10	6,670
Carrots	860	3	1	860	8	4	3,440	7	2	17,206
Vineyard	0	8	2	0	0	0	0	0	0	0
Almonds	0	0	0	0	6	3	0	6	2	0
Cotton Gin	0	0	0	0	1	1	0	0	0	0
Onions and Garlic	796	10	2	1,592	6	3	2,388	11	4	3,184
Melons	323	1	0	0	2	1	323	7	2	646
Beans, Dry	559	0	0	0	1	1	599	0	0	0
Broccoli	2,903	5	1	2,903	0	0	0	0	0	0
Total		169	36	35,047	165	90	121,467	179	61	105,986

[1]Double cropped.

Volume 4A - COTP Map Appendix

1.7 CHANGES TO THE DRAFT EIS/EIR VOLUME 4A - COTP MAP APPENDIX

No changes have been identified.

Volume 4B - Los Banos-Gates Map Appendix

1.8 CHANGES TO THE DRAFT EIS/EIR VOLUME 4B - LOS BANOS-GATES MAP APPENDIX

No changes have been identified.

SECTION 2.0

CHANGES TO THE SUPPLEMENT TO THE DRAFT EIS/EIR

2.0 CHANGES TO THE SUPPLEMENT TO THE DRAFT EIS/EIR

There have been a number of changes to the data and analyses presented in the Supplement to the Draft EIS/EIR. This section of the Final EIS/EIR documents those changes that are not addressed in Section 1.0. The changes presented in this section also reflect changes to the COTP preferred route that occurred as a result of the additional analyses and consideration of public comments on the Supplement.

The sections of the Supplement updated by information in Section 1.0 are listed below:

Supplement Section	Final EIS/EIR Section
Abstract	Abstract
Summary	Summary
1.0 Introduction	1.1.7 Summary of Public and Agency Consultation
7.0 Individuals and Organizations Receiving a Copy of the Supplement to the Draft EIS/EIR	1.1.9 Individuals and Organizations Receiving a Copy of the Final EIS/EIR
8.0 Index	1.1.12 Index

2.1 CHANGES TO THE SUPPLEMENT TO THE DRAFT EIS/EIR SECTION 1.0 - INTRODUCTION

No changes have been identified for this section of the Supplement to the Draft EIS/EIR. Section 1.1.7 of this document provides an update of public and agency consultation since release of the Supplement to the Draft EIS/EIR.

2.2 CHANGES TO THE SUPPLEMENT TO THE DRAFT EIS/EIR SECTION 2.0 - SUBSTATIONS

1. **Page 2.1-1**

   Paragraph 2.
   Change: "R11E" to "R12E".

2. **Page 2.1-1**

   Paragraph 2, Line 2.
   Change: "1/4 mile north" to "1/2 mile north"

3. **Page 2.1-7**

   Paragraph 2, Line 5.
   Add: "There will be peaks of construction activity requiring 20 to 30 or more workers at one time." after "year.".

2.3 CHANGES TO THE SUPPLEMENT TO THE DRAFT EIS/EIR SECTION 3.0 - NORTH ROUTING OPTIONS

1. Pages 3.1-3, 3.2-3, 3.2-9, 3.2-15, 3.3-3, 3.3-9, 3.3-14, and 3.4-3, respectively.

   Tables 3.1-1, 3.2-1, 3.2-2, 3.2-3, 3.3-1, 3.3-2, 3.3-3, and 3.4-1, respectively.
   Replace: Above referenced tables with Tables 2.3-1, 2.3-2, 2.3-3, 2.3-4, 2.3-5, 2.3-6, 2.3-7, and 2.3-8. The tables are located at the end of this section.

2. Page 3.1-4

   Paragraph 4, Line 1.
   Change: "49.8" to "30.46"

3. Page 3.1-5

   Paragraph 1, Line 5.
   Add: "This option is further from the Loveness airstrip and would reduce the land use impacts compared with the N-10A option." after "route."

4. Page 3.1-5

   Paragraph 1, Line 4.
   Add: "Loveness Airstrip," after "the"

5. Page 3.1-5

   Paragraph 4, Line 1.
   Change: "new" to "North 1"

6. 3.1-6

   Following Paragraph 5.
   Add the following paragraph after paragraph 5:

   "<u>Variation of John Cross Alternative</u>

   A variation of the Copic Bay route option and John Cross Alternative route was investigated. The alternative involves the placement of both existing 500 kV lines along N-10 Alt.4 and building the COTP along the existing Intertie right-of-way. An engineering and environmental evaluation was performed on the variation and compared to the preferred route shown in the Draft EIS/EIR. The new variation was found to be environmentally superior, but considerably more costly, requiring longer line lengths, complex contractual arrangements among private and public utilities, loss of Intertie use for a limited period of time, and greater environmental impacts to certain resources. The impacts are partially due to the need to build three lines with this variation compared to one with the preferred route.

   Table 2.3-9 shows the estimated impacts from the route variation relative to the preferred route as shown in the Draft EIS/EIR. Section 1.2.2 of Volume 1 of this Final EIS/EIR further explains the variation and how it was evaluated."

7. Following page 3.1-6

   Add: Table 2.3-9. The table is located at the end of this section.

8. Page 3.2-1

   Paragraph 6, Line 8.
   Add: "or" after "residences,"
   Add: "." after "land"
   Delete "or timber production zones."

9. Page 3.2-1

   Paragraph 6, Line 9.
   Change: "2.38" to "and 4.80"

10. Page 3.2-1

Paragraph 6, Line 10.
Delete: "and"
Add: "which would result in a significant impact." after "timberland,"

11. Page 3.2-1

Paragraph 6, Line 12.
Add: "The impacts to prime timber are considered significant." after "visual impacts."

12. Page 3.2-4

Following Paragraph 3
Add the following paragraph after paragraph 3:

"Fuel Modification practices have been used for many years by land management agencies, as a means of reducing amounts of flammable fuels to aid fire control. More recently, federal land management agencies have begun to use fuel modification methods to reduce unnatural fuel buildups which are the result of many years of fire suppression efforts. These unnatural fuel buildups have contributed greatly to large fires which otherwise would not have occurred had fire been allowed to remain a part of the natural environment. With this in mind, fuel modification activities can emulate the role once filled by fire, reducing fuel concentrations and thereby reducing the potential for large intense forest fires.

Fuels management or hazard reduction can be used to slow the spread of fire in timbered areas. Fuels modification is frequently used as a means of reducing the amounts of flammable fuels in an area to aid fire control or suppression efforts. Fuel breaks, when used in conjunction with suppression forces, can be effective in slowing or stopping wildfires under all but the most extreme conditions. In areas where there are continuous fuel types between the existing Intertie and the N-10M2 route option, fuel treatment can be used to break up the fuels and modify spread rates as well as the intensity and volume of smoke a fire may produce. Fuels modification would be significant in areas such as immediately east of the Burnt Lava Flow Virgin Area, where the lines traverse a heavily forested area. The area is a "bottleneck" bounded on the west by the Burnt Lava Flow Virgin Area and on the east by the two Intertie lines.

A fuel break is a strategically located strip or block of land on which a cover of dense, heavy, or flammable vegetation has been permanently changed to lower fuel volume or flammability. The width of fuel breaks are determined by several factors which include vegetation, topography, and visual concerns. The Shasta-Trinity National Forest has indicated that 200 to 300 feet would be appropriate widths for fuel breaks. These widths could be expanded on ridges and saddles, as needed.

Some suggested fuels management strategies include the following:

- Maintain the right-of-way with a low cover of grass, brush, and light fuel volume. Should a fire then originate or spot onto the right-of-way, heat intensities and scorch and flame heights would be such that it could pass under the line without damage. An additional hazard reduction treatment suggested was to feather back the edges of the right-of-way along concentrations of heavy fuels.

- Construct an additional field break adjacent to both sides of the right-of-way that would be accessible to fire and equipment. These would be corridors within which vegetation would also be modified to lower fuel volume and flammability. Fuel breaks as little as 100 feet wide may be needed in areas with light fuels or natural barriers. Widths would generally not be expected to exceed 300 feet in areas with steep slopes or heavy fuel concentrations.

- Other land management activities that were suggested to enhance the effectiveness of the fuel breaks include rangeland grazing, wildlife browsing, and timber stand improvement operations such as thinning and prescribed burns.

- In addition to vegetation modification, a fire response plan could be instituted which would include the Forest Service or California Department of Forestry (CDF) notifying the utilities in the event of a fire in the vicinity of the Intertie including the COTP. Such a plan does not currently exist for the existing Intertie. Advance warning of oncoming fires will help give the system operation and the utilities additional time to reschedule generation and load on the Intertie so that, if there were an outage, the lines would not be fully loaded.

Fire protection forces will be an important aspect of the fire response plan in assuring that forest fires in all but the most extreme events will not be the cause of a simultaneous three-line outage. The CDF and the Forest Service have similar responsibilities for forest fire protection and suppression.

Fire stations run by both the CDF and the Forest Service are detailed on Figure 2.3-1 at the end of this section. Initial attack responsibility in the event of a forest fire is detailed as follows: Redding to Round Mountain (approximately) - CDF; Round Mountain area to Big Bend area--east side of Pit River - CDF; and west side of Pit River - Forest Service; Smith Flat to Southern Oregon border - Forest Service. (Information provided by Bruce Turbeville, CDF.)"

13. Page 3.2-5

    Paragraph 5, Line 2.
    Change: "juniper woodland" to "a timber plantation"

14. Page 3.2-5

    Paragraph 5, Lines 4 and 5.
    Change: "4.8" to "7.23"
    Add: "." after "timber"
    Delete: "and 2.7 miles of TPZ land located along 10Alt5(Al)."

15. Page 3.2-5

    Paragraph 5, Line 5.
    Change: "6.8" to "7.40"

16. Page 3.2-5

    Paragraph 5, Line 6.
    Delete: "and 7.5 miles of TPZ land."
    Add: "." after "timber"
    Add: "If the timber plantation can be avoided," before "The County Line"

17. Page 3.2-5

    Paragraph 5, Line 7.
    Add: "slightly" after "crosses"
    Add: "." after "timber"
    Delete: "and TPZ land"

18. Page 3.2-6

    Paragraph 1, Line 7.
    Change: ".81" to ".73"

19. Page 3.2-6

    Paragraph 2, Line 6.
    Change: "three" to "two"

20. Page 3.2-6

    Paragraph 2, Lines 7 and 8.
    Delete the sentence: "The N-10M option passes within 1,000 feet of one of these sites."

21. Page 3.2-7

    Paragraph 5, Line 7.
    Delete: "timber production zones,"

22. Page 3.2-10

Paragraph 2, Line 7.
Delete: "and 4.9 miles of timber production zones"

23. Page 3.2-10

Paragraph 3, Line 3.
Delete: "and TPZ resources"

24. Page 3.2-11

Paragraph 1, Lines 1 and 3.
Change: "189" to "163.42" and "208" to "150.97"

25. Page 3.2-11

Paragraph 1, Line 6.
Add: "The North-of-Bear option would cross approximately 0.75 miles within a designated old growth retention area. The right-of-way could be routed to avoid impacts to the goshawk territory within this stand, but some old growth would be removed. This would be a significant impact that would be difficult to mitigate." after "vegetation."

26. Page 3.2-11

Delete: Paragraph 3 and replace with the following paragraph:

"The North-of-Bear option passes through timber in the Shasta-Trinity National Forest, whereas the South-of-Bear option passes through timber in both the Shasta-Trinity National Forest and privately owned timberland. The North-of-Bear option crosses 4.9 miles of prime timber, whereas the South-of-Bear option crosses 4.4 miles of prime timber. Since the North-of-Bear option is located entirely on public land, it has no TPZ impacts. The South-of-Bear option, on the other hand, crosses 5.7 miles of privately owned timber with TPZ status. The majority of the TPZ land contains non-prime timber, however. Therefore, the South-of-Bear option is slightly preferred because it affects less prime timber."

27. Page 3.2-12

Paragraph 1, Line 5.
Change: "14" to "13"

28. Page 3.2-12

Paragraph 1, Line 6.
Change: ".13" to ".68"

29. Page 3.2-12

Paragraph 1, Line 7.
Change: ".17" to ".58"

30. Page 3.2-16

Paragraph 2, Line 1.
Change: "634.5" to "529"

31. Page 3.2-16

Paragraph 2, Lines 1 and 3.
Change: "634.5" to "455.08" and "417.2" to "318.42"

32. Page 3.2-16

Paragraph 2, Line 3.
Change: "417.2" to "340"

33. Page 3.2-16

Paragraph 4, Line 5.
Delete: "and 2.7 miles of TPZ land,"

34. Page 3.2-16

Paragraph 4, Line 6.
Change: "15.7" to "16.3"
Add: "." after "timber"

35. Page 3.2-16

Paragraph 4, Lines 6 and 7.
Delete: "and 7.5 miles of TPZ land"

36. Page 3.2-16

Paragraph 4, Lines 8-11.
Delete: the sentence "The North 2 Routing option . . . route."

37. Page 3.2-17

Paragraph 2, Lines 7 and 8.
Change: "40.92" to "36.57" and "43.39" to "44.00"

38. Page 3.2-17

Paragraph 3, Line 11.
Change: "seven" to "six"

39. Page 3.2-17

Paragraph 3, Line 12.
Change: "historic camp" to "trail"
Delete: "one cemetery/gathering place,"

40. Page 3.3-4

Lines 2 and 3.
Delete: "and 1.5 miles of timber production zones"

41. Page 3.3-4

Add the following after paragraph 1:
"The U. S. Forest Service indicated in November 1987 that the area east of the North 3J corridor (east of Little Meadows) has a feasible route location that will minimize resource impacts while meeting geologic concerns. Should a superior location be found near North 3J during final design, the lead agencies will work with the Forest Service to identify, review, and approve that location."

42. Page 3.3-4

Paragraph 3, Line 6.
Change: "1,455" to "1,445"

43. Page 3.3-5

Paragraph 1, Lines 1 and 3.
Change: "163" to "114" and "184" to "130"

44. Page 3.3-5

Paragraph 3, Line 6.
Delete: "and 1.5 miles of TPZ land"

45. Page 3.3-5

Paragraph 3, Line 8.
Change: "," to "."
Delete: "and 1.1 miles of TPZ land"

46. Page 3.3-6

Paragraph 1, Line 3.
Add: "North 3J would require approximately 18 miles of new access roads, while the preferred route would require 19 miles." before "The estimated"

47. Page 3.3-6

Paragraph 1, Line 7.
Change: "0.4" to "0.8" and "8.70" to "8.62"

48. Page 3.3-6

Paragraph 1, Line 8.
Change: "9.06" to "19.42"

49. Page 3.3-7

Paragraph 2, Line 6.
Add: "or" before "prime"
Add: "." after "land"
Delete: ", or timber production zones."

50. Page 3.3-10

Paragraph 6, Line 3.
Delete: "There are no TPZ impacts."

51. Page 3.3-11

Paragraph 2, Line 4.
Change: ".12" to ".63"

52. Page 3.3-11

Paragraph 3, Line 2.
Add: ", though the North 3K option is preferred" after "resources"

53. Page 3.3-11

Paragraph 3, Line 1.
Add: "nearly" before "equivalent"

54. Page 3.3-11

Paragraph 3, Line 5.
Change: "Each" to "North 3K"
Delete: "two"

55. Page 3.3-11

Paragraph 3, Lines 6-9.
Change: ", both sacred mountains. The North 3K . . . middle-ground zone." to "The existing option passes within 3.4 miles of 12 Native American heritage sites and within 1,000 feet of three of them."

56. Page 3.3-11

Delete last paragraph and replace with the following paragraph:

Both options would require a similar number of angle structures. However, a detailed geological investigation of soil conditions in this area revealed that the North 3K option traverses areas of excessive soil instability. In order to complete construction in the North 3K option, tower sites will have to be located in areas of known slide activity and along areas of considerably steep slopes which, in addition, would not be suitable for the construction of access roads. The existing route option offers a somewhat more stable terrain for tower siting and access road construction. A geological assessment conducted for the area concludes that the North 3K option is not suitable for construction. Geological conditions along the existing route option marginally support transmission line construction.

57. Page 3.3-12

Paragraph 5, Line 5.
Delete: "and 3.8 miles of timber production zones"

58. Page 3.3-12

Paragraph 7, Line 4.
Add: "." after "timber"
Delete: "and TPZ resources"

59. Page 3.3-16

Paragraph 1, Lines 4 and 5.
Change: "315" to "225" and "258" to "186"

60. Page 3.3-16

Paragraph 3, Line 4.
Add: "," after "timber"
Delete: "and 8.3 miles of TPZ land,"

61. Page 3.3-16

Paragraph 2, Line 4.
Add: "key" after "no" and "The Grizzly Peak route does cross deer summer range" after "habitat."

62. Page 3.3-16

Paragraph 3, Lines 5 and 6.
Add: "." after "timber"
Delete: "and 7.2 miles of TPZ land."

63. Page 3.3-16

Paragraph 3, Line 10.
Add: "." after "timberland"
Delete: "and TPZ land"

64. Page 3.3-17

Paragraph 1, Line 2.
Change: "3.45" to ".47"

65. Page 3.3-17

Paragraph 2, Line 4.
Change: "12" to "15"

66. Page 3.3-17

Paragraph 2, Line 6.
Change: "ten place names" to "several place names"

67. Page 3.3-17

Paragraph 2, Line 11.
Change: "5" to "14"

68. Pages 3.3-17, 3.3-18

Delete the paragraph under "Engineering/Construction Considerations" and replace with the following paragraphs:

"Although the Grizzly Peak option is approximately 2.6 miles longer than the Hearst option, the Hearst option requires the installation of approximately 15 more structures than would be required on the Grizzly Peak option due to the additional number of ridge tops traversed. The Grizzly Peak option traverses elevations approaching 5,600 feet and would require special consideration during design to withstand loads associated with high winds and heavy ice conditions. The Hearst option approaches elevations of 5,200 feet and would be subjected to somewhat less wind and icing load, although this difference is considered minimal.

Access to the Grizzly Peak option is significantly better than the Hearst option. A geological assessment was conducted of soil stability addressing slopes, landslides known to be active in the area, stable sites for tower locations, and suitable opportunities for the construction of access roads. Access roads to support the construction and maintenance of the transmission line would require cut and fill operations and benching and compaction, as well as the installation of overside drains and water bars.

The Hearst option, although 2.6 miles shorter in length than the Grizzly Peak option, traverses many areas of unstable or marginally stable ground, requiring the construction of a new access road system between the upper elevation of Alder Creek at the 5,200 foot level, and along and parallel to Alder Creek to the 4,000 foot level, in areas where roads do not presently exist. Preliminary assessments indicate that such an access road system would require the installation of severe switchbacks to many tower sites. Based upon best available information, such an access road system would traverse areas of unstable soils, and would traverse areas of slopes approaching 45°. In some areas, access road inclines of 15% would be required. Indications are that some sections of the access roads along the Hearst option would erode to an impassable state within the first year following construction.

It is concluded that during the operation of the line, due to the potential for severe storms and weather conditions that could damage the line and, at the same time, prevent helicopter access to damaged towers, the construction along the Hearst option would greatly increase risks associated with soil erosion, tower movement, initiation of landslides, and the rapid deterioration of access roads. There is a necessity to retain the access to tower locations for maintenance and repair purposes is of paramount importance for consideration in an engineering/construction evaluation.

The Grizzly Peak option offers the advantage of an existing road network and traverses more level terrain on stable ground significantly more suitable for reliable transmission line construction and maintenance. As a consequence of the concern for soil stability for transmission line construction and maintenance, the Hearst option is considered marginally acceptable at best. The Grizzly Peak option is clearly perferable due to overall considerations of the cost of construction, the number of towers installed, and the impact of construction of a new access road system for the Hearst option in areas of questionable soil suitability compared with the advantages of the utilization of existing roads along the Grizzly Peak option. This discussion specifically addresses the use of route segments N-7H2, a part of the Hearst option, rather than segment North 3K, which recent analyses indicate is not suitable for construction."

69. Page 3.4-1

    Paragraph 3, Line 7.
    Insert: "," after "land"
    Delete: "and 3.5 miles of timber production zones"

70. Page 3.4-4

    Paragraph 4, Line 1.
    Change: "93" to "63"

71. Page 3.4-4

    Paragraph 4, Line 2.
    Change: "99" to "82"

72. Page 3.4-5

    Paragraph 1, Line 3.
    Insert: "," after "timber"
    Delete: "and 3.5 miles to TPZ land,"

73. Page 3.4-5

    Paragraph 1, Lines 4 and 5.
    Insert: "." after "timber"
    Delete: "and 4.15 miles of TPZ land."

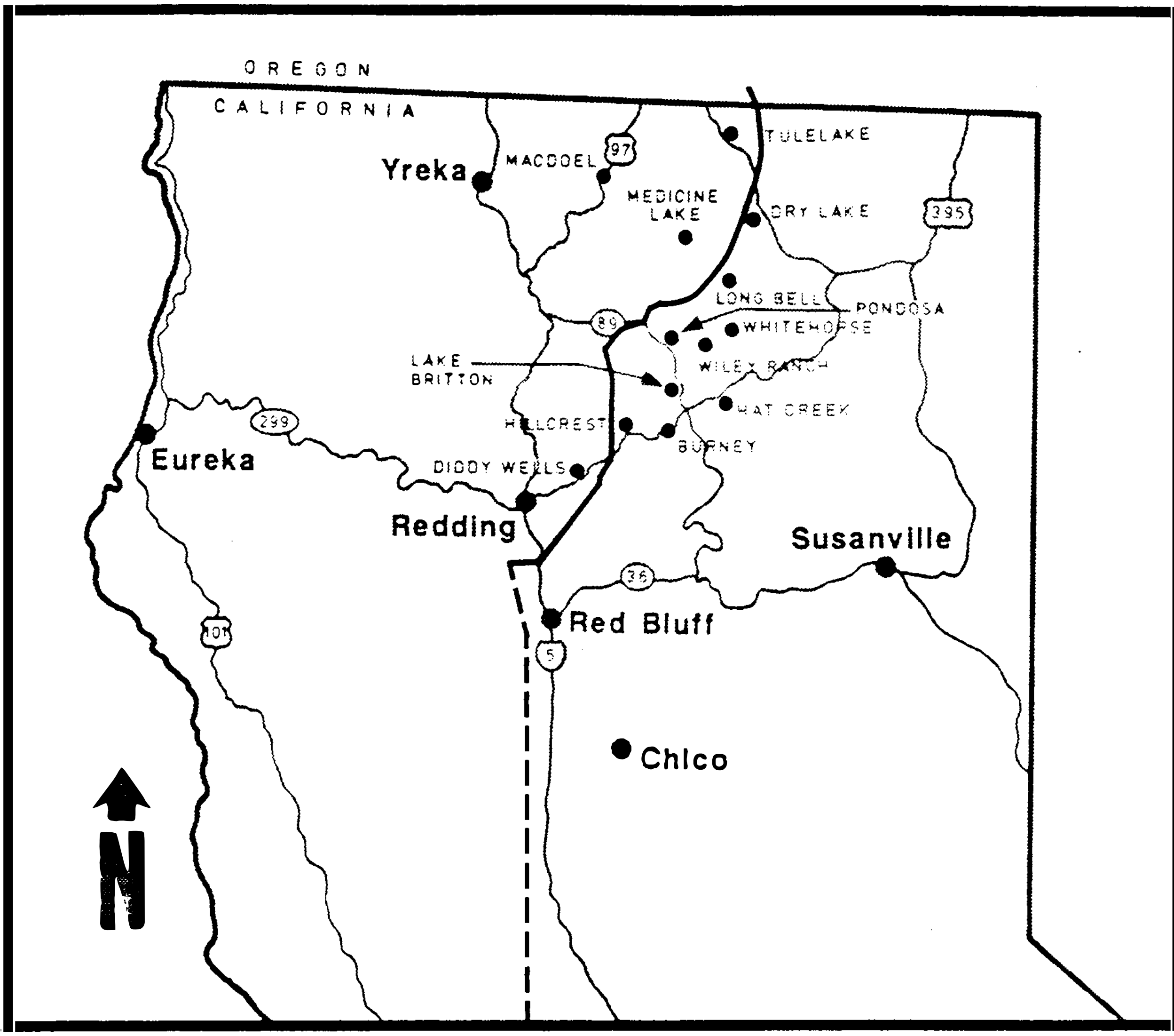
74. Page 3.4-5

    Paragraph 1, Line 10.
    Insert: "," after "timber"
    Delete: "and TPZ land,"

FIGURE 2.3-1

CALIFORNIA-OREGON TRANSMISSION PROJECT

Fire Stations Along COTP Preferred Route North of Redding



NOT TO SCALE   ROUTES SHOWN ARE SCHEMATIC

LEGEND

BURNEY	CDF	MEDICINE LAKE	USFS
DIDDY WELLS	CDF	PONDOSA	CDF
DRY LAKE	USFS	REDDING	CDF
HAT CREEK	USFS	TULELAKE	USFS
HILLCREST	CDF	WHITEHORSE	USFS
LAKE BRITTON	USFS	WILEY RANCH	USFS
LONG BELL	USFS		
MACDOEL	CDF		

COTP PREFERRED ROUTE

COTP UPGRADE SECTION

● FIRE STATION*

*Does not include Fire Lookouts such as Bear Mountain or Grizzly Peak

TABLE 2.3-1

NORTH 1 ROUTE COMPARISON: LOVENESS—GRAHAM OPTION VERSUS THE DRAFT EIS/EIR PREFERRED ROUTE

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
A.														
NORTH 1	Newell	9.70	235	14.68	35.59	60.00	$3,545	160.66	30.46	18.20	12.51	0	7	0.00
TOTAL		9.70	235	14.68	35.59	60.00	$3,545	160.66	30.46	18.20	12.51	0	7	0.00
B.														
N-10A	Newell	9.21	223	14.41	34.94	64.34	$4,899	162.52	74.76	18.07	16.85	0	6	0.00
N-10E	Newell	1.03	25	0.58	1.41	0.00	$444	4.44	0.00	0.00	0.00	0	2	0.00
TOTAL		10.24	248	14.99	36.35	64.34	$5,343	166.96	74.76	18.07	16.85	0	6	0.00

NUMBER	MILES OF DEER, ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000 FEET	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
A.															
NORTH 1	9.70	0.0	0	0	0.0	22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.78
TOTAL	9.70	0.0	0	0	0.0	22		0.00	0.00	0.00	0.00	0.00	0.00	0	0.78
B.															
N-10A	8.60	0.0	0	2	0.2	31	0.00	0.00	0.00	0.00	0.00	1.40	0.34	1	0.64
N-10E	0.60	0.0	2	2	1.9	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.14
TOTAL	9.20	0.0	2	4	0.4	33	0.00	0.00	0.00	0.00	0.00	1.40	0.34	1	0.78

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS STATE/COUNTY	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: WILD AND SCENIC RIVERS EXISTING/ELIGIBLE	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
A.													
NORTH 1	0	0	0	$672.20	$169.40	2.27	1.51	$0.00	$0.00	0.13	1.50	0	7
TOTAL	0	0	0	$672.20	$169.40	2.27	1.51	$0.00	$0.00	0.13	N/A	0	7
B.													
N-10A	0	0	0	$595.90	$150.20	3.37	1.56	$0.12	$0.06	0.17	2.30	0	7
N-10E	0	0	0	$71.40	$18.00	1.94	0.56	$0.00	$0.00	0.00	5.00	0	0
TOTAL	0	0	0	$667.30	$168.20	3.22	1.46	$0.06	$0.03	0.17	N/A	0	7

N/A=Not applicable *=Total agricultural acreage includes rangeland in addition to cultivated agricultural land.

TABLE 2.3-2

NORTH 2 ROUTE COMPARISON: COUNTY LINE OPTION VERSUS N-10M OPTION

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
A.														
NORTH 2A	Newell	5.20	126	7.20	17.45	47.30	$2,203	46.28	32.12	1.96	9.04	0	9	0.00
N-10ALT5(A1)	Newell	4.10	99	4.97	12.05	74.54	$1,389	29.42	63.82	0.00	12.56	0	9	0.00
TOTAL		9.30	225	12.17	29.50	121.84	$3,592	75.70	95.94	1.96	21.60	0	9	0:00
B.														
N-10M2(A1)	Newell	8.70	211	10.44	25.30	130.91	$2,948	53.41	108.39	0.00	21.82	0	9	0.00
TOTAL		8.70	211	10.44	25.30	130.91	$2,948	53.41	108.39	0.00	21.82	0	9	0.00

NUMBER	MILES OF DEER, ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000 FEET	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
A.															
NORTH 2A	1.50	0.0	0	0	0.0	0	116.20	4.80	0.42	4.80	0.00	0.00	0.00	0	0.00
N-10ALT5(A1)	0.00	0.0	0	0		0	33.88	0.00	0.00	2.43	2.70	0.00	0.00	0	0.00
TOTAL	1.50	0.0	0	0	0.0	0	150.08	4.80	0.42	7.23	2.70	0.00	0.00	0	0.00
B.															
N-10M2(A1)	0.00	0.0	0	0	0.0	0	29.04	0.60	0.00	7.35	7.50	0.00	0.00	0	0.00
TOTAL	0.00	0.0	0	0	0.0	0	29.04	0.60	0.00	7.35	7.50	0.00	0.00	0	0.00

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS (STATE/COUNTY)	WILD AND SCENIC RIVERS (EXISTING/ELIGIBLE)	NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
A.													
NORTH 2A	0	0	0	$360.40	$90.80	0.00	1.38	NO FARM LAND		0.24	1.50	0	2
N-10ALT5(A1)	0	0	0	$284.10	$71.60	0.00	1.21			0.24	2.00	0	0
TOTAL	0	0	0	$644.50	$162.40	0.00	1.31	$0.00	$0.00	0.48	N/A	0	2
B.													
N-10M2(A1)	0	0	0	$602.90	$151.90	0.00	1.20			0.66	2.00	0	2
TOTAL	0	0	0	$602.90	$151.90	0.00	1.20	$0.00	$0.00	0.66	N/A	0	2

N/A=Not applicable *=Total agricultural acreage includes rangeland in addition to cultivated agricultural land.

TABLE 2.3-3

NORTH 2 ROUTE COMPARISON: (BEAR MTN) NORTH OF BEAR OPTION VERSUS SOUTH OF BEAR OPTION

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
A.														
NORTH 2B	Newell	9.10	221	11.00	26.67	136.40	$3,084	44.47	113.20	0.00	22.90	0	9	0.00
N-10ALT5(B)	Newell	3.40	82	5.62	13.62	61.80	$1,152	44.53	50.22	0.00	14.09	0	9	0.00
TOTAL		12.50	303	16.62	40.29	198.20	$4,236	89.00	163.42	0.00	36.99	0	9	0.00
B.														
NORTH 2C	Newell	5.10	124	6.16	14.93	94.50	$1,728	26.87	81.51	0.00	15.87	0	9	0.00
N-10N2(B)	Newell	5.20	126	6.57	15.93	83.64	$2,203	28.28	69.46	0.32	14.65	0	9	0.00
TOTAL		10.30	250	12.73	30.86	178.14	$3,931	55.15	150.97	0.32	30.52	0	9	0.00

NUMBER	MILES OF DEER,ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000 FEET	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
A.															
NORTH 2B	1.50	0.0	0	0	0.0	0	182.70	4.90	2.65	4.90	0.00	0.00	0.00	0	0.00
N-10ALT5(B)	2.50	0.5	0	0	0.0	0	77.40	0.00	3.20	0.00	0.00	0.00	0.00	0	0.00
TOTAL	4.00	0.5	0	0	0.0	0	260.10	4.90	5.85	4.90	0.00	0.00	0.00	0	0.00
B.															
NORTH 2C	1.00	0.0	0	0	0.0	0	18.10	0.38	0.38	2.60	4.90	0.00	0.00	0	0.00
N-10N2(B)	0.00	0.0	0	0	0.0	0	72.60	1.50	1.50	1.80	0.80	0.00	0.00	0	0.00
TOTAL	1.00	0.0	0	0	0.0	0	90.70	1.88	1.88	4.40	5.70	0.00	0.00	0	0.00

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS (STATE/COUNTY)	WILD AND SCENIC RIVERS (EXISTING/ELIGIBLE)	NATIONAL TRAILS	TRANSMISSION LINE PATROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
A.													
NOR H 2B	0	0	0	$630.60	$158.90	0.00	1.21			0.56	3.80	0	1
N-10ALT5(B)	0	0	0	$235.60	$59.40	0.00	1.65	NO FARM LAND		0.12	3.00	0	2
TOTAL	0	0	0	$866.20	$218.30	0.00	1.33	$0.00	$0.00	0.68	N/A	0	3
B.													
NORTH 2C	0	0	0	$353.40	$89.10	0.00	1.21			0.34	4.30	0	2
N-10N2(B)	0	0	0	$360.40	$90.80	0.00	1.26			0.24	2.50	0	1
TOTAL	0	0	0	$713.80	$179.90	0.00	1.23	$0.00	$0.00	0.58	N/A	0	3

N/A=Not applicable *=Total agricultural acreage includes rangeland in addition to cultivated agricultural land.

TABLE 2.3-4

NORTH 2 ROUTE COMPARISON: (OVERALL) N-10M AND NORTH OF BEAR OPTIONS VERSUS THE DRAFT EIS/EIR PREFERRED ROUTE

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
A.														
N-10ALT5(A)	Bovill	26.00	629	31.60	76.61	456.38	$7,421	162.85	391.26	0.00	90.90	0	9	0.00
N-10ALT5(A1)	Bovill	4.10	99	4.97	12.05	74.54	$1,389	29.42	63.82	0.00	12.56	0	9	0.00
TOTAL		30.10	728	36.57	88.66	530.92	$8,810	192.27	455.08	0.00	103.46	0	9	0.00
B.														
N-10M2(A1)	Bovill	8.70	211	10.44	25.30	130.91	$2,948	53.41	108.39	0.00	21.82	0	9	0.00
N-10M2(A)	Bovill	14.10	342	22.56	54.69	145.50	$5,972	67.66	96.83	18.41	32.01	0	9	0.00
NORTH 2B	Bovill	9.10	221	11.00	26.67	136.40	$3,084	44.47	113.20	0.00	22.90	0	9	0.00
TOTAL		31.90	774	44.00	106.66	412.81	$12,004	165.54	318.42	18.41	76.73	0	9	0.00

NUMBER	MILES OF DEER, ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000 FEET	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
A.															
N-10ALT5(A)	1.50	0.2	0	0	0.0	0	629.20	18.00	8.00	18.00	0.00	0.00	0.00	0	0.00
N-10ALT5(A1)	0.00	0.0	0	0	0.0	0	33.88	0.00	0.00	2.43	2.70	0.00	0.00	0	0.00
	1.50	0.2	0	0	0.0	0	663.08	18.00	8.00	20.43	2.70	0.00	0.00	0	0.00
B.															
N-10M2(A1)	0.00	0.0	0	0	0.0	0	29.04	0.60	0.00	7.35	7.50	0.00	0.00	0	0.00
N-10M2(A)	1.50	0.0	0	0	0.0	0	193.60	4.00	4.00	4.00	0.00	0.00	0.00	0	0.00
NORTH 2B	1.50	0.0	0	0	0.0	0	182.70	4.90	2.65	4.90	0.00	0.00	0.00	0	0.00
TOTAL	3.00	0.0	0	0	0.0	0	405.34	9.50	6.65	16.25	7.50	0.00	0.00	0	0.00

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS (STATE/COUNTY)	WILD AND SCENIC RIVERS (EXISTING/ELIGIBLE)	NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
A.													
N-10ALT5(A)	0	0	0	$1,517.70	$382.50	0.00	1.21			1.99	3.80	0	5
N-10ALT5(A1)	0	0	0	$284.10	$71.60	0.00	1.21			0.24	2.00	0	0
	0	0	0	$1,801.80	$454.10	0.00	1.21	$0.00	$0.00	2.23	N/A	0	5
B.													
N-10M2(A1)	0	0	0	$602.90	$151.90	0.00	1.20			0.66	2.00	0	2
N-10M2(A)	0	0	0	$977.10	$246.20	0.00	1.60			0.53	2.50	0	3
NORTH 2B	0	0	0	$630.60	$158.90	0.00	1.21			0.56	3.80	0	1
TOTAL	0	0	0	$2,210.60	$557.00	0.00	1.37	$0.00	$0.00	1.75	N/A	0	6

N/A=Not applicable *=Total agricultural acreage includes rangeland in addition to cultivated agricultural land.

TABLE 2.3-5

NORTH 3 ROUTE COMPARISON: (GRIZZLY PEAK) NORTH 3J OPTION VERSUS THE DRAFT EIS/EIR PREFERRED ROUTE

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
A.														
NORTH 3J	Bertle	8.70	211	18.48	44.80	147.27	$3,197	1365.58	113.62	3.16	42.79	0	6	0.00
TOTAL		8.70	211	18.48	44.80	147.27	$3,197	1365.58	113.62	3.16	42.79	0	6	0.00
B.														
N-7ALT1(C)	Bertle	8.56	207	18.04	43.73	155.64	$3,146	1346.37	122.84	0.00	44.79	0	6	0.00
N-8A	Bertle	0.50	12	1.15	2.79	9.10	$323	98.39	7.01	0.00	2.85	0	6	0.00
TOTAL		9.06	219	19.19	46.52	164.74	$3,469	1444.76	129.85	0.00	47.64	0	6	0.00

NUMBER	MILES OF DEER, ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000 FEET	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
A.															
NORTH 3J	0.00	3.0	0	0	0.0	0	135.76	1.45	3.65	3.15	1.50	0.00	0.00	0	0.00
TOTAL	0.00	3.0	0	0	0.0	0	135.76	1.45	3.65	3.15	1.50	0.00	0.00	0	0.00
B.															
N-7ALT1(C)	0.00	3.0	0	0	0.0	0	145.20	1.56	3.29	2.76	1.10	0.00	0.00	0	0.00
N-8A	0.00	0.0	0	0	0.0	0	12.10	0.20	0.30	0.20	0.00	0.00	0.00	0	0.00
TOTAL	0.00	3.0	0	0	0.0	0	157.30	1.76	3.59	2.96	1.10	0.00	0.00	0	0.00

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS STATE/COUNTY	WILD AND SCENIC RIVERS EXISTING/ELIGIBLE	NATIONAL TRAILS	TRANSMISSION LINE PATROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
A.													
NORTH 3J	0	0	1	$602.90	$151.90	0.00	2.12	NO FARM LAND		0.49	4.00	0	13
TOTAL	0	0	1	$602.90	$151.90	0.00	2.12	$0.00	$0.00	0.49	N/A	0	13
B.													
N-7ALT1(C)	0	0	1	$593.20	$149.50	0.00	2.10			0.44	4.00	0	10
N-8A	0	0	0	$34.70	$8.70	0.00	2.30			0.03	2.00	0	3
TOTAL	0	0	1	$627.90	$158.20	0.00	2.12	$0.00	$0.00	0.47	N/A	0	13

N/A=Not applicable *=Total agricultural acreage includes rangeland in addition to cultivated agricultural land.

TABLE 2.3-6

NORTH 3 ROUTE COMPARISON: (STUMP CREEK) NORTH 3K OPTION VERSUS EXISTING ROUTE OPTIONS N-7H2(B) AND N-8A(1)

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
A.														
NORTH 3K	Bertie	2.40	58	6.52	15.81	43.64	$882	617.70	31.31	0.00	16.11	0	6	0.00
TOTAL		2.40	58	6.52	15.81	43.64	$882	617.70	31.31	0.00	16.11	0	6	0.00
B.														
N-7H2(B)	Bertie	1.10	26	2.53	6.13	20.00	$404	284.83	14.97	0.00	6.27	0	6	0.00
N-8A(1)	Bertie	1.25	30	3.36	8.15	22.73	$807	323.77	16.62	0.00	8.30	0	6	0.00
TOTAL		2.35	56	5.89	14.28	42.73	$1,211	608.60	31.59	0.00	14.57	0	6	0.00

NUMBER	MILES OF DEER, ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000 FEET	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
A.															
NORTH 3K	0.00	0.0	0	0	0.0	0	58.08	0.00	2.40	0.00	0.00	0.00	0.00	0	0.00
TOTAL	0.00	0.0	0	0	0.0	0	58.08	0.00	2.40	0.00	0.00	0.00	0.00	0	0.00
B.															
N-7H2(B)	0.00	0.0	0	0	0.0	0	26.62	0.00	1.10	0.00	0.00	0.00	0.00	0	0.00
N-8A(1)	0.00	0.0	0	0	0.0	0	30.25	0.00	1.25	0.00	0.00	0.00	0.00	0	0.00
TOTAL	0.00	0.0	0	0	0.0	0	56.87	0.00	2.35	0.00	0.00	0.00	0.00	0	0.00

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS STATE/COUNTY	WILD AND SCENIC RIVERS EXISTING/ELIGIBLE	NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
A.													
NORTH 3K	0	0	0	$166.30	$41.90	0.00	2.72	NO FARM LAND		0.09	2.00	1	9
TOTAL	0	0	0	$166.30	$41.90	0.00	2.72	$0.00	$0.00	0.09	N/A	1	9
B.													
N-7H2(B)	0	0	0	$76.20	$19.20	0.00	2.30			0.04	2.00	0	0
N-8A(1)	0	0	0	$86.60	$21.80	0.00	2.69			0.05	2.00	3	12
TOTAL	0	0	0	$162.80	$41.00	0.00	2.51	$0.00	$0.00	0.09	N/A	3	12

N/A=Not applicable   *=Total agricultural acreage includes rangeland in addition to cultivated agricultural land.

TABLE 2.3-7

NORTH 3 ROUTE COMPARISON: (OVERALL) NORTH 3J OPTION VERSUS THE HEARST OPTION

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
A.														
NORTH 3A(1)	Bartle	4.45	108	7.11	17.24	80.91	$1,635	534.83	66.26	0.00	17.76	0	6	0.00
N-7N2(A)	Bartle	6.28	152	14.89	36.10	106.91	$2,308	1505.87	77.31	2.00	29.47	0	6	0.00
NORTH 3K	Bartle	2.40	58	6.52	15.81	46.64	$882	617.70	31.31	0.00	16.11	0	6	0.00
N-8A(2)	Bartle	0.25	6	0.58	1.41	4.55	$806	73.84	3.70	0.00	1.59	0	6	0.00
N-8A	Bartle	0.50	12	1.15	2.79	9.10	$323	98.39	7.01	0.00	2.85	0	6	0.00
TOTAL		13.88	336	30.25	73.35	248.11	$5,954	2830.63	185.59	2.00	67.78	0	6	0.00
B.														
N-10ALT5(C)	Bartle	4.10	99	5.90	14.30	75.50	$1,507	65.07	63.35	0.00	14.81	0	6	0.00
N-7ALT1(A)	Bartle	2.50	61	3.59	8.70	45.50	$919	123.16	38.98	0.00	9.01	0	6	0.00
N-7ALT1(B)	Bartle	0.69	17	1.81	4.39	12.54	$254	70.35	9.25	0.00	4.48	0	6	0.00
NORTH 3J	Bartle	8.70	211	10.48	64.80	147.27	$3,197	1365.58	113.62	3.16	42.70	0	6	0.00
TOTAL		15.99	388	29.78	72.19	280.81	$5,876	1624.16	225.20	3.16	71.00	0	6	0.00

NUMBER	MILES OF DEER, ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000 FEET	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
A.															
NORTH 3A(1)	1.00	0.0	0	0	0.0	0	4.84	0.48	0.72	1.78	3.80	0.00	0.00	0	0.00
N-7N2(A)	1.50	0.0	0	0	0.0	0	74.78	0.00	3.20	0.50	3.40	0.00	0.00	0	0.07
NORTH 3K	0.00	0.0	0	0	0.0	0	58.08	0.00	2.40	0.00	0.00	0.00	0.00	0	0.00
N-8A(2)	0.00	0.0	0	0	0.0	0	6.05	0.00	0.25	0.00	0.00	0.00	0.00	0	0.00
N-8A	0.00	0.0	0	0	0.0	0	12.10	0.20	0.30	0.20	0.00	0.00	0.00	0	0.00
TOTAL	2.50	0.0	0	0	0.0	0	155.85	0.68	6.87	2.48	7.20	0.00	0.00	0	0.07
B.															
N-10ALT5(C)	0.00	0.0	0	0	0.0	0	9.68	0.16	0.24	1.60	3.60	0.00	0.00	0	0.00
N-7ALT1(A)	0.00	0.0	0	0	0.0	0	0.00	0.00	0.00	1.00	2.50	0.00	0.00	0	0.00
N-7ALT1(B)	0.00	0.0	0	0	0.0	0	0.00	0.00	0.00	0.48	0.69	0.00	0.00	0	0.00
NORTH 3J	0.00	3.0	0	0	0.0	0	135.76	1.45	3.65	3.15	1.50	0.00	0.00	0	0.00
TOTAL	0.00	3.0	0	0	0.0	0	145.44	1.61	3.89	6.23	8.29	0.00	0.00	0	0.00

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS STATE/COUNTY	WILD AND SCENIC RIVERS EXISTING/ELIGIBLE	NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
A.													
NORTH 3A(1)	0	0	0	$308.40	$77.70	0.00	1.60			0.27	1.50	0	1
N-7N2(A)	0	0	1	$435.20	$109.70	0.00	2.37			0.26	2.80	0	3
NORTH 3K	0	0	0	$166.30	$41.90	0.00	2.72			0.09	1.00	1	9
N-8A(2)	0	0	0	$17.30	$4.40	0.00	2.32			0.01	2.00	0	0
N-8A	0	0	0	$34.70	$8.70	0.00	2.30			0.03	1.50	0	2
TOTAL	0	0	1	$961.90	$242.40	0.00	2.18	$0.00	$0.00	0.66	N/A	1	15
B.													
N-10ALT5(C)	1	0	0	$284.10	$71.60	0.00	1.44			0.24	3.00	0	1
N-7ALT1(A)	0	0	0	$173.30	$43.70	0.00	1.44			0.15	4.00	0	0
N-7ALT1(B)	0	0	0	$47.80	$12.00	0.00	2.62			0.05	4.00	0	0
NORTH 3J	0	0	1	$602.90	$151.90	0.00	2.12			0.49	4.00	0	13
TOTAL	1	0	1	$1,108.10	$279.20	0.00	1.86	$0.00	$0.00	0.93	N/A	0	14

N/A=Not applicable *=Total agricultural acreage includes rangeland in addition to cultivated agricultural land.

TABLE 2.3-8

NORTH 4 ROUTE COMPARISON: THE McCLESKEY OPTION VERSUS THE DRAFT EIS/EIR PREFERRED ROUTE

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
A.														
NORTH 4	Pit River	4.60	112	8.08	19.59	80.00	$2,962	166.27	62.76	0.00	19.29	0	4	1.00
TOTAL		4.60	112	8.08	19.59	80.00	$2,962	166.27	62.76	0.00	19.29	0	4	1.00
B.														
N-BALT1	Pit River	3.95	96	5.34	12.95	60.81	$2,544	90.50	73.76	0.00	13.51	0	2	0.00
N-BALT2	Pit River	0.70	17	1.96	4.75	12.50	$451	49.80	8.23	0.00	4.75	0	2	1.00
TOTAL		4.65	113	7.30	17.70	73.31	$2,995	140.30	81.99	0.00	10.26	0	2	1.00

NUMBER	MILES OF DEER, ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000 FEET	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE*
A.															
NORTH 4	2.00	0.5	0	2	0.4	19	14.50	0.00	0.00	4.60	3.50	0.00	0.00	0	0.00
TOTAL	2.00	0.5	0	2	0.4	19	14.50	0.00	0.00	4.60	3.50	0.00	0.00	0	0.00
B.															
N-BALT1	2.00	0.0	1	4	1.0	20	14.50	0.00	0.00	3.55	3.45	0.00	0.00	0	0.00
N-BALT2	0.00	0.5	0	0	0.0	0	14.50	0.00	0.00	2.22	0.70	0.00	0.00	0	0.00
TOTAL	2.00	0.5	1	4	0.9	20	29.00	0.00	0.00	5.77	4.15	0.00	0.00	0	0.00

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS (STATE/COUNTY)	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: WILD AND SCENIC RIVERS (EXISTING/ELIGIBLE)	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
A.													
NORTH 4	0	0	0	$318.80	$80.30	4.13	1.76	NO FARM LAND		0.43	3.50	1	22
TOTAL	0	0	0	$318.80	$80.30	4.13	1.76	$0.00	$0.00	0.43	N/A	1	22
B.													
N-BALT1	0	0	0	$273.70	$69.00	5.06	1.38			0.35	4.00	1	22
N-BALT2	0	0	0	$48.50	$12.20	0.00	2.80			0.26	1.00	0	2
TOTAL	0	0	0	$322.20	$81.20	4.30	1.57	$0.00	$0.00	0.61	N/A	1	24

N/A=Not applicable *=Total agricultural acreage includes rangeland in addition to cultivated agricultural land.

TABLE 2.3-9

JOHN CROSS ALTERNATIVE COMPARISON: N—10 ALT4 VARIATION VERSUS THE DRAFT AND FINAL EIS/EIR PREFERRED ROUTE

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
A.														
N-10ALT4*	Newell	16.55	702	22.86	55.42	0.00	$16,500	316.12	0.00	4.78	0.00	0	7	0.00
TOTAL		16.55	702	22.86	55.42	0.00	$16,500	316.12	0.00	4.78	0.00	0	7	0.00
B.														
NORTH1(Cal.only)	Newell	3.90	94	5.16	12.51	0.00	$1,338	58.03	0.00	10.44	0.00	0	7	0.00
N-10G	Newell	4.92	119	5.64	13.68	0.00	$2,046	31.53	0.00	11.63	0.00	0	9	0.00
N-10J	Newell	3.25	79	3.40	8.24	0.00	$1,354	17.81	0.00	7.36	0.00	0	10	0.00
TOTAL		12.07	292	14.20	34.43	0.00	$4,738	107.37	0.00	29.43	0.00	0	10	0.00

NUMBER	MILES OF DEER, ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000 FEET	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED**
A.															
N-10ALT4*	17.00	0.3	0	0	0.0	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.50
N-10ALT4*	17.00	0.3	0	0	0.0	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.50
B.															
NORTH1(Cal.only)	3.90	0.0	0	0	0.0	13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.78
N-10G	4.00	2.1	0	1	0.2	18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.18
N-10J	3.00	0.0	2	4	1.8	24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
	10.90	2.1	2	5	2.0	55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.96

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS STATE/COUNTY	WILD AND SCENIC RIVERS EXISTING/ELIGIBLE	NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
A.													
N-10ALT4*	0	0	0	$1,146.90	$289.00	0.06	1.38	$0.00	$0.00	0.00	3.00	0	0
N-10ALT4*	0	0	0	$1,146.90	$289.00	0.06	1.38	$0.00	$0.00	0.00	3.00	0	0
B.													
NORTH1(Cal.only)	0	0	0	$270.30	$68.10	3.33	1.32	$0.00	$0.00	0.13	1.50	0	4
N-10G	0	0	0	$341.00	$85.90	3.66	1.15	$0.60	$0.20	0.00	2.50	0	0
N-10J	1	0	0	$225.20	$56.80	7.38	1.05	$0.00	$0.00	0.00	5.00	0	0
	1	0	0	$836.50	$210.80	4.56	1.18	$0.24	$0.08	0.13	9.00	0	4

*The data for N-10ALT4 was extrapolated by the Project for a 350 foot right-of-way.
N/A=Not applicable **=Total agricultural acreage includes rangeland in addition to cultivated agricultural land.

2.4 CHANGES TO THE SUPPLEMENT TO THE DRAFT EIS/EIR TO SECTION 4.0 - SOUTH ROUTING OPTIONS

1. Pages 4.1-3 and 4.2-3

   Tables 4.1-1 and 4.2-1 respectively.
   Replace: Above referenced tables with Tables 2.4-1 and 2.4-2

2. Page 4.1-4

   Paragraph 2, Line 2.
   Change: "9.35" to "9.50" and "9.6" to "9.90"

3. Page 4.1-5

   Line 1.
   Add: "," after "areas"
   Delete: the fourth word, "and"
   Add: ", and two planned subdivisions" after "residences"

4. Page 4.1-5

   Line 3.
   Change: "8.5" to "8.2"

5. Page 4.1-5

   Line 4.
   Change: "2.25" to "2.55"

6. Page 4.1-5

   Line 5.
   Change: "8.05" to "8.35"

7. Page 4.1-5

   Line 6.
   Change: "2.4" to "2.7"

8. Page 4.1-5

   Paragraph 1, Line 8.
   Add: "cross the planned subdivisions and" after "both"

9. Page 4.2-4

   Paragraph 5, Line 6.
   Change: "0.45" to "1.35"

TABLE 2.4-1

SOUTH 1 ROUTE COMPARISON: SOUTH 1 VERSUS THE PREFERRED ROUTE

ALTOP12

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
A.														
SOUTH 1	Delta	9.50	230	0.00	0.00	0.00	$6,737	0.00	0.00	0.00	0.00	36	24	6.75
TOTAL		9.50	230	0.00	0.00	0.00	$6,737	0.00	0.00	0.00	0.00	36	24	6.75
B.														
S-BE1	Delta	3.00	73	0.00	0.00	0.00	$1,850	0.00	0.00	0.00	0.00	13	11	0.25
S-BE2	Delta	2.57	62	0.00	0.00	0.00	$1,585	0.00	0.00	0.00	0.00	11	11	2.60
S-BH	Delta	3.53	85	0.00	0.00	0.00	$3,122	0.00	0.00	0.00	0.00	13	11	3.50
S-BJ(1)	Delta	0.80	19	0.00	0.00	0.00	$486	0.00	0.00	0.00	0.00	4	11	0.80
TOTAL		9.90	239	0.00	0.00	0.00	$7,043	0.00	0.00	0.00	0.00	41	11	7.15

NUMBER	MILES OF DEER, ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000 FEET	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
A.															
SOUTH 1	0.00	0.0	0	11	1.2	224 (a)	0.00	0.00	0.00	0.00	0.00	2.55	0.20	36	1.01
TOTAL	0.00	0.0	0	11	1.2	224	0.00	0.00	0.00	0.00	0.00	2.55	0.20	36	1.01
B.															
S-BE1	0.00	0.0	0	6	2.0	239 (b)	0.00	0.00	0.00	0.00	0.00	0.00	2.60	12	0.36
S-BE2	0.00	0.0	2	3	1.2	22	0.00	0.00	0.00	0.00	0.00	0.80	1.70	8	0.24
S-BH	0.00	0.0	0	0	0.0	3	0.00	0.00	0.00	0.00	0.00	1.10	3.25	16	0.46
S-BJ(1)	0.00	0.0	0	0	0.0	0	0.00	0.00	0.00	0.00	0.00	0.80	0.80	4	0.11
TOTAL	0.00	0.0	2	9	0.9	264	0.00	0.00	0.00	0.00	0.00	2.70	8.35	40	1.17

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS STATE/COUNTY	WILD AND SCENIC RIVERS EXISTING/ELIGIBLE	NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
A.													
SOUTH 1	0	0	0	$648.00	$163.30	23.58	0.00	$2.49	$1.20		3.80	0	1
TOTAL	0	0	0	$648.00	$163.30	23.58	0.00	$2.49	$1.20	0.00	N/A	0	1
B.													
S-BE1	0	0	0	$207.90	$52.40	79.67	0.00	$2.16	$0.99		4.70	0	0
S-BE2	0	0	0	$178.10	$44.90	8.56	0.00	$2.05	$1.03		4.70	0	0
S-BH	0	0	0	$244.60	$61.60	0.85	0.00	$2.85	$1.43		4.00	0	1
S-BJ(1)	0	0	0	$34.70	$8.70	0.00	0.00	$4.95	$1.55		4.30	0	0
TOTAL	0	0	0	$665.30	$167.60	26.67	0.00	$2.60	$1.20	0.00	N/A	0	1

N/A=Not applicable *=Total agricultural acreage includes rangeland in addition to cultivated agricultural land.

TABLE 2.4-2

SOUTH 2 ROUTE COMPARISON: EXISTING ROUTE OPTIONS S-9G AND SOUTH 2 VERSUS THE PREFERRED ROUTE

ALTOPT2

NUMBER	CORRIDOR NAME	LENGTH (MILES)	NEW R.O.W. REQUIRED (ACRES)	NEW ACCESS ROADS (MILES)	CLEARING: ACCESS ROADS (ACRES)	CLEARING: RIGHT OF WAY (ACRES)	ESTIMATED CONSTRUCTION COST (THOUSANDS)	SOIL LOSS TONS/YEAR	TALL-GROWING VEGETATION REMOVED (ACRES): TIMBER LAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): RANGELAND	PERMANENT CLEARING OF ROADS AND TOWER SITES (ACRES): TIMBER	NEW STRUCTURES IN WETLANDS OR FLOODPLAINS	SPECIAL STATUS PLANT SPECIES	LENGTH OF HIGH COLLISION POTENTIAL FOR BIRDS (MILES)
A.														
S-9G	Tesla	1.60	39	0.00	0.00	0.00	$2,648	0.00	0.00	0.15	0.00	0	12	0.00
SOUTH 2	Tesla	4.15	101	0.00	0.00	0.00	$2,720	0.00	0.00	0.48	0.00	0	12	0.00
TOTAL		5.75	140	0.00	0.00	0.00	$5,369	0.00	0.00	0.63	0.00	0	12	0.00
B.														
S-9F	Tesla	4.92	119	0.00	0.00	0.00	$853	0.00	0.00	0.60	0.00	0	12	0.00
S-9H	Tesla	0.26	6	0.00	0.00	0.00	$225	0.00	0.00	0.04	0.00	0	7	0.00
TOTAL		5.18	125	0.00	0.00	0.00	$1,078	0.00	0.00	0.64	0.00	0	12	0.00

NUMBER	MILES OF DEER, ELK RANGE CROSSED	MILES OF RAPTOR NESTING AREA CROSSED	NUMBER OF DWELLINGS W/I R.O.W. (200 FEET)	NUMBER OF DWELLINGS W/IN 1000'	DWELLINGS PER MILE WITHIN 1000 FEET	DWELLING UNITS IN THE FOREGROUND (1.2 MILES)	FOREST SERVICE ADMINISTERED LAND CROSSED (ACRES)	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: PRIME TIMBER	MILES CROSSED OF PRIME TIMBER ON FOREST SERVICE LANDS: NON-PRIME TIMBER	TOTAL PRIME TIMBER CROSSED IN MILES	MILES CROSSED OF TIMBER PRODUCTION ZONES	MILES OF AGRICULTURE PRESERVE LANDS CROSSED	MILES OF IRRIGATED (PRIME AND STATEWIDE) CROPLAND CROSSED	NUMBER OF TOWERS ON IRRIGATED CROPLAND	TOTAL AGRICULTURAL ACREAGE REMOVED*
A.															
S-9G	0.00	0.0	0	2	1.3	11	0.00	0.00	0.00	0.00	0.00	0.90	0.25	1	0.68
SOUTH 2	0.00	0.0	0	4	1.0	86	0.00	0.00	0.00	0.00	0.00	0.45	0.00	1	0.58
TOTAL	0.00	0.0	0	6	1.0	97	0.00	0.00	0.00	0.00	0.00	1.35	0.25	2	1.26
B.															
S-9F	0.00	0.0	3	7	1.4	79	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0	0.63
S-9H	0.00	0.0	0	1	3.8	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.04
TOTAL	0.00	0.0	3	8	1.5	80	0.00	0.00	0.00	0.00	0.00	0.00	0.15	1	0.67

NUMBER	NUMBER OF CROSSINGS OF RECREATION TRAVEL ROUTES: SCENIC HIGHWAYS STATE/COUNTY	WILD AND SCENIC RIVERS EXISTING/ELIGIBLE	NATIONAL TRAILS	TRANSMISSION LINE PAYROLL (THOUSANDS)	NON-LOCAL WORKER EXPENDITURES (THOUSANDS)	AVERAGE DWELLINGS PER CORRIDOR MILE WITHIN 1.2 MILES	NEW MILES OF ACCESS ROAD/ CORRIDOR MILE	AVERAGE SHORT-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	AVERAGE LONG-TERM AG. EFFECTS (THOUSANDS/ CORRIDOR MILE)	TOTAL JOBS LOST	PREHISTORIC SITE SENSITIVITY	NATIVE AMERICAN SITES WITHIN 1000' OF LINE	NATIVE AMERICAN SITES W/IN 3.4 MILES
A.													
S-9G	1	0	0	$341.00	$85.90	6.88	0.00	$1.35	$0.68		1.50	0	1
SOUTH 2	2	0	0	$343.00	$86.40	20.72	0.00	$0.16	$0.08		1.30	0	1
TOTAL	3	0	0	$684.00	$172.30	16.87	0.00	$0.49	$0.25	0.00	N/A	0	2
B.													
S-9F	1	0	0	$110.90	$27.90	16.06	0.00	$0.06	$0.03		2.30	0	2
S-9H	1	0	0	$18.00	$4.50	3.85	0.00	$0.00	$0.00		1.00	0	1
TOTAL	2	0	0	$128.90	$32.40	15.44	0.00	$0.06	$0.03	0.00	N/A	0	3

N/A=Not applicable *=Total agricultural acreage includes rangeland in addition to cultivated agricultural land.

2.5 CHANGES TO THE SUPPLEMENT TO THE DRAFT EIS/EIR SECTION 5.0 - PUBLIC AND AGENCY CONSULTATION

1. Page 5.0-1

   Paragraph 3, Line 2.
   Change: "May" to "September"

2. Page 5.0-5

   Add: the following after the last bullet:

   June 1987

   - USDA Forest Service
     Summary of Discussion: Conduct of biological and archaeological survey activities on National Forest System lands.

   July 1987

   - Landowner (May B. Thompson; Tenant - John Smith)
     Summary of Discussion: Routing of centerline on property parallel to existing 230 kV transmission lines.

   - Landowner (James Egan)
     Summary of Discussion: Routing of centerline adjacent to property. Right-of-way (200-foot wide) would affect a small portion of the property.

   - Landowner (Gerald Nichol)
     Summary of Discussion: Location of route centerline adjacent to existing four 230 kV transmission lines on the property.

   - Landowner (Tim Peterson)
     Summary of Discussion: Location of route centerline along west property line to avoid bisecting the property.

   - USDA Forest Service
     Summary of Discussion: Future coordination for acquisition of right-of-way easement permits and preconstruction and construction activities.

   August 1987

   - Landowner (Lewis J. Westlake)
     Summary of Discussion: Location of route centerline adjacent to existing 230 kV lines. Property is a future planned subdivision, only 40 acre parcels have been approved at this time.

   - Public Hearings on the Supplement to the Draft EIS/EIR. August 4, 5, and 6 in Newell, Burney, and Tracy, California, respectively.

   - Landowner (Dick Moseman)
     Summary of Discussion: Location of centerline on property.

   - Landowners (Don and Norman Holck)
     Summary of Discussion: Their concerns on the location of the 500 kV line and the relocation of the 230 kV lines through their farm fields, and to show an existing irrigation lateral along the west side of Mountain House Road that will have to be extended to the north of the proposed substation.

   - Landowner (Iver Johanson)
     Summary of Discussion: Update on the location of the Olinda Substation site.

   - USDA Forest Service
     Summary of Discussion: Environmental concerns about route options on National Forest system lands. Discussions on work to be completed before issuance of Forest Service Record of Decision (ROD) on the Final EIS/EIR, and fuels management along Intertie.

   September 1987

   - USDA Forest Service
     Summary of Discussion: NEPA requirements for Forest Service to issue

ROD. Specific comments on fuels management needs, environmental analyses, and route options to be incorporated into the environmentally superior and Project preferred routes.

- Landowners (Robert and Dave Dal Porto)
  Summary of Discussion: Their concerns on the adverse impacts of the COTP on the proposed development of their land east of Bethel Island Road. Their property cannot be avoided by the COTP preferred alternative.

- Daughter of Landowner (Sonny Beryngelson)
  Summary of Discussion: Updated the owner of land which would be affected by the proposed Olinda Substation regarding the planned located and size.

2.6 CHANGES TO THE SUPPLEMENT TO THE DRAFT EIS/EIR TO SECTION 6.0 - LIST OF PREPARERS - ADDITIONS

Pat Grind, Graphic Artist, Resource Management International. B.A. Fine Arts, California State University, Sacramento, 1970. Experience in graphic design, illustration, and civil engineering drafting and in the preparation of parcel maps and the design, production, and coordination of printing brochures and newsletters.

Steven R. Olson, Electrical Design Engineer; Resource Management International. B.S. Electrical and Electronic Engineering, California State University, Sacramento, 1987. Experience in the design and Operation and Maintenance of electrical transmission and distribution systems.

Christine M. Rakers, Graphic Artist; Resource Management International. A.A. Commercial Art, Solano Community College, 1984. Four years experience in graphic arts and production management.

James L. Strangways, Economist; Resource Management International. B.B.A. Finance, University of Arkansas at Little Rock. Eight years experience in utility economics, rates, forecasting, and revenue requirements.

SECTION 3.0
GUIDE TO PUBLIC COMMENTS AND RESPONSES

3.0 GUIDE TO PUBLIC COMMENTS AND RESPONSES

Numerous comments were received on both the Draft EIS/EIR and the Supplement to the Draft EIS/EIR. Due to the large number of comments and to aid the reader in locating the corresponding letter or testimony, we have segregated the letters and testimony into separate volumes. Final EIS/EIR Volumes 2A and 2B contain correspondence and Volume 3 contains testimony. Literature that is cited in the responses is referenced in Section 1.1.11 of this document.

Some comment letters and testimony contain attachments. All attachments have been reviewed by the lead agencies; however, due to space limitations, some attachments were determined to be non-substantive and have not been reproduced. All comment letters, testimony, and attachments are available for public review at the offices of the lead agencies in Sacramento, California.

Section 3.1 contains lists of letters and testimony received during the public comment period on the Draft EIS/EIR. These lists are sorted alphabetically by the commentor's last name with an L-# ("L" denoting letter) or a T-# ("T" denoting testimony) assigned to each letter or testimony.

Section 3.2 contains lists of letters and testimony received during the public comment period on the Supplement to the Draft EIS/EIR. These lists are also sorted alphabetically by the commentor's last name with an SL-# ("SL" denoting Supplement letter) or a ST-# ("ST" denoting Supplement testimony) assigned to each letter or testimony.

Section 3.3 contains a list of letters and testimony received during the comment periods on the Draft EIS/EIR and the Supplement to the Draft EIS/EIR categorized by topic.

When reviewing Volumes 2A, 2B, and 3, please note that some L-#'s, SL-#'s, T-#'s or ST-#'s were not used when logging in the letters and testimony. Also, a few of the subcomments within comment letters or testimony may not be in alphabetical order because some paragraphs originally bracketed as a single comment were subsequently divided into more than one comment.

Comments Received on the Draft EIS/EIR

3.1 COMMENTS RECEIVED ON THE DRAFT EIS/EIR

Section 3.1 is divided into two subsections: Section 3.1.1, Comments Requiring Responses, and Section 3.1.2, Comments Not Requiring Responses.

Section 3.1.1, Comments Requiring Responses, presents a list of the letters and testimony requiring responses. The list is sorted alphabetically by the commentor's last name, with an L-# or T-# assigned to each letter or testimony. The reader can locate a letter reproduced with responses to its specific comments in L-# order in Volumes 2A or 2B, Section 2, Correspondence and Responses on the Draft EIS/EIR. The testimony is reproduced with responses to its specific comments in T-# order in Volume 3, Section 2, Testimony and Responses on the Draft EIS/EIR.

Section 3.1.2, Comments Not Requiring Responses, presents lists of the letters and testimony not requiring responses. The lists are sorted alphabetically by the commentor's last name, with an L-# or T-# assigned to each letter or testimony. This section includes letters requesting changes of address and requests for the Draft EIS/EIR or information on the projects. There are a few short statements presented at hearings that are not comments on the Draft EIS/EIR; however, these are reproduced in this Final EIS/EIR to maintain continuity throughout the hearing transcripts.

3.1.1 COMMENTS REQUIRING RESPONSES

Table 3.1.1-1 identifies all of the letters (identified by L-#'s) and testimony (identified by T-#'s) requiring responses. An L-# on the list can be found in Volumes 2A or 2B, Section 2, of this Final EIS/EIR with responses to its specific comments. A T-# on the list can be found in Volume 3, Section 2 of this Final EIS/EIR with responses to its specific comments.

TABLE 3.1.1-1

COMMENTS RECEIVED ON THE DRAFT EIS/EIR
REQUIRING RESPONSES

Commentor	Organization	Letter (L) or Testimony (T) Number
Adams, C.		T-102
Allen, J.	Allen Ranch	T-175
Allen, J.	Allen Ranch	T-176
Allen, J.S.	Allen Ranch	L-308
Anonymous		L- 89
Anonymous		L- 87
Anonymous		L-153
Anonymous		T-100
Areias, J.		T-178
Arnando, S.		T-140
Aronado, L.	Reclamation District #2024	T-151
Arthur, G.		T- 2
Arthur, G.		T- 22
Atiyeh, V.	Governor of Oregon	L-269
Attaway, N. & K.		L-137
Austin, C. & D.		L-189
Barker, D.		L-111
Barrie, T.	California Department of Transportation	L-355
Barsch, R.E.	California Department of Water Resources	L-359
Barter, J. & E.		T-182
Basustin, P.		T- 83
Beebe, R.		T-142
Beebe, R.D.		L-372
Beers, R.	Citizens Against Transmission Line Easement	L-325
Beers, R.	Citizens Against Transmission Line Easement	T- 77
Bello, P.		L-323
Benton, R.W. & Drake, D. J.	University of California Livestock Farm Advisory	T- 84
Beresford, A.	Contra Costa County	T-156
Berryman, R.	Champion International Corp.	T- 81
Berryman, R.	Champion International Corp.	L- 39
Bertagna, J.		L-178
Bettencourt, N.		T-162
Bever, A.		L-296
Bloomfield, H.J.		L- 96
Boatwright, D.E.	California Legislature	L-263
Bones, J.W.	Lone Star Development	L- 97
Bookout, T. & L.		L-205
Bosworth, B.	Shasta County Board of Supervisors	T-108
Bowen, J.A.		T- 15
Bowen, T.J.		L-157
Bowers, G.H.	Bowers Engineering	L-335
Boyle, E.	California Department of Transportation	L-356
Brady, C.	Positive Resolution of Powerline Problems	T-152
Brady, C.	Positive Resolution of Powerline Problems	T-172
Brady, C.	FLSSC, FOG, PROPP	L-320
Brady, C.	Positive Resolution of Powerline Problems	L-151

* Form letter; only T-185 is reproduced; see T-185 for response.
** Form letter; only L-155 is reproduced; see L-155 for response.
*** Form letter; only L-278 is reproduced; see L-278 for response.

TABLE 3.1.1-1 (CONTINUED)

	Commentor	Organization	Letter (L) or Testimony (T) Number
	Brady, C.	Positive Resolution of Powerline Problems	L-309
	Bragdon, H.	Contra Costa County Community Development Department	L- 22
	Bragdon, H.E.	Contra Costa County Community Development Department	L-290
	Bragdon, H.E.	Contra Costa County Community Development Department	T-168
	Briggs, G.	Roseburg Resources	T-109
	Briggs, G.	Roseburg Resources	L-334
	Broddick, L. & G.		L-169
	Bross, S.		L-115
	Buckingham, Mr. & Mrs. K.		T- 34
	Burgess, D.		T- 35
	Burns, B.	Reclamation District #799	T-166
	Butcher, R.D.	National Park and Conservation Association	L-202
	Byrne, D.	Tulelake Growers Association	T- 17
	Byrne, D.	Tulelake Growers Association	T- 36
	Byrne, M.		L-340
	Byrne, M.	Modoc Cattleman's Association and Lava Beds Resource Conservation District	T- 26
	Byrne, P.M.		L- 55
	Campbell, D.	Hobie Cat	L- 28
	Campbell, J.		T-145
	Campbell, J.C.		L-302
	Carlson, H.L.	University of California Agricultural Extension Service	T- 37
	Carman, D.L.		T- 38
	Carman, J. & S.		T- 39
***	Carotenuto, V.	Caliente Yacht Club	L-262
	Carpelan, M.	Shasta Nation	T- 74
	Champ, A.	Corps of Engineers	L-268
	Chatten, J.D.		T-183
	Christensen, E.F.	LDS Church	L-366
	Christy, B.		L-188
	Clark, R. & Fabianek S.	Malin Chamber of Commerce	L-195
	Clifford, L.H.		L-224
	Cline, C.	Caliente Isle	T-150
	Cline, C.I.	Bethel Marina	L-121
***	Cline, W.	Caliente Yacht Club	L-280
***	Collinson, B.	Caliente Yacht Club	L-270
	Cook, J. & A.		L-353
	Cook, J.C.		T- 68
	Cooke, J.	Hearst Corporation	L- 79
	Cooper, F.E.		L-135
	Cooper, N.	Fallman Enterprises	T-149
	Cope, J.W.	City Council of Malin, Oregon	T- 40
	Cordonier, J.	City of Tulelake	T- 23
	Cordonier, J.	City of Tulelake	L-102
	Cordonier, J.C.	City of Tulelake	T- 41
	Cory, T.		T-136
	Cottle, R.		L- 1
	Coulson, J.	Modoc County Board of Supervisors	T- 31
	Crane, C.		T-135
	Crawford, S.		T- 44
	Crechrion, J.		L-171
	Cross, C.W.J.	Modoc County Planning Commission	T- 12
	Cross, C.W.J.	Modoc County Planning Commission	T- 45
	Dal Porto, R.		T-146
***	Daniels, M.	Caliente Yacht Club	L-369
***	Daniels, R.	Caliente Yacht Club	L-311
***	Darling, N.	Caliente Yacht Club	L- 40

TABLE 3.1.1-1 (CONTINUED)

	Commentor	Organization	Letter (L) or Testimony (T) Number
	Dauphine, D.C.	California Farm Bureau	L-297
	Davis, A.		L-199
***	DeCato, D. & J.	Caliente Yacht Club	L-370
	Decato, D. & J.		L-234
*	Deckard, R.W.		T-185
	Dederick, J.E.	County of Modoc	L-316
	Delfino, K.L.	Department of Forestry	L-362
	Delin, L.T.		L- 91
	Delledera, S.		L-237
	Dierksen, C. & Hale, B.		L-176
	Dierksen, C. & Hale, B.		L-213
	Diersen, G.		T-160
	Dobbins, G.L.		L-236
	Donahue J. & V.		L-103
	Doolittle J.T.	California Legislature	L-264
	Draper, M.	Citizens for Better Forestry	T- 85
	Drehobl, R.J.	USDI Bureau of Land Management	L-327
***	Du Frane, S.	Caliente Yacht Club	L-261
***	Dudley, D. & J.	Caliente Yacht Club	L- 26
	Dybas, L.		L-106
	Dybas, R.		L-104
	Dyer, R.	Portland General Electric Company	L-331
	Edgar, R.H.		T-122
	Edwards, D.B.		L-229
	Edwards, D.B.		L-222
	Edwards, W.J.	Edwards Ranch	L-215
	Ellis, Dr.	Raptor Research	L-223
	Elmore, B.A.		L-248
	Elmore, H.C.		L-218
	Elsea, J.E.		L-174
	Erickson, P.		T-120
	Ericson, D. & P.		T-181
	Fallman E.M		L- 65
	Fallman, E.	Planning and Conservation League	L-287
	Farless, J.E.	Corps of Engineers	L-351
**	Fayne, M.D.		L-160
	Feldman, E.	Planning and Conservation League	L-286
	Fileccia, N.S.		T-101
	Fileccia, N.S. & B.D.		L-179
	Fiock, N.		L-346
	Fiock, N.E.		L- 33
	Fleh, J.	Soda Mountain Wilderness Council and Friends of the Greensprings	T- 76
	Florence, S.	USDI Bureau of Land Management	T-177
	Frank, D. & Fullerton W.	Friends of the Greensprings	L-329
	Frey, N.	Siskiyou County Board of Supervisors	T-115
	Frey, N.		T-129
	Fritz, J.		L-100
	Fullerton, W.	Friends of the Greensprings	L-130
	Gagarin, C.	Citizens for Better Forestry	T- 72
	Gains, K.	Rancho Bueno Ventura	T-104
	Galeoto,Jr., J.C.	Tulelake Police Department	T- 46
	Gallagher, L.M.	California Department of Transportation	L-317
	Ganger, W.D.		T- 47
	Garrison, K. & D.		T-114
	Garvey, T.M.	Westlands Water District	L-303
	Germino, J.	Germino et al.	T-147
	Germino, J.	Germino et al.	L-193
	Gigler, A.R.		L-243
	Gigler, A.R.		T- 33
	Gigler, A.R.		T- 48

	Commentor	Organization	Letter (L) or Testimony (T) Number
	Gigler, A.R.		T-119
	Gigler, A.R.		T-123
	Gilbert, R.S.	County of Fresno	L-293
	Gore, G.M.		L-284
	Graham, B.	Oregon Review Committee	T- 1
	Graham, B.	Oregon Review Committee	T- 11
	Greenbank, C.	County of Modoc	L- 20
	Greenbank, W.B.	Modoc County Agricultural Commission	T- 16
	Griffith, M.		T-143
	Grist, C.	Oregon Department of Energy	L-310
	Gromm, R.	Reclamation District #799	L-267
	Gromm, R.	Reclamation District #799	T-148
	Grupe, L.	Star Thistle Farm	L-219
**	Guthrie, B.		T- 49
	Halmes, J.E.		L-244
	Halousek, B.		L-251
	Halousek, C.		T- 50
	Halousek, R.		L-149
	Halousek, R.		L-216
	Halsey, T.V.	Reclamation District #830	T-157
***	Hamburger, D.	Caliente Yacht Club	L- 48
	Hammel C.B.		L- 78
	Hanson, L.		L-247
	Harding, R.M.	Carr, Kennedy, Peterson and Frost	L-347
	Harrington, J.		T-116
	Hart, S.	Citizens Against Transmission Line Easement	T- 78
	Haslerud, E.	Roseburg Resources	T-111
	Hathaway, A.	Shasta County Board of Supervisors	T-112
	Hathcock, D.		L-232
	Haynes, M.A.	Haynes and Walden Farms	T- 51
***	Hearn, Mr. & Mrs. H.J.	Caliente Yacht Club	L-281
	Heiss, B.		L-112
**	Hemphill J. & R.		L-156
	Henry, J.V.	Save Our Streams	L-342
	Henwood, K.	Forest Landowners of Shasta and Siskiyou Counties	L-307
	Herum, S.	Neumiller and Beardslee	T-139
	Herum, S.A.	Neumiller and Beardslee	L- 41
	Herum, S.A.	Neumiller and Beardslee	L-203
	Herum, S.A.	Neumiller and Beardslee	L-204
	Herum, S.A.	Neumiller and Beardslee	L-299
	Herum, S.A.	Neumiller and Beardslee	L-300
	Heulhut, A.		T- 52
	Higgins, P.D.	Pacific Power	L-291
***	Hix, L. & L.	Caliente Yacht Club	L- 24
	Hogan, Mr. & Mrs. R.		L- 54
	Holck, D.	D. Holck Farms	L- 14
	Holck, N.		T-141
	Holden, J.B.J.	Oregon Aeronautics Division	L- 21
	Hoopingarner, H.A.		L-339
***	Hopkins, B.	Caliente Yacht Club	L- 49
	Huffman, O.		T- 28
	Hunter, J.	County of Shasta Planning Department	L-337
	Hurlburt, D.	Tulelake Rotary Club	T- 14
	Hurley, J.		T-180
	Imbrecht, C.R.	California Energy Commission	L-344
**	Jackson, R.L. & G.		L-155
	Jennuakin, C.		T-169
	Jennuakin, C.		T-163
	Jereb, J.		L-173
	Jermane, R. & D.		L- 42
*	Jililian, A.		T-192

TABLE 3.1.1-1 (CONTINUED)

	Commentor	Organization	Letter (L) or Testimony (T) Number
*	Jililian, T.		T-191
	Johnson, L.	Congressman George Miller	T-159
	Johnson, M.S.		L-348
	Johnson, W.A. & P.K.		L-318
	Joiner, V.		L-198
	Jones, D.A.	San Francisco Clean Water Program	L-150
	Jones, W.		L-118
*	Katze, G.		T-189
	Keehn, R.		L-180
	Kelleher, D.	Tulelake Growers Association	T- 32
	Kelley, G.	Lava Beds Conservation District and Soil Conservation Service	T- 53
	Kelley, G.	Lava Beds Conservation District and Soil Conservation Service	T- 24
	Kemmerly/Hesnard, J.	California Department of Transportation	L-358
	Kennett, W.E.		L- 45
	Kerns, J.	Klamath County Chamber of Commerce	T- 27
	Kifer, J.		L-288
	Kilian, C.		L-285
	King, T. F.	Advisory Council on Historic Preservation	L- 9
	Klassen, H.	Modoc County Farm Bureau	T- 19
	Klassen, H.C.		L-298
	Kloc, D.A.	United States Air Force	L-368
	Knoll, E.		L-139
	Knopf, C.		T-171
	Kuck, D.	Siskiyou County Cattleman's Association	T- 82
	Kuck, D.	Siskiyou County Cattleman's Association	T- 86
	La Pena, F.	California State University, Sacramento	L-319
	Lackey, T.	Champion International Corp.	T-103
	Lackey, T.	Champion International Corp.	T-113
	Lane, J.	State Lands Commission	L-266
	Laxague, J.	Modoc County Board of Supervisors	T- 43
	Laxague, J.	Modoc County Board of Supervisors	T- 42
	LeQuieu, J.		T- 25
	LeQuieu, J.		T- 55
	Learner, P.		L- 19
	Lebaron S.		L-190
	Lemke, C.		T- 54
	Ley, H. & J.		T- 87
	Lindenmeyer, T.H.	East Bay Regional Park District	L- 18
	Lipski, J.A.		T- 88
	Livak, N.J.	Livak et al.	L-200
	Loveness, L.		T- 4
	Loveness, L.		T- 30
***	Lyman J.	Caliente Yacht Club	L-271
	Macken, A.		T- 56
	Macy, N.	Macy's Flying Service, Inc.	T- 20
	Macy, N.S.	Macy's Flying Service, Inc.	T- 58
	Macy, W.E. & N.		T- 57
	Martin, P.		T- 75
	Martin, P.		T- 92
***	Martini, L.	Caliente Yacht Club	L-282
***	Masela, G. M.	Caliente Yacht Club	L-363
	Matthews, W.E. & R.L.		L-315
	Mattia, M.A.		L-212
	Matzen, B.J.		T-184
	Mazzini, J.		T-134
	McAuliffe, C.		T- 18

TABLE 3.1.1-1 (CONTINUED)

	Commentor	Organization	Letter (L) or Testimony (T) Number
	McCarroll, Jr., J.P.	Hearst Corporation	T- 89
	McClain, S.		T- 90
	McClain, W.		T- 91
	McCleskey, D.		L-159
	McCleskey, D.		T-130
	McCleskey, D.		T-137
	McCleskey, D.L.		L-184
	McCormack, F.	Izaak Walton League	L- 4
	McCormack, F.	Izaak Walton League	T- 59
***	McFerney, D.	Caliente Yacht Club	L- 32
	Meagher, R.	Concerned Citizens of Butte Valley	T-118
	Meagher, R.A.		T-127
	Meagher, R.A.	Concerned Citizens of Butte Valley	L-328
	Melo, L.		L-196
	Melo, L.		T- 70
	Melo, L.		T- 93
	Mettler, M.A.	Pool Establishment	L-133
	Mevi, J.		T-179
	Meyer, Larry J.		L-182
	Micka, L.		L-304
	Micka, L.		T-117
	Micka, L.		T-128
	Miller, G.	Committee on Interior and Insular Affairs	T-170
	Miller, G.	Committee on Interior and Insular Affairs	L- 17
	Miller, M.	Modoc County-Klamath County Power Line Committee	T- 8
	Mirick, E.		L-231
***	Modis, C. & L.	Caliente Yacht Club	L-272
	Moore, B.		L-209
	Moore, H.		L-109
	Moore, J.K.	Sierra Club Mother Lode Chapter	L-322
	Moore, M.		L-108
	Moore, M.J.		L-276
	Moore, S.G.		L- 30
**	Morrill, R.B.		L-161
*	Moser, W.		T-187
	Muir III, D.H.		L- 53
	Murray, Jr., C.W.	Environmental Protection Agency	L-364
	Murray, T.J.	Bonneville Power Administration	L-371
	Mussetter, R.	California Energy Commission	T-138
	Myers, R.	Tulelake Chamber of Commerce	L-206
	Nelson, T.	Assemblyman Phillip Isenberg	T-164
	Newton, C./Harlow, G.	Shasta County Fire	L-260
	Nile, J.	Santa Fe Pacific Timber Company	T- 69
	Nile, J.	Santa Fe Pacific Timber Company	T- 94
	Nile, J.B.	Santa Fe Pacific Timber Company	L-192
	Nile, J.B.	Santa Fe Pacific Timber Company	L-341
	Nystrom R.K.		L-211
	Ohanian, J.B.	Office of Planning and Research	L-326
	Oreck, R.		T- 73
	Oreck, R.P.		T- 95
	Ottoman, J.R.		T- 5
	Ottoman, J.R.		T- 7
***	Papenhauser, R. & J.	Caliente Yacht Club	L-365
	Parnell, J.C.	California Department of Fish and Game	L-333
	Patel, V.	Department of Water Resources	L-360
	Pendoley, R.J.	Solano County	L-349

TABLE 3.1.1-1 (CONTINUED)

	Commentor	Organization	Letter (L) or Testimony (T) Number
	Perlman, M.		L-207
	Peterson, D.	Modoc County-Klamath County Power Line Committee	T- 9
	Peterson, D.G.	Modoc County-Klamath County Power Line Committee	L-214
	Phillips G. & H.		L- 15
	Polityka, C.	USDI Office of Environmental Project Review	L-332
	Prosser, Mr. & Mrs. J.		L-235
	Pugh, P.	Associated Professional Engineers	L-255
	Rayburn, R.G.	Department of Parks & Recreation	L-361
	Ream, M.L.		T- 96
	Rechtin, J.	Lava Beds National Monument	L- 3
*	Rentz, M.		T-190
	Reseck, G.A.		L-175
	Rhodes, P.		T-110
	Rhodes, P.T.	Mt. Shasta Audubon	L-314
	Robinson, L. & D.		T- 60
	Robinson, R. & A.		L- 13
***	Roumbanis J., L., M., D., & C.	Caliente Yacht Club	L-278
	Ruling, C.		L-220
	Ruppert, B. & D.		L-273
	Russak, J.E. & M.		L-245
	Rutherford, G.		T-133
	Ryan, F.		T-124
	Sani, G.		L-217
	Schaefer, P.		L-336
	Scott, D.		T-155
	Sec. Pro-tem	Siskiyou County Republican Central Committee	T- 61
	Shaw, A. T.		L-119
	Shaw, M.		L- 52
	Shelley, T.	Senator Boatwright	T-165
***	Siegel M.	Caliente Yacht Club	L-279
	Silviera, J.W. & B.		L- 70
	Simpson, E.R.		L-249
	Sipes, J.	Bethel Island Municipal Improvement District	T-154
	Smith, B.J.	California Department of Transportation	L-357
*	Smith, D. & L.		T-186
	Smith, Z.G.	USDA Forest Service	L-295
	Snyder, B.	California Licensed Foresters Association	L-343
	Sollid, A. & G.		L-177
	Spieler, J.F.		L-208
	Spotts, J.L.		L-227
	Sprayberry, D. & M.		L-105
	Staats, R.	State Senator John Doolittle	T- 29
*	Stackwood, J.		T-188
	Stastny, E.		T- 6
	Statham, S.	Assembly California Legislature	T- 62
	Stoeffler, D.	Knightsen Community Council	T-153
	Stonecypher, A. & W.R.		T- 63
	Streeter, D.	Oregon Clearinghouse	L- 11
	Stromsness, C.		L-283
	Sumner, D.		T- 79
	Sumner, S.		T- 97
	Sylva, E. & R.		L- 46
	Taylor, M.		L-226
	Teague, D.		L-172
	Tendeland, T. & F.		L-289
	Terry, R.		L-120
	Thackeray, G.	Siskiyou County Board of Supervisors	T- 98

TABLE 3.1.1-1 (CONTINUED)

	Commentor	Organization	Letter (L) or Testimony (T) Number
	Thackeray, G.	Siskiyou County Board of Supervisors	L-128
	Thatch, G.D.		L-305
	Thiel, R.		T-121
	Thiel, R.		T-126
	Thompson, T.A.		L-186
	Thresh, C.	Positive Resolution of Powerline Problems	T-144
	Tibbetts, E.		L-101
	Tomaselli, R.		L-183
	Tomaselli, G. & R.		L- 44
	Toner, K.		L-345
	Torlakson, T.	Contra Costa County Board of Supervisors	T-167
	Torlakson, T.	Contra Costa County Board of Supervisors	L-265
	Townley, S.		T- 99
	Treman, B.		T- 80
	Tschirky, H.		T- 21
	Tschirky, P.	Modoc County-Klamath County Power Line Committee	T- 10
	Tschirky, R.		T- 64
	Tschirky/Graham	Modoc County-Klamath County Power Line Committee	L-330
	Turner, H.		T-161
***	Tuttle, E.	Caliente Yacht Club	L- 34
***	Tuttle, L.	Caliente Yacht Club	L- 31
***	Tuttle, P.M.	Caliente Yacht Club	L- 29
***	Tuttle, S.C.	Caliente Yacht Club	L- 35
	Urrutia, J.M.	Bank of Stockton	L-117
	Valens, M.		T- 3
	Van Nostrand, J.M.	Perkins Coie	L-292
	Van Susteren, P.		L-313
	Vernon, F.		L-233
	Victorine, J.	Tulelake Grange	T- 13
	Vidricksen, K.L., M.D.		L-277
	Vincent, A.R.	Klamath Basin Audubon Society	T- 65
	Vinzant, M.J.		L-181
	Walden, D.D.	Haynes and Walden Farms, Inc.	T- 66
	Waldman, A.L.		L-225
	Walt H.R.	California Board of Forestry	L-321
	Way, C.T.	East Bay Municipal Utility District	L- 10
	Weisenburg, Jr., L.A.	Delta Coves	T-158
	Weisenburg, L. E.	Delta Coves	L- 90
	Weisser, V.	California Public Utilities Commission	L-306
	Weland, M.C.	Oregon Fish and Wildlife Service	L- 23
	White, J.	California Aviation Council	T-173
	White, J.C.	California Aviation Council	L-197
	Whitehorn, S.	Roseburg Resources	T-132
	Whitener, J.J.	Bethel Island Fire	L-324
***	Williams, I.	Caliente Yacht Club	L- 43
	Wilson, J.P.		L-110
	Wolford, M.	Byron Unified School District	L-312
	Wood, W.M.	Klamath Sierra Club	L- 27
	Wood, W.M.	Klamath Sierra Club	T- 67
**	Wright, C.		L-162
**	Wright, G.		L-163
***	Xeulner, R.D.	Caliente Yacht Club	L-256
	Zoller, D.	Greenhorn Grange	T- 71

3.1.2 COMMENTS NOT REQUIRING RESPONSES

Tables 3.1.2-1 and 3.1.2-2 identify all of the letters (identified by L-#'s) and testimony (identified by T-#'s) not requiring responses. Examples of letters and testimony not requiring a response are: requests for changes of address, additions or deletions to our mailing list, requests for the Draft EIS/EIR or information on the projects, and short statements presented at hearings that are not comments on the Draft EIS/EIR. Letters requesting the above items are not reproduced in this Final EIS/EIR, but to maintain continuity throughout the hearing transcripts, all testimony are reproduced.

TABLE 3.1.2-1

LETTERS RECEIVED ON THE DRAFT EIS/EIR
NOT REQUIRING RESPONSES*

Commentor	Organization	Letter (L) Number
Arp, W. & N.		L-250
Auslen, R.M.		L-185
Bachman, G.	Shapiro and Associates	L- 98
Baque, P.		L-354
Beebe, R.D.		L- 85
Bergdale, G.N.	Dames and Moore	L-138
Berryman, R.	Champion International Corp.	L- 75
Bowers, G.H.	Bowers Engineering	L-154
Bradford, D.F.		L-122
Brady, C.	Positive Resolution of Powerline Problems	L- 94
Brown, J.	Oregon Forestry Department	L-252
Brown, J.H.	Tulare Planning Department	L-338
Buckingham, R.A.		L- 67
Bunyan Lumber		L- 72
California Department of Forestry		L-241
Carden, J.		L- 12
Chandler, T.V.	American Water Works	L-136
Christy, D.	Herald and News	L- 76
Cline, C.I.	Bethel Marina	L-123
Coleman, D.		L- 47
Conaty, M.		L-228
Cope, B.	Sierra Energy and Risk Assessment	L- 69
Corvin, W.C.	Stanford University	L- 81
Creighton, J.E.		L-191
Crymes, A.		L-275
Dauphine, D.C.	California Farm Bureau	L- 88
Downs, J. & B.		L-221
Ellis, Mr. & Mrs. E.		L-134
Friends of the Greensprings		L- 58
Falk, Mr. & Mrs. D.		L-230
Fileccia, N.S.		L-258
Francis, L.		L- 92
Goldschmidt, N.	Governor of Oregon	L- 5
Gorham, K.		L- 8
Graham, B.	Oregon Review Committee	L- 60
Gray, J.	Dames and Moore	L- 50
Gray, J.T.	Dames and Moore	L- 37
Grist, C.	Oregon Department of Energy	L-246
Harris, J.	Citizens Utilities Company	L- 80
Henry, J.V.	Save Our Streams	L- 82
Hensley, P.	Mission Energy Company	L-131
Herger, W.	California Legislature	L-253
Humboldt State		L- 74
Isenberg, P.	California Legislature	L-301
Ivey, B.		L-274
Johnson, M.		L-210
Jones, M.S.		L-132
Kilian, C.J.		L- 25
Kilian, C.J.		L- 77
Krauska, T.A.		L- 99
Lerma, J.M.		L-146
Lindenmeyer, T.H.	East Bay Regional Park District	L- 66
Lupine,		L- 59
Mason, D.	USDI Bureau of Land Management	L- 71

* These letters did not contain substantive comments regarding the Draft EIS/EIR and, therefore, did not require a response.

TABLE 3.1.2-1 (CONTINUED)

Commentor	Organization	Letter (L) Number
Mazzini, E.	Montgomery Creek Library	L- 16
McCleskey, Mrs. D.		L-187
McCormack, F.	Izaak Walton League	L-148
McGreehan, A.	Town of Paradise	L- 38
Meek, D.	Subcommittee on Mining	L- 61
Mills, J.	Clavey River Project	L-257
Munowitch, B.	City of Davis	L- 73
Nordell, L.P.	Montana Department of Natural Resources	L- 84
Omundson, D.	USDI National Park Service	L- 62
Opp, R.	Oregon Department of Fish and Wildlife	L- 56
Peterson, D.	Modoc County-Klamath County Power Line Committee	L- 64
Peterson, D.G.	Modoc County-Klamath County Power Line Committee	L-116
Pettis, M.		L-140
Poehlmann, D.	USDA Forest Service	L- 6
Prescott, P.		L-259
Primer, M.	Kern County	L- 7
Pungrchar, N.		L-201
Rain Resources		L- 83
Reese,Jr., J.W.	Shadwell and Reese	L- 36
Reginato, J.F.	Shasta Cascade	L- 57
Reynolds, W.L.		L-242
Robinett, W.L.	Puget Power	L-113
Sachs, P.M.	Adams et. al.	L- 93
Sedgwick, G.B.	Leedshill-Herkenhoff	L-152
Shasta Holiday		L- 95
Simmons, T.	Humboldt Research	L-147
Slesin, L.	Microwave News	L- 63
Stout, B.	National Wildlife Federation	L- 68
Swift, R.	Hearst/Wyntoon	L- 86
Uerlings, J.	Klamath County Chamber of Commerce	L-240
Vargo, T.	Western Joint Utilities Services Sub-Board	L-114
Webb, R.B.		L-107
White, J.C.		L-158

TABLE 3.1.2-2

TESTIMONY RECEIVED ON THE DRAFT EIS/EIR
NOT REQUIRING RESPONSES

Commentor	Organization	Testimony (T) Number
Chadwell,		T-105
Edgar, R.H.		T-125
Hays, B.		T-106
Heiss, D.		T-131
Ramsdell, B.		T-107

Comments Received on the Supplement to the Draft EIS/EIR

3.2 COMMENTS RECEIVED ON THE SUPPLEMENT TO THE DRAFT EIS/EIR

Section 3.2 is divided into two subsections: Section 3.2.1, Comments Requiring Responses, and Section 3.2.2, Comments Not Requiring Responses.

Section 3.2.1, Comments Requiring Responses, presents lists of the letters and testimony requiring responses. The lists are sorted alphabetically by the commentor's last name, with an SL-# or ST-# assigned to each letter or testimony. The reader can locate a letter reproduced with responses to specific comments in SL-# order in Volume 2B, Section 3, Correspondence and Responses on the Supplement to the Draft EIS/EIR. The testimony is reproduced with responses to specific comments in ST-# order in Volume 3, Section 3, Testimony and Responses on Supplement to the Draft EIS/EIR.

Section 3.2.2, Comments Not Requiring Responses, presents lists of the letters and testimony not requiring responses. The lists are sorted alphabetically by the commentor's last name, with an SL-# or ST-# assigned to each letter or testimony. This section includes letters requesting changes of address and requests for the Draft EIS/EIR or information on the projects. There are a few short statements presented at hearings that are not comments on the Supplement to the Draft EIS/EIR; however, these are reproduced in this Final EIS/EIR to maintain continuity throughout the hearing transcripts.

3.2.1 COMMENTS REQUIRING RESPONSES

Tables 3.2.1-1 and 3.2.1-2 identify all of the letters (identified by SL-#'s) and testimony (identified by ST-#'s) requiring responses. An SL-# on the list can be found reproduced in Volume 2B, Section 3, of this Final EIS/EIR with responses to its specific comments. An ST-# on the list can be found reproduced in Volume 3, Section 3 of this Final EIS/EIR with responses to its specific comments.

TABLE 3.2.1-1

LETTERS RECEIVED ON THE SUPPLEMENT TO THE DRAFT EIS/EIR REQUIRING RESPONSES

Commentor	Organization	Letter (SL) Number
Amstein, L.		SL- 60
Anonymous		SL- 15
Barker, P.F.	USDA Forest Service	SL- 99
Barringer, B.		SL- 50
Beebe, R.D.		SL-125
Beers, R.		SL- 85
Bottimore, M.L.		SL-111
Brown, N.		SL-108
Caldwell, F.		SL-119
Carrara, J.F.		SL-115
Caughey, D. & E.		SL- 68
Deffebach, M.F.		SL-116
Delledera, S.		SL- 17
Dobbins, G.L.		SL- 47
Donovan, M.J. & Rapalus, N.		SL- 65
Duvall, P.		SL- 8
Easton, C.C.		SL- 92
Fiock, N.		SL- 9
Fisher, A.		SL-129
Fletcher		SL- 7
Forner, V.		SL- 88
Fox, D.D.		SL- 29
Frey, N.	Siskiyou County Board of Supervisors	SL- 84
Garcia, A. & D.		SL- 28
Germino, J.O.	Germino et al.	SL- 38
Graham, B.		SL- 64
Grist, C.	Oregon Department of Energy/Oregon Review Committee	SL-103
Hammond, J.C.		SL- 98
Hanson, L.		SL- 61
Henwood, K.	Henwood Energy Services, Inc.	SL-121
Higgins, P.D.	Pacific Power & Light Company	SL-101
Howard, D.M.	Community Legal Information Center	SL-124
Hughes, J.J. & H.L.		SL- 59
Jacoby, K. & P.		SL- 72
Jaffe, D.		SL- 32
Johnson, F.H.		SL-113
Jones, E.W.		SL- 19
Kennett, W.		SL- 66
Kifer, J.R.		SL- 39
Kifer, J.R. & A.K.		SL- 45
Kilian, C.J.		SL-106
Killeen, M.D.		SL-109
Kincaid, C.		SL- 30
King, R.F.	City of Coalinga	SL- 24
King, V.		SL- 86
Krauska, M.S. & T.A.		SL- 89
Krauska, T.		SL- 97
Lebaron, S.		SL- 18
Leight, W.J.		SL- 36
Matthias, B. & E.		SL- 16
Mazzarella, S.		SL- 1
McCleskey, D.L.		SL- 80
McConey, J.		SL-131
Miller, C.E.		SL- 56
Moore, G. & S.		SL- 57
Murray, T.J.	Bonneville Power Administration	SL-122

TABLE 3.2.1-1 (CONTINUED)

Commentor	Organization	Letter (SL) Number
Nelson, C.		SL- 93
Nelson, L. & D.		SL- 26
Newton, W.W. & A.J.		SL- 31
Norby, G.M. & E.M.		SL- 27
Otez, J.		SL- 51
Patel, V.	California Department of Water Resources	SL- 76
Perry Marine Service		SL- 14
Peterson, D. et al.	Modoc County-Klamath County Power Line Committee	SL-120
Plummer, F.F., R.A., F.M. & S.		SL- 41
Polityka, C.	USDI Office of Environmental Project Review	SL-102
P.R.O.P.P.		SL-123
Rechtin, J.		SL-107
Rhyne, D.		SL- 44
Rice, L. & A.		SL- 12
Roberts, D.S.	Driscoll Strawberry Associates	SL- 23
Rodocick, D.		SL- 83
Ruling, C.		SL- 4
Russak, J.E.		SL-117
Russak, W.		SL-105
Shaw, M.		SL- 3
Shumway, N.D.	U. S. Congress	SL-104
Slingerland, R.M.		SL- 2
Smerber, J.		SL- 91
Smerber, J.P.		SL- 94
Smerber, W.		SL- 90
Smerber, Z.A.		SL- 96
Starr, P.		SL- 5
Stastny, E.		SL- 95
Streeter, D.		SL- 58
Terry, R.		SL- 55
Thatch, G.D.		SL-118
Thomson, W.L. & P.A.		SL- 20
Trapnell, H.W.	Hambone Ranch	SL- 78
Vignola, R.	Antioch City Hall	SL- 81
Vinzant, M.		SL- 48
Walt, H.R.	California Board of Forestry	SL-100
Walter, F.		SL- 46
Wetmore, M.L.		SL- 69
White, J.C.	California Aviation Council	SL- 6
Wickizer, D.	California Board of Forestry	SL-126
Wieman, D.	Environmental Protection Agency	SL-130
Williams, J.		SL-114
Wooley, W.		SL-127
Woolley, E.W.		SL-112
Woolley, K.		SL- 82

TABLE 3.2.1-2

TESTIMONY RECEIVED ON THE SUPPLEMENT TO THE DRAFT EIS/EIR REQUIRING RESPONSES

Commentor	Organization	Testimony (ST) Number
Agrons, B.	Oregon Representative	ST- 27
Arthur, G.		ST- 15
Berryman, R.	Champion International Corp.	ST- 8
Brady, C.	Positive Resolution of Powerline Problems	ST- 30
Briggs, G.	Roseburg Resources	ST- 6
Brown, N.		ST- 34
Burroughs, B.	Jersey Island Company	ST- 31
Byrne, D.	Tulelake Growers Association	ST- 17
Byrne, M.	Modoc County Cattleman's Association and Lava Bed Resource Conservation District	ST- 26
Coulson, J.	Modoc County Board of Supervisors	ST- 23
Cross, J.	Modoc County-Klamath County Power Line Committee	ST- 13
Dal Porto, R.	Dal Porto Properties	ST- 29
Dalton, W.		ST- 14
Graham, B.	Oregon Review Committee and Modoc County-Klamath County Power Line Committee	ST- 12
Halousek, H.		ST- 20
Halsey, T.V.	Reclamation District #830	ST- 36
Hendershott, A.		ST- 10
Henwood, K.	Henwood Energy Services, Inc.	ST- 5
Johnson, F.		ST- 2
Kilian, C.		ST- 9
Klassen, H.	Modoc County Farm Bureau	ST- 24
Loveness, L.		ST- 19
Mazzini, J.		ST- 3
McCleskey, D.		ST- 1
McCormic, M.	Oregon Review Committee	ST- 21
Peterson, D.	Modoc County-Klamath County Power Line Committee	ST- 11
Rechtin, J.		ST- 25
Roeder, N.		ST- 22
Sipes, A.		ST- 35
Thresh, C.	Positive Resolution of Powerline Problems	ST- 33
Toler, I.		ST- 4
Tschirky, P.	Modoc County-Klamath County Power Line Committee	ST- 16
Victorine, J.	Tulelake Grange	ST- 18
Whitehorn, S.		ST- 7

3.2.2 COMMENTS NOT REQUIRING RESPONSES

Tables 3.2.2-1 and 3.2.2-2 identify all of the letters (identified by SL-#'s) and testimony (identified by ST-#'s) not requiring responses. Examples of letters and testimony not requiring a response are: requests for changes of address, additions or deletions to our mailing list, requests for the Draft EIS/EIR or Supplement to the Draft EIS/EIR, or information on the projects, and short statements presented at hearings that are not comments on the Supplement to the Draft EIS/EIR. Letters requesting the above items are not reproduced in this Final EIS/EIR, but to maintain continuity throughout the hearing transcripts, all testimony are reproduced.

TABLE 3.2.2-1

LETTERS RECEIVED ON THE SUPPLEMENT TO THE DRAFT EIS/EIR
NOT REQUIRING RESPONSES*

Commentor	Organization	Letter (SL) Number
Anonymous		SL- 35
Brotsch, B.		SL-133
Donovan, M.J. & Rapalus, N.		SL- 73
Dunn, D. & G.		SL- 33
Environ. Coord.		SL- 52
Feider, J.	Western Area Power Administration	SL-110
Ferris, H.	Pacific Power & Light Company	SL- 63
Frager, S.R.	AFA	SL- 77
Gabbar, R.		SL- 11
Hanson, T.		SL- 62
Hayhurst, C. & B.		SL- 34
Hughes, D.		SL- 49
Kilian, C.		SL- 87
Klatt, P.	Western Power	SL- 25
Leight, W. & H.		SL- 10
McCauley, D.		SL- 67
McCleskey, D.		SL-132
McCleskey, D.		SL-134
Murray, T.J.	Bonneville Power Administration	SL- 40
Nystrom, R.K.		SL- 37
Phillips, A.		SL- 74
Phillips, A. & J.		SL- 75
Quay, C.	Benton County Public Utility District	SL- 53
Rodocick, J.		SL- 22
Semonich, D.		SL- 42
Simmons, T.	Humboldt Research	SL- 13
Speigel & McDiarmid		SL- 70
Taggart, L.	California Indian Legal Services	SL- 54
Toler, I.		SL- 71
Trapnell, H.W.	Hambone Ranch	SL- 79
Willard, et al.		SL- 21
Wynhamer, E. & M.		SL- 43

* These letters did not contain substantive comments regarding the Supplement to the Draft EIS/EIR and, therefore, did not require a response.

TABLE 3.2.2-2

TESTIMONY RECEIVED ON THE SUPPLEMENT TO THE DRAFT EIS/EIR NOT REQUIRING RESPONSES

Commentor	Organization	Testimony (T) Number
Halsey, T.V.	Reclamation District #830	ST- 28
Miller, D.		ST- 32

Letters and Testimony Received on the Draft EIS/EIR and the Supplement to the Draft EIS/EIR Categorized by Topic

3.3 LETTERS AND TESTIMONY RECEIVED ON THE DRAFT EIS/EIR AND THE SUPPLEMENT TO THE DRAFT EIS/EIR CATEGORIZED BY TOPIC

Table 3.3-1 is a list of the letters and testimony received during the comment periods on the Draft EIS/EIR and the Supplement to the Draft EIS/EIR categorized by topic. The topics are presented in alphabetical order and include:

Air Quality/Climate
Associated Facilities
Benefits Without Surplus
Bonneville Power Administration
Capacity of Intertie
Clearance Requirements
Communication Site Alternatives
Conservation Alternatives
Construction
Cost Estimate
Cultural Resources
Data & Analysis Assumptions
Earth Resources
Economics
Electrical Effects
Electrolysis
General Environmental
Generation Alternatives
Irreversible/Irretrievable/Growth Inducing/Cumulative Impacts
Landowner Concerns
Land Use
Land Use/Agriculture
Land Use/Timber
Los Banos-Gates Project
Maintenance
Mitigation
Need
Need for the Tracy-Tesla 230-kV Lines After the Project
New Technology
No Action Alternative
Noise
Northern California Benefits
Northwest Operations
Olinda Substation
Oregon Benefits
Overall Benefits
Pacific Northwest Reinforcement Project
Permits
Public Involvement/Information Requests
Radio Interference
Real Estate
Reliability
Routing and Separation Requirements
Routing East of Intertie
Routing of Transmission Line in Southern Oregon
Routing (General)
Routing/Substations (General)
Routing/John Cross Alternative
Routing South of the Sacramento River
Routing Next to Existing Intertie
Schedule
Siting of Towers
Socioeconomics
Southern Oregon Switching Station
Study Process
Towers
Unclassified Comments
Undergrounding of Transmission Lines
Upgrading of the Existing Intertie
Upgrading of Existing Western 230-kV Lines
Vegetation
Visual Resources
Water Resources/Fisheries
Wildlife

TABLE 3.3-1

LETTERS AND TESTIMONY RECEIVED ON THE DRAFT EIS/EIR AND THE SUPPLEMENT TO THE DRAFT EIS/EIR CATEGORIZED BY TOPIC

Air Quality/ Climate

L-295 J1
L-310 PP
L-330 D4
L-330 Y12
L-332 MM
T-182 C
T-182 E
T-182 G
SL- 99 I

Associated Facilities

L-306 QQ

Benefits Without Surplus

L- 3 T
L- 3 U
L-157 C
L-179 E
L-196 H
L-218 A
L-310 K1
L-310 S2
L-320 E
L-329 D
L-329 E
L-329 P
L-330 G16
L-339 I
L-341 C
L-343 C
T- 60 D
T- 70 K
T- 81 J
T- 93 I
T- 97 B
T-103 D
T-132 C

Bonneville Power Administration

L-306 S
L-310 B1
L-310 I1
L-310 J1
L-310 W1
L-310 Z1
L-310 A2
L-310 B2
L-310 V2
L-310 W2
L-310 S3
L-310 T3
L-310 W3
L-329 N
L-329 O
L-329 P
L-342 Q
L-342 T
SL- 95 A
SL-114 B
SL-125 J

Capacity of Intertie

L-306 W2
L-306 X2
L-371 I

Clearance Requirements

L- 21 A
L- 28 A
L-255 C
L-295 L
L-305 N
L-310 R
L-310 S
L-310 U
L-310 V3
L-329 E1
L-329 F1
L-330 P10
L-330 A13
L-330 L13
L-362 Z
L-362 CC
L-362 EE
T- 4 E
T- 4 G
T- 6 E
T- 11 B
T- 15 H
T- 30 D
T- 89 H
T-166 B
T-173 B
T-173 C
T-173 D
SL- 56 A
SL-104 C
SL-118 D
SL-121 M
SL-123 L
SL-125 E
SL-129 C

Communication Site Alternatives

L-6

Conservation Alternatives

L- 3 S
L-236 B
L-243 C
L-306 AA
L-306 BB
L-306 CC
L-306 GG
L-310 M2
L-322 B
L-330 C
L-342 AA
T- 33 E
SL-107 B
ST- 25 G

Construction

L-110 A
L-248 J
L-248 K
L-295 T1
L-295 A2
L-295 B2
L-295 M2
L-321 W
L-321 X
L-321 CC
L-330 H13
L-330 L16
L-333 J
L-349 D
L-360 B
L-362 Q
L-362 MM
L-364 BB
T- 75 C
T- 92 C
T-108 E
SL-100 CC
SL-106 G
SL-125 C

Cost Estimate

L-196 I
L-309 SS
L-309 TT
T- 37 J
T- 70 L
T- 93 B

Cultural Resources

L- 3 R
L- 9 A
L- 15 G
L- 15 H
L- 18 B
L-117 A
L-157 D
L-159 M
L-173 B
L-176 C
L-184 F
L-188 D
L-213 C
L-248 B
L-248 F
L-248 G
L-248 H
L-248 I
L-248 M
L-248 O
L-248 P
L-248 S
L-295 I
L-295 J
L-295 Q
L-295 SS
L-295 K1
L-295 D2
L-295 G2
L-302 G
L-306 K
L-306 Q
L-306 R
L-309 J
L-309 S2
L-309 D3
L-310 X
L-310 AA
L-310 BB
L-310 QQ
L-310 S2
L-321 L
L-321 M
L-321 Z
L-321 Y
L-322 BB
L-327 L
L-327 M
L-329 JJ
L-329 LL
L-329 WW
L-330 M6
L-330 D12
L-330 K12
L-330 O12
L-332 R
L-332 AA
L-332 DD
L-332 EE
L-332 FF
L-333 Q
L-333 R
L-333 S
L-337 B
L-337 E
L-339 B
L-339 E
L-345 A
L-362 J
T- 53 A
T- 55 G
T- 74 A
T- 74 C
T- 81 C
T- 81 E
T- 83 B
T- 92 D
T-108 G
T-110 E
T-134 C
T-134 E
T-134 F
T-135 A
T-181 D
SL-99 S
SL-106 G

Data & Analysis Assumptions

L-203 B
L-203 C
L-203 D
L-203 G
L-203 H
L-203 P
L-203 Q
L-204 F
L-204 G
L-204 J
L-204 S
L-204 T
L-204 U
L-204 V
L-292 C
L-292 D
L-292 E
L-295 BB
L-298 B
L-298 C
L-299 A
L-299 B
L-299 C
L-299 F
L-299 G
L-299 M
L-299 N
L-300 A
L-300 B
L-300 C
L-300 M
L-306 B
L-306 C
L-306 F
L-306 G
L-306 I
L-306 J
L-306 U
L-306 V
L-306 W
L-306 RR
L-306 SS
L-306 C1
L-307 CC
L-309 C
L-309 D
L-309 F
L-309 G
L-309 O1
L-309 B2
L-309 D2
L-310 A
L-310 B
L-310 C
L-310 UU
L-310 F1
L-310 H1
L-310 L1
L-320 G
L-321 A
L-321 J
L-322 M
L-325 G
L-325 J
L-325 K
L-330 N
L-330 O
L-330 N5
L-330 X8
L-330 B9
L-344 A
L-334 C
L-337 A
T- 1 K
T- 77 C
T- 77 M
T- 77 P
T- 81 A
T- 99 D
T- 99 G
T- 99 H
T- 99 I
T- 99 J
T-108 A
T-109 F
T-112 A
T-117 A
T-128 A
T-139 A
T-139 B
T-139 C
T-139 F
T-139 K
T-139 M
T-150 B
SL- 99 A
SL-100 C
SL-100 V
SL-100 X
SL-106 B
SL-120 F
SL-121 C
SL-121 G
SL-123 N
SL-124 C
SL-130 B
ST- 11 D
ST- 30 L

Earth Resources

L- 3 R
L- 15 G
L- 15 H
L- 18 B
L-117 A
L-157 D
L-159 M
L-176 C
L-184 F
L-188 D
L-213 C
L-295 I
L-295 J
L-295 SS
L-295 F1
L-295 K1
L-295 D2
L-295 G2
L-302 G
L-306 K
L-309 J
L-309 S2
L-309 D3
L-310 X
L-310 AA
L-310 BB
L-310 QQ
L-321 L
L-321 M
L-321 Z
L-321 Y
L-329 JJ
L-329 LL
L-330 M6
L-330 K12
L-330 O12
L-332 R
L-333 Q
L-333 R
L-333 S
L-337 B
L-339 B
L-339 E
L-345 A
L-362 J
T- 53 A
T- 55 G
T- 81 C
T- 81 E
T- 83 B
T- 92 D
T-110 E
T-130 F
T-134 D
T-134 G
T-137 F
T-139 I
T-181 E
T-182 B
T-182 D
T-182 I
T-183 F
T-183 G
SL- 2 B
SL- 65 G
SL- 65 H
SL- 83 B
SL- 90 A
SL- 91 A
SL- 93 A
SL- 93 B
SL- 99 S
SL-106 G
ST- 1 H
ST- 4 A
ST- 4 E

Economics

L-306 X
L-306 Z
L-306 FF
L-306 HH
L-306 KK
L-306 LL
L-306 UU
L-306 VV
L-306 WW
L-306 XX
L-306 YY
L-306 A1
L-306 B1
L-306 D1
L-306 E1
L-306 F1
L-306 G1
L-306 H1
L-306 I1
L-306 J1
L-306 K1
L-306 M1
L-306 N1
L-306 O1
L-306 P1
L-306 Q1
L-306 R1
L-306 S1
L-306 T1
L-306 U1
L-306 V1
L-306 W1
L-306 X1
L-306 Y1
L-306 Z1
L-306 A2

(continued)

Economics (continued)

L-306 B2
L-306 C2
L-306 D2
L-306 E2
L-306 G2
L-306 H2
L-306 I2
L-306 J2
L-306 K2
L-306 L2
L-306 M2
L-306 P2
L-306 Q2
L-306 R2
L-306 S2
L-306 T2
L-306 U2
L-306 Y2
L-306 Z2
L-306 A3
L-306 C3
L-306 D3
L-306 E3
L-306 F3
L-306 G3
L-306 H3
L-306 I3
L-306 J3
L-306 K3
L-306 L3
L-306 M3
L-306 N3
L-306 O3
L-306 P3
L-306 Q3
L-306 R3
L-306 S3
L-306 T3
L-321 RR
L-329 C
L-329 Q
L-329 V
L-329 W
L-329 Y
L-329 Z
L-329 AA
L-329 I1
L-331 B
L-331 C
L-331 D
L-335 B
L-335 C
L-335 D
L-341 D
L-342 I
L-343 D
L-344 B
L-344 C
L-344 D
L-344 E
L-344 F
L-362 W
L-362 X
SL- 46 A
SL- 47 C
SL- 48 A
SL-121 X
SL-126 B
ST- 25 I
T- 89 B
T- 89 F

Electrical Effects

L- 15 D
L- 15 F
L-121 A
L-121 B
L-121 C
L-121 D
L-121 F
L-179 F
L-189 D
L-199 A
L-199 B
L-243 A
L-243 B
L-243 D
L-251 C
L-255 B
L-309 O
L-309 E2
L-310 E
L-310 L
L-310 ZZ
L-310 C1
L-310 D1
L-310 F2
L-310 I2
L-310 O2
L-310 R2
L-312 A
L-320 C
L-324 E
L-324 F
L-329 XX
L-329 C1
L-330 EE
L-330 FF
L-330 G1
L-330 H1
L-330 I1
L-330 J1
L-330 K1
L-330 L1
L-330 M1
L-330 O1
L-330 P1
L-330 U1
L-330 V1
L-330 F3
L-330 G3
L-330 H3
L-330 I3
L-330 T4
L-330 Z4
L-330 B5
L-330 R8
L-330 B11
L-330 Z11
L-330 B12
L-330 W12
L-330 Z12
L-330 F13
L-330 G13
L-330 I14
L-330 O15
L-330 X15
L-330 M16
L-339 C
L-366 C
L-371 P
L-372 E
T- 4 J
T- 14 F
T- 15 E
T- 18 A
T- 18 D
T- 21 A
T- 21 B
T- 21 C
T- 21 D
T- 21 E
T- 21 F
T- 21 G
T- 27 C
T- 33 B
T- 33 D
T- 33 F
T- 33 I
T- 33 J
T- 48 A
T- 48 E
T- 48 F
T- 51 D
T- 51 E
T- 51 F
T- 51 H
T- 55 C
T- 55 E
T- 60 E
T- 63 A
T- 64 B
T- 64 D
T- 66 B
T-101 B
T-116 A
T-119 A
T-119 C
T-119 D
T-119 E
T-119 H
T-119 I
T-120 B
T-121 B
T-123 A
T-127 A
T-136 C
T-136 D
T-146 G
T-150 C
T-150 E
T-181 G
T-183 C
T-183 D
SL- 51 A
SL- 64 A
SL- 64 B
SL- 83 B
SL- 94 B
SL-103 H
SL-106 E
SL-109 A
SL-119 B
SL-120 L
SL-120 M
SL-123 J
ST- 4 H
ST- 9 B
ST- 30 K

Electrolysis

L-330 C13
L-330 I13
L-330 P15
T- 4 H
SL-104 D

General Environmental

L- 1 B
L- 3 K
L- 3 Y
L- 9 A
L- 11 A
L- 15 A
L- 17 A
L- 20 A
L- 22 A
L- 23 A
L- 23 C
L- 24 A
L- 26 A
L- 27 A
L- 28 A
L- 29 A
L- 31 A
L- 32 A
L- 33 A
L- 34 A
L- 35 A
L- 39 A
L- 39 B
L- 40 A
L- 41 A
L- 42 A
L- 43 A
L- 45 C
L- 46 A
L- 48 A
L- 49 A
L- 53 A
L- 89 A
L-119 A
L-121 E
L-130 A
L-130 B
L-130 C
L-135 A
L-137 A
L-151 A
L-151 B
L-151 C
L-151 D
L-155 A
L-156 A
L-157 A
L-157 J
L-159 B
L-159 C
L-159 H
L-159 I
L-159 J
L-160 A
L-161 A
L-162 A
L-163 A
L-171 A
L-172 C
L-176 A
L-180 A
L-181 B
L-181 C
L-184 B
L-184 D
L-189 B
L-192 A
L-192 B
L-192 C
L-192 D
L-200 C
L-203 E
L-203 F
L-203 G
L-203 H
L-204 B
L-204 H
L-204 I
L-204 J
L-204 K
L-204 T
L-204 U
L-211 A
L-212 A
L-212 B
L-213 A
L-214 A
L-216 A
L-216 C
L-217 A
L-226 A
L-237 A
L-237 B
L-237 C
L-237 D
L-247 A
L-248 J
L-248 K
L-248 L
L-248 N
L-248 Q
L-249 A
L-249 B
L-251 A
L-251 B
L-255 B
L-255 C
L-256 A
L-260 B
L-261 A
L-262 A
L-263 A
L-264 B
L-264 C
L-265 A
L-265 B
L-265 C
L-266 A
L-267 B
L-268 A
L-269 A
L-270 A
L-271 A
L-272 A
L-273 B
L-276 A
L-276 D
L-276 E
L-278 A
L-279 A
L-280 A
L-281 A
L-282 A
L-283 B
L-284 A
L-285 A
L-286 A
L-287 A
L-288 B
L-289 A
L-290 E
L-291 A
L-292 G
L-295 C
L-295 F
L-295 H
L-295 L
L-295 T
L-295 X
L-295 AA
L-295 CC
L-295 HH
L-295 UU
L-295 ZZ
L-295 B1
L-295 F1
L-295 G1
L-295 H1
L-295 I1
L-295 O1
L-295 S1
L-295 U1
L-295 I2
L-295 J2
L-295 K2
L-295 L2
L-295 O2
L-295 P2
L-295 T2
L-296 B
L-298 B
L-298 C
L-298 E
L-299 D
L-299 E
L-299 F
L-299 G
L-299 H
L-300 D
L-300 E
L-300 F
L-300 G
L-300 H
L-302 I
L-305 A
L-305 B
L-305 C
L-306 B
L-306 C
L-306 F
L-306 G
L-306 H
L-306 I
L-306 T
L-306 V
L-306 NN
L-306 OO
L-306 PP
L-306 QQ
L-307 N
L-307 Q
L-307 R
L-307 II
L-307 LL
L-307 MM
L-307 NN
L-307 OO
L-307 PP
L-307 QQ
L-307 RR
L-307 SS
L-307 TT
L-307 UU
L-309 B
L-309 C
L-309 D
L-309 E
L-309 G
L-309 O
L-309 C1
L-309 D1
L-309 G1
L-309 S1
L-309 T1
L-309 U1
L-309 B2
L-309 D2
L-309 Q2
L-309 Y2
L-309 H3
L-309 I3
L-309 J3
L-309 K3
L-309 L3
L-310 A
L-310 C
L-310 E
L-310 G
L-310 Q
L-310 Z
L-310 F1
L-310 H1
L-310 K1
L-310 L1
L-310 M1
L-310 P1
L-310 Q1
L-310 R1
L-310 S1
L-310 T1
L-310 V1
L-310 C2
L-310 H2
L-310 D2
L-310 E2
L-310 F2
L-310 G2
L-310 I2
L-310 K2
L-310 L2
L-310 N2
L-310 P2
L-310 Q2
L-310 S2
L-310 U2
L-310 Z2
L-310 A3
L-310 C3
L-310 I3
L-310 L3
L-310 R3
L-310 U3
L-311 A
L-312 C
L-313 A
L-313 B
L-313 F
L-313 G
L-315 A
L-317 A
L-318 E
L-321 A
L-321 B
L-321 I
L-321 J
L-321 R
L-321 V
L-321 BB
L-321 DD
L-321 EE

(continued)

General Environmental (continued)

L-321 HH
L-321 KK
L-321 MM
L-322 J
L-322 L
L-322 M
L-324 A
L-324 C
L-324 D
L-325 A
L-325 D
L-325 E
L-325 F
L-325 G
L-325 J
L-325 K
L-325 M
L-325 S
L-325 T
L-325 U
L-326 A
L-327 K
L-327 N
L-327 V
L-327 Y
L-328 A
L-328 B
L-329 GG
L-329 HH
L-329 II
L-329 NN
L-330 A
L-330 F
L-330 P
L-330 Q
L-330 JJ
L-330 NN
L-330 OO
L-330 PP
L-330 QQ
L-330 B1
L-330 C1
L-330 D1
L-330 N1
L-330 W1
L-330 X1
L-330 Y1
L-330 Z1
L-330 H2
L-330 V2
L-330 W2
L-330 Y2
L-330 B3
L-330 L3
L-330 M3
L-330 N3
L-330 O3
L-330 P3
L-330 S3
L-330 V3
L-330 Z3
L-330 I4
L-330 J4
L-330 N4
L-330 M5
L-330 N5
L-330 R5
L-330 S5
L-330 U5
L-330 G6
L-330 H6
L-330 I6
L-330 K6
L-330 T8
L-330 V8
L-330 C9
L-330 E9
L-330 G9
L-330 O9
L-330 S9
L-330 T9
L-330 U9
L-330 V9
L-330 X9
L-330 Y9
L-330 A10
L-330 B10
L-330 D10
L-330 E10
L-330 F10
L-330 G10
L-330 N10
L-330 O10
L-330 Q10
L-330 R10
L-330 T10
L-330 Y10
L-330 H11
L-330 I11
L-330 N11
L-330 U11
L-330 V11
L-330 F12
L-330 B13
L-330 P13
L-330 R13
L-330 A14
L-330 O14
L-330 R14
L-330 S14
L-330 W14
L-330 F15
L-330 B16
L-330 I16
L-330 N16
L-330 O16
L-330 P16
L-330 Q16
L-330 R16
L-330 S16
L-330 T16
L-330 U16
L-330 V16
L-330 W16
L-330 X16
L-330 Y16
L-330 Z16
L-330 A17
L-330 B17
L-330 C17
L-330 D17
L-331 A
L-332 C
L-332 E
L-332 F
L-332 G
L-332 O
L-332 P
L-332 S
L-332 T
L-332 U
L-332 V
L-332 X
L-332 Y
L-332 BB
L-332 CC
L-332 GG
L-332 II
L-332 KK
L-332 MM
L-332 PP
L-333 G
L-333 H
L-333 I
L-333 J
L-333 L
L-333 M
L-333 N
L-333 O
L-333 U
L-333 V
L-333 W
L-333 Y
L-334 E
L-336 A
L-339 A
L-339 J
L-342 U
L-342 EE
L-342 GG
L-345 AA
L-345 EE
L-345 GG
L-347 A
L-348 A
L-349 A
L-349 B
L-349 D
L-349 E
L-353 A
L-353 C
L-360 E
L-361 A
L-361 E
L-362 A
L-362 F
L-362 G
L-362 H
L-362 O
L-362 P
L-362 R
L-362 S
L-362 U
L-362 Y
L-362 II
L-362 LL
L-362 QQ
L-363 A
L-364 B
L-364 C
L-364 K
L-364 L
L-364 M
L-364 N
L-364 O
L-364 P
L-364 Q
L-364 R
L-364 S
L-364 T
L-364 BB
L-364 CC
L-364 DD
L-364 EE
L-365 A
L-366 A
L-366 B
L-369 A
L-370 A
L-371 A
L-371 B
L-371 C
L-371 D
L-371 E
L-371 F
L-371 G
L-371 L
L-371 M
L-371 N
L-371 U
L-371 V
L-372 A
L-372 B
L-372 D
L-372 F
L-372 G
L-372 H
L-372 I
L-372 K
T- 1 K
T- 4 A
T- 4 K
T- 6 G
T- 6 H
T- 9 L
T- 14 A
T- 15 A
T- 15 D
T- 15 M
T- 22 C
T- 23 A
T- 26 G
T- 28 A
T- 29 B
T- 29 C
T- 30 A
T- 30 D
T- 32 B
T- 33 C
T- 33 G
T- 38 F
T- 48 C
T- 49 B
T- 54 A
T- 57 C
T- 68 F
T- 72 A
T- 76 A
T- 77 A
T- 77 B
T- 77 C
T- 77 D
T- 77 E
T- 77 F
T- 77 O
T- 77 P
T- 77 Q
T- 79 A
T- 80 A
T- 81 A
T- 81 I
T- 84 A
T- 86 D
T- 87 A
T- 87 B
T- 89 K
T- 90 A
T- 91 A
T- 96 A
T- 97 A
T- 98 A
T- 99 D
T- 99 E
T- 99 G
T- 99 H
T- 99 J
T-102 A
T-103 A
T-103 B
T-104 B
T-109 A
T-110 A
T-113 A
T-113 B
T-114 A
T-115 A
T-115 C
T-117 A
T-118 A
T-120 C
T-123 B
T-128 A
T-129 A
T-129 C
T-130 A
T-130 B
T-130 C
T-134 A
T-134 B
T-137 A
T-137 B
T-137 C
T-139 A
T-139 B
T-139 C
T-139 D
T-139 E
T-139 F
T-139 K
T-139 M
T-139 V
T-139 W
T-139 X
T-139 Y
T-140 A
T-140 B
T-140 C
T-140 D
T-140 F
T-141 B
T-145 A
T-145 B
T-146 A
T-146 B
T-146 C
T-146 D
T-146 E
T-146 F
T-149 A
T-149 B
T-149 D
T-150 A
T-150 B
T-152 A
T-152 B
T-152 C
T-152 D
T-152 E
T-152 F
T-152 G
T-152 H
T-152 I
T-152 L
T-152 M
T-152 N
T-153 A
T-153 F
T-153 H
T-154 B
T-155 B
T-155 E
T-155 F
T-156 A
T-156 B
T-156 C
T-156 D
T-157 A
T-157 H
T-158 A
T-159 A
T-160 A
T-161 B
T-162 B
T-164 A
T-165 A
T-167 A
T-167 B
T-167 C
T-168 A
T-170 A
T-172 A
T-172 B
T-172 D
T-183 I
T-185 B
T-186 B
T-187 B
T-188 B
T-189 B
T-190 B
T-191 B
T-192 B
SL- 2 A
SL- 4 A
SL- 7 A
SL- 8 A
SL- 9 A
SL- 9 B
SL- 9 C
SL- 9 D
SL-12 A
SL-15 A
SL-17 A
SL-18 A
SL-18 E
SL-18 G
SL-19 A
SL-20 A
SL-24 A
SL-26 A
SL-27 A
SL-28 A
SL-32 B
SL-47 B
SL-48 B
SL-50 A
SL-55 A
SL-58 A
SL-61 A
SL-62 A
SL-65 B
SL-65 I
SL-78 A
SL-78 B
SL-80 A
SL-81 A
SL-81 B
SL-82 D
SL-83 A
SL-83 D
SL-85 A
SL-85 B
SL-85 C
SL-90 B
SL-91 B
SL-92 B
SL-94 A
SL-94 C
SL-97 A
SL-98 A
SL-99 C
SL-99 EE
SL-99 KK
SL-99 MM
SL-99 NN
SL-100 B
SL-100 E
SL-100 K
SL-100 L
SL-100 M
SL-102 A
SL-105 B
SL-106 A
SL-107 O
SL-112 A
SL-115 B
SL-116 B
SL-117 B
SL-117 G
SL-117 H
SL-119 A
SL-120 A
SL-121 B
SL-121 D
SL-121 R
SL-122 A
SL-122 D
SL-123 D
SL-124 A
SL-124 B
SL-125 A
SL-125 D
SL-127 B
ST- 1 A
ST- 1 I
ST- 2 A
ST- 3 A
ST- 19 A
ST- 25 A
ST- 25 L
ST- 26 B
ST- 30 A
ST- 30 E
ST- 30 L
ST- 31 B
ST- 33 A
ST- 34 A
ST- 35 A
ST- 36 A

Generation Alternatives

L- 3 W
L- 78 A
L-196 A
L-196 B
L-196 C
L-196 D
L-196 E
L-196 F
L-196 G
L-295 HH
L-306 EE

(continued)

Generation Alternatives (continued)

L-309 U1
L-322 A
L-332 D
L-342 A
L-342 F
L-342 G
L-342 T
L-342 U
L-342 W
T- 70 D
T- 70 G
T- 70 H
T- 70 J
T- 77 N
T- 89 C
T- 89 E
T- 93 A
T- 93 C
T- 93 E
T- 93 F
T- 94 C
T- 97 C
T-132 B
ST- 10 B
ST- 25 H

Irreversible/ Irretrievable/ Growth Inducing/ Cumulative/Impacts

L-104 B
L-181 B
L-264 A
L-290 L
L-295 I1
L-295 W1
L-295 X1
L-295 Y1
L-295 Z1
L-306 TT
L-307 L
L-307 PP
L-307 QQ
L-309 H2
L-309 I2
L-309 J2
L-309 K2
L-309 L2
L-309 M2
L-309 N2
L-309 O2
L-309 P2
L-310 X1
L-310 SS
L-313 B
L-321 Q
L-321 S
L-321 U
L-325 E
L-329 GG
L-330 D5
L-330 L5
L-334 D
L-342 J
L-362 F
L-362 H
L-362 M
L-362 N
T- 3 C
T- 3 E
T- 9 E
T- 9 G
T- 73 A
T-109 G
T-132 D
SL-100 S
SL-100 W
SL-107 H
SL-121 T
SL-121 V
SL-121 BB
SL-126 G
ST- 5 B
ST- 6 A
ST- 7 E
ST- 8 A

Landowner Concerns

L- 45 B
L-181 A
L-235 A
L-284 A
L-296 B
L-307 O
L-309 MM
L-309 F2
L-330 Q14
T-141 A
T-181 H
SL- 23 B
SL- 23 C
SL- 38 A
SL- 39 B
SL- 45 A
SL- 57 A
SL- 65 A
SL- 66 C
SL- 72 A
SL- 80 B
SL- 96 A
SL-113 A
SL-115 A
SL-116 A
SL-117 A
SL-117 F
SL-118 A
SL-118 C
SL-121 W
ST- 29 A

Land Use

L- 15 B
L- 18 A
L- 41 B
L- 44 A
L- 55 A
L- 91 A
L- 91 B
L- 91 C
L-100 A
L-115 A
L-118 A
L-118 B
L-119 B
L-157 G
L-159 K
L-169 A
L-183 A
L-184 A
L-184 C
L-197 A
L-197 B
L-215 B
L-251 E
L-277 A
L-289 B
L-290 M
L-295 D
L-295 Y
L-295 NN
L-295 YY
L-295 D1
L-295 L1
L-295 U1
L-299 J
L-300 J
L-306 P
L-307 P
L-309 Q
L-309 R
L-309 E1
L-309 H1
L-309 L1
L-309 M1
L-309 X1
L-309 Z1
L-309 A3
L-309 B3
L-309 C3
L-310 I
L-310 O
L-310 LL
L-310 NN
L-310 OO
L-312 B
L-318 B
L-329 ZZ
L-329 J1
L-330 GG
L-330 LL
L-330 MM
L-330 RR
L-330 A1
L-330 E1
L-330 P2
L-330 C3
L-330 L4
L-330 W4
L-330 X4
L-330 T5
L-330 W5
L-330 B6
L-330 Y6
L-330 C7
L-330 D7
L-330 L7
L-330 M7
L-330 T7
L-330 U7
L-330 V7
L-330 W7
L-330 X7
L-330 U10
L-330 H15
L-330 Y15
L-334 B
L-358 A
L-358 C
L-361 B
L-362 DD
L-368 A
L-368 B
L-368 C
L-372 L
T- 4 I
T- 8 B
T- 9 H
T- 11 C
T- 12 B
T- 19 A
T- 19 B
T- 19 C
T- 20 A
T- 26 E
T- 29 A
T- 37 B
T- 45 B
T- 51 G
T- 58 A
T- 73 F
T- 78 D
T- 78 E
T- 78 F
T- 78 G
T-101 C
T-110 I
T-114 B
T-122 A
T-124 A
T-130 D
T-137 D
T-144 C
T-148 A
T-148 C
T-148 E
T-149 C
T-152 K
T-155 A
T-155 D
T-161 A
T-173 A
T-183 B
T-184 A
SL- 2 C
SL- 5 B
SL- 6 B
SL- 82 B
SL- 86 B
SL- 99 DD
SL-103 D
SL-123 F
SL-123 H
ST- 10 A
ST- 29 B
ST- 30 I

Land Use/ Agriculture

L- 14 A
L- 20 A
L- 27 D
L- 41 C
L- 79 A
L-102 A
L-149 A
L-157 H
L-159 E
L-188 B
L-188 C
L-203 E
L-204 C
L-204 D
L-204 E
L-251 D
L-287 B
L-289 C
L-289 D
L-297 A
L-297 B
L-297 H
L-297 I
L-299 D
L-300 D
L-300 L
L-305 E
L-305 F
L-305 G
L-305 I
L-309 C2
L-309 RR
L-310 HH
L-310 XX
L-310 D3
L-310 J3
L-310 L3
L-310 P3
L-310 Q3
L-310 R3
L-315 B
L-316 B
L-316 C
L-325 Q
L-329 QQ
L-329 SS
L-330 E
L-330 R
L-330 S
L-330 T
L-330 U
L-330 V
L-330 W
L-330 X
L-330 Y
L-330 Z
L-330 BB
L-330 CC
L-330 DD
L-330 SS
L-330 TT
L-330 UU
L-330 VV
L-330 WW
L-330 XX
L-330 YY
L-330 ZZ
L-330 Q1
L-330 C2
L-330 D2
L-330 L2
L-330 O2
L-330 S2
L-330 E3
L-330 K3
L-330 E4
L-330 K4
L-330 M4
L-330 O4
L-330 V4
L-330 F5
L-330 P5
L-330 X5
L-330 E6
L-330 R6
L-330 T6
L-330 U6
L-330 V6
L-330 W6
L-330 E7
L-330 F7
L-330 H7
L-330 I7
L-330 J7
L-330 K7
L-330 N7
L-330 O7
L-330 P7
L-330 Q7
L-330 R7
L-330 S7
L-330 Y7
L-330 Z7
L-330 A10
L-330 B13
L-330 B17
L-336 C
L-349 C
L-353 E
T- 1 I
T- 4 F
T- 6 A
T- 6 C
T- 6 F
T- 8 A
T- 9 A
T- 9 B
T- 9 F
T- 10 B
T- 11 J
T- 12 A
T- 14 C
T- 14 D
T- 15 D
T- 15 J
T- 16 B
T- 16 C
T- 17 A
T- 17 B
T- 17 C
T- 18 B
T- 18 C
T- 20 B
T- 23 A
T- 24 A
T- 26 A
T- 26 C
T- 26 D
T- 27 B
T- 28 C
T- 29 D
T- 30 C
T- 31 C
T- 31 D
T- 33 M
T- 35 B
T- 36 A
T- 36 B
T- 36 C
T- 36 E
T- 37 C
T- 37 D
T- 37 E
T- 38 B
T- 39 B
T- 40 C
T- 41 A
T- 41 C
T- 42 A
T- 43 B
T- 51 C
T- 52 A
T- 52 B
T- 55 B
T- 55 D
T- 55 F
T- 56 C
T- 57 A
T- 58 B
T- 58 D
T- 63 E
T- 63 F
T- 64 F
T- 66 A
T- 77 K
T- 87 A
T- 89 A
T- 98 B
T-104 A
T-109 H
T-111 B
T-115 C
T-121 A
T-129 C
T-132 G
T-139 H
T-140 E
T-146 H
T-153 E
T-157 B
T-181 B
T-185 D
T-189 D
T-190 D
T-191 D
T-192 D
SL- 84 B
SL-104 E
SL-104 G
SL-118 B
SL-118 D
SL-120 H
ST- 11 F
ST- 14 D

Land Use/ Timber

L- 3 A
L- 3 I
L- 3 J
L- 20 B
L- 33 B
L-128 B
L-159 L
L-179 C
L-184 E
L-198 A
L-209 A
L-264 D
L-264 E
L-295 N
L-295 AA
L-295 XX
L-295 R1
L-295 R2
L-307 M
L-307 Q
L-307 NN
L-307 OO
L-307 UU
L-310 M
L-316 A
L-321 B

(continued)

Land Use/ Timber (continued)

L-321 K
L-321 N
L-321 P
L-321 LL
L-321 PP
L-329 RR
L-330 AA
L-330 R2
L-330 O6
L-330 S6
L-330 X6
L-330 L9
L-330 R9
L-330 L10
L-330 V10
L-330 D11
L-330 E11
L-330 F11
L-330 K11
L-330 O11
L-330 P11
L-330 A12
L-330 P12
L-330 S12
L-330 T12
L-330 U12
L-330 X12
L-330 D13
L-330 M13
L-330 S13
L-330 T13
L-330 B14
L-330 D14
L-330 C14
L-330 Z14
L-330 K15
L-330 M15
L-330 Q15
L-330 S15
L-330 W15
L-330 C16
L-330 D16
L-330 F16
L-330 J16
L-337 C
L-337 D
L-341 A
L-341 B
L-343 A
L-343 B
L-345 C
L-362 A
L-362 I
L-362 K
L-362 V
L-362 FF
L-362 NN
L-372 J
T- 14 B
T- 15 I
T- 26 B
T- 29 E
T- 37 A
T- 38 A
T- 38 C
T- 39 D
T- 47 B
T- 52 D
T- 63 B
T- 67 D
T- 69 E
T- 72 B
T- 72 D
T- 72 E
T- 73 B
T- 81 B
T- 82 A
T- 89 G
T- 94 E
T-108 H
T-109 E
T-110 D
T-111 A
T-130 E
T-132 E
T-132 F
T-137 E
T-186 D
T-187 D
T-188 D
SL- 18 D
SL- 82 A
SL- 84 A
SL- 90 A
SL- 91 A
SL- 93 A
SL- 93 B
SL- 99 H
SL- 99 J
SL- 99 N
SL- 99 O
SL- 99 Y
SL- 99 CC
SL- 99 JJ
SL-100 D
SL-100 T
SL-100 V
SL-106 G
SL-121 A
SL-126 F
ST- 1 E
ST- 4 A
ST- 5 A
ST- 25 C

Los Banos-Gates Project

L-201 A
L-208 A
L-208 B
L-208 C
L-293 A
L-293 B
L-303 A
L-306 Y
L-308 A
L-308 B
L-327 O
L-327 P
L-327 Q
L-327 R
L-327 S
L-327 T
L-327 U
L-327 W
L-327 X
L-332 B
L-332 I
L-332 Z
L-333 Z
L-333 AA
L-333 BB
L-333 CC
L-333 DD
L-333 EE
L-333 FF
L-333 GG
L-333 HH
L-333 II
L-333 JJ
L-333 KK
L-333 LL
L-347 B
L-357 D
L-360 C
L-360 D
L-361 C
L-361 D
T-175 A
T-175 B
T-175 C
T-175 D
T-175 E
T-175 F
T-175 G
T-175 H
T-175 I
T-176 A
T-176 B
T-176 C
T-176 D
T-176 E
T-176 F
T-176 G
T-176 H
T-176 I
T-177 A
T-178 A
T-178 B
T-179 A
T-179 B
T-179 C
T-180 A

Maintenance

L-121 E
L-203 N
L-204 Q
L-290 J
L-305 D
L-309 S1
L-324 C
L-329 A1
L-329 B1
L-330 N13
T-139 P
T-139 S
T-166 A
T-182 H
T-295 V
SL-99 F
SL-125 H

Mitigation

L- 23 C
L-159 F
L-290 E
L-295 C
L-295 K2
L-295 L2
L-295 O2
L-302 I
L-306 H
L-306 T
L-306 NN
L-306 OO
L-306 PP
L-309 C1
L-309 G1
L-310 Q
L-310 Z
L-310 B1
L-310 P1
L-310 Q1
L-310 Z2
L-310 A3
L-310 C3
L-321 V
L-321 DD
L-321 EE
L-321 HH
L-321 KK
L-321 MM
L-324 D
L-327 Y
L-329 II
L-330 V
L-330 W
L-332 C
L-332 J
L-332 K
L-332 L
L-332 M
L-332 O
L-332 P
L-332 X
L-332 Y
L-332 GG
L-332 II
L-332 KK
L-333 O
L-345 AA
L-345 EE
L-349 E
L-362 G
L-362 O
L-362 P
L-362 R
L-362 S
L-362 U
L-362 Y
L-362 II
L-362 JJ
L-362 KK
L-362 LL
L-364 C
L-364 K
L-364 L
L-364 M
L-364 N
L-364 O
L-364 P
L-364 Q
L-364 S
L-364 T
L-364 CC
L-364 DD
L-364 EE
T- 81 I
SL- 99 K
SL- 99 L
SL- 99 GG
SL- 99 PP
SL-100 I
SL-100 J
SL-100 N
SL-100 O
SL-100 Q
SL-100 R
SL-100 DD
SL-100 EE
SL-101 C
SL-102 B
SL-102 G
SL-102 I
SL-103 F
SL-103 G
SL-107 I
SL-107 M
SL-120 L
SL-126 G
SL-130 A
ST- 25 K

Need

L- 24 C
L- 26 C
L- 29 C
L- 31 C
L- 32 C
L- 34 C
L- 35 C
L- 40 C
L- 43 C
L- 48 C
L- 49 C
L- 78 B
L-172 B
L-256 C
L-261 C
L-262 C
L-270 C
L-271 C
L-272 C
L-278 C
L-279 C
L-280 C
L-281 C
L-282 C
L-306 F2
L-306 N2
L-306 O2
L-311 C
L-314 A
L-321 T
L-323 B
L-329 B
L-329 BB
L-330 J12
L-330 X13
L-339 G
L-340 A
L-342 D
L-342 H
L-363 C
L-364 J
L-365 C
L-369 C
L-370 C
T- 69 B
T- 69 C
T- 69 D
T- 70 F
T- 94 B
T- 94 D
T-108 B
T-109 B
T-132 A
T-138 A
T-157 E
SL- 18 B
SL- 69 A
SL- 81 C
SL- 82 C
SL- 92 A
SL-100 Y
SL-100 Z
SL-100 AA
SL-106 I
SL-112 B
SL-123 C
SL-124 F
SL-127 C
ST- 1 C
ST- 30 D
ST- 30 E

Need for the Tracy-Tesla 230-kV Lines After the Project

T-142 B

New Technology

L- 309 V1
SL-100 BB
SL-106 H
ST- 9 C

No Action Alternative

L-295 BB
L-306 II
L-306 JJ
L-306 MM
L-325 A
L-329 X
L-329 FF
L-329 K1
SL-106 J

Noise

L-178 A
L-290 K
L-309 Y2
L-310 A1
L-310 E1
L-330 D15
SL-103 C

Northern California Benefits

L-139 A
L-157 B
L-174 B
L-229 A
L-330 K14
L-331 E
L-331 F
T- 20 D
T- 37 H
T- 52 E
T- 58 F
T-183 I

Northwest Operations

L- 27 B
L-159 A
L-193 E
L-283 A
L-310 J
L-310 W2
L-310 F3
L-310 G3
L-310 H3
L-329 J
L-330 B
L-330 X2
L-334 H
L-342 M
L-342 S
L-371 G
T- 3 D
T- 22 B
T- 22 D
T- 67 A
SL-114 A
SL-126 C
ST- 7 A

Olinda Substation

SL- 66 A

Oregon Benefits

L-195 B
L-216 B
L-219 A
L-310 Y1
L-310 Z1
L-310 B2
L-320 D
L-329 A
L-329 H
L-329 L
L-331 F
L-331 G
L-342 Q
L-371 H
T- 2 A
T- 3 A
T- 3 B
T- 30 B
T- 32 A
T- 48 B

Overall Benefits

L-236 A
L-276 A
L-276 B
L-276 C

(continued)

Overall Benefits (continued)

L-310 W1
L-320 A
L-321 E
L-321 H
L-321 R
L-329 F
L-329 G
L-329 I
L-329 K
L-329 M
L-329 CC
L-329 DD
L-329 EE
L-330 A
L-330 Z13
L-330 L15
L-335 A
L-335 F
L-335 G
L-342 E
L-342 O
L-342 P
L-342 R
L-342 V
L-342 Y
L-342 Z
L-362 E
T- 33 A
T- 70 A
T- 70 C
T- 93 D
T- 99 B
SL-127 D

Pacific Northwest Reinforcement Project

L-306 S
L-310 I1

Permits

L- 10 A
L-260 A
L-266 A
L-268 B
L-295 G
L-295 W
L-295 E1
L-307 SS
L-307 TT
L-317 C
L-330 G15
L-333 P
L-333 T
L-349 G
L-351 A
L-355 A
L-356 A
L-357 A
L-357 B
L-358 B
L-359 A
L-360 A
L-362 GG
L-362 HH
L-364 Z
T- 9 P
T- 33 N
T- 48 J
T- 81 F
T- 81 G
T- 81 H
T-120 A
T-146 J
SL-117 C
SL-121 S
SL-121 U
SL-121 AA

Public Involvement. Information Requests

L-11 B
L-41 A
L-90 C
L-106 A
L-115 C
L-150 A
L-159 G
L-159 J
L-180 B
L-181 C
L-192 A
L-192 B
L-211 B
L-212 A
L-263 A
L-264 C
L-265 A
L-265 B
L-265 C
L-269 A
L-288 A
L-290 N
L-292 H
L-295 E
L-295 F
L-295 DD
L-295 EE
L-295 G1
L-295 P2
L-296 A
L-297 K
L-305 A
L-305 B
L-309 A
L-313 A
L-325 U
L-330 D9
L-330 F9
L-332 A
L-332 Q
L-364 R
T- 9 M
T- 9 N
T- 9 O
T- 29 C
T- 68 F
T- 70 E
T- 93 H
T- 93 J
T-130 C
T-137 C
T-139 D
T-140 D
T-149 A
T-150 A
T-152 B
T-152 C
T-152 D
T-152 E
T-152 G
T-152 H
T-152 I
T-153 F
T-153 H
T-155 B
T-156 A
T-156 B
T-156 C
T-156 D
T-158 A
T-161 B
T-167 A
T-167 B
T-167 C
SL-100 A

Radio Interference

L-212 F
L-310 MM
L-330 V12
L-330 A15
L-330 C15
T-143 C

Rates

L- 87 A
L-306 DD
L-306 ZZ
L-306 U3
L-306 V3
L-306 W3
L-306 X3
L-306 Y3
L-310 A2
L-330 H16
L-342 L
L-342 X
L-342 BB
L-342 CC
L-342 DD
T- 81 K
T-125 A
T-126 A
SL-117 E
SL-117 I
SL-126 D
SL-126 E
ST- 1 B
ST- 7 D

Real Estate

L- 14 B
L- 41 E
L- 70 A
L-104 A
L-112 A
L-149 B
L-200 A
L-200 B
L-200 D
L-227 A
L-233 A
L-244 A
L-309 C2
L-320 B
L-329 QQ
L-330 J3
L-309 K3
L-330 Q3
L-330 C12
L-330 U14
T- 6 D
T- 14 G
T- 15 G
T- 37 I
T- 86 A
T- 89 I
T-101 D
T-139 L
T-139 T
T-143 B
SL- 32 A
SL- 36 A
SL- 41 B
SL- 59 A
SL- 65 E
SL- 68 A
SL- 68 B
SL-115 C
SL-116 C
SL-129 A
SL-129 B
SL-129 E
ST- 4 C
ST- 7 B
ST- 16 B

Reliability

L-295 H1
L-295 Q2
L-295 S2
L-295 U2
L-295 V2
L-307 B
L-307 C
L-307 E
L-313 E
L-314 D
L-321 C
L-322 I
L-331 H
L-331 K
L-332 HH
L-332 JJ
L-332 LL
L-335 E
L-340 B
L-342 B
L-342 C
L-362 B
L-362 AA
L-362 BB
L-364 H
L-364 I
T- 22 B
SL-88 B
SL-99 D
SL-99 M
SL-99 T
SL-99 HH
SL-99 II
SL-101 D
SL-105 C
SL-107 K
SL-107 L
SL-121 E
SL-121 F
SL-121 EE
SL-121 GG
SL-124 D
ST- 8 B
ST- 25 D
ST- 25 E

Routing and Separation Requirements

L- 3 P
L- 3 V
L-112 B
L-159 D
L-159 N
L-179 D
L-186 A
L-196 J
L-198 C
L-212 C
L-283 B
L-291 B
L-295 A
L-295 R
L-295 U
L-295 GG
L-307 DD
L-307 II
L-313 C
L-322 H
L-341 E
L-343 E
L-345 M
L-346 A
L-364 A
L-364 E
L-364 F
L-364 G
L-372 U
T- 27 A
T- 89 K
T- 93 K
T-103 B
T-108 D
T-108 I
T-108 J
T-109 B
T-109 D
T-110 B
T-110 C
T-112 B
T-112 C
T-113 A
T-113 B
T-130 G
T-132 H
T-137 G
T-152 J
SL-101 A
SL-101 B
SL-123 K
SL-125 K
SL-125 N

Routing East of Intertie

L- 3 Z
L-112 B
L-159 D
L-159 N
L-198 C
L-241
L-283 B
L-307 F
L-307 G
L-307 DD
L-307 II
L-309 U
L-309 T1
L-310 N3
L-314 C
L-314 F
L-321 D
L-339 H
L-334 A
L-341 E
L-343 E
L-346 A
L-362 RR
L-364 RR
T- 27 A
T- 38 E
T- 39 C
T- 69 F
T- 69 G
T- 69 H
T- 70 M
T- 73 E
T- 75 F
T- 80 A
T- 89 A
T- 89 K
T- 89 L
T- 89 M
T- 92 H
T- 94 A
T- 94 F
T- 94 G
T- 94 H
T- 95 B
T- 95 C
T- 99 A
T- 99 F
T-100 A
T-108 J
T-109 D
T-110 B
T-112 B
T-112 C
T-113 C
T-115 D
T-132 H
T-137 G
T-139 G
SL- 97 B
SL-105 A
SL-106 C
SL-107 C
SL-107 D
SL-111 B
SL-117 D
SL-121 I
SL-121 K
SL-121 L
SL-121 Q
SL-121 CC
ST- 5 C
ST- 7 C

Routing of Transmission Line in Southern Oregon

L-310 P
L-310 M1
L-331 J
L-372 F
T- 1 C
T- 1 E
T- 6 B
T- 11 A
SL-101 E
SL-120 J
ST-11 G
ST-21 A

Routing (General)

L- 15 K
L- 30 A
L- 30 B
L- 30 C
L- 45 C
L- 55 C
L-133 A
L-159 P
L-176 B
L-176 D
L-179 A
L-179 B
L-188 A
L-190 A
L-190 C
L-193 A
L-198 B
L-203 A
L-203 J
L-204 A
L-204 M
L-205 E
L-212 D
L-213 B
L-213 D
L-214 B
L-214 C
L-225 A
L-232 A
L-245 A
L-245 B
L-245 D
L-245 E
L-267 A
L-306 J
L-306 U
L-309 T
L-310 B
L-310 H
L-310 K
L-310 TT
L-310 UU
L-310 Y2
L-310 O3
L-315 A

(continued)

Routing
(General)
(continued)

L-310 V
L-310 W
L-310 J2
L-318 E
L-321 OO
L-329 YY
L-330 B3
L-330 K9
L-330 H12
L-330 A16
L-330 I16
L-337 A
L-337 F
L-341 E
L-343 E
L-345 CC
L-345 DD
L-345 HH
L-346 A
L-347 A
L-362 D
L-366 D
L-371 Q
T- 1 F
T- 7 A
T- 7 C
T- 11 A
T- 11 B
T- 11 C
T- 11 D
T- 11 E
T- 11 F
T- 11 G
T- 11 I
T- 11 L
T- 27 A
T- 29 A
T- 37 A
T- 38 A
T- 38 C
T- 38 D
T- 39 A
T- 47 B
T- 48 H
T- 52 D
T- 58 G
T- 62 A
T- 67 C
T- 69 A
T- 77 E
T- 77 F
T- 77 M
T- 83 A
T-108 A
T-108 B
T-108 C
T-108 D
T-108 E
T-108 F
T-108 G
T-108 I
T-108 J
T-109 D
T-109 F
T-109 H
T-110 B
T-111 B
T-112 A
T-112 B
T-112 C
T-130 A
T-130 G
T-130 H
T-130 I
T-132 G
T-132 H
T-137 A
T-137 G
T-137 H
T-137 I
T-139 N
T-142 I
T-139 O
T-139 U
T-139 X
T-147 A
T-147 B
T-148 B
T-148 D
T-155 F
T-162 C
T-181 A
T-181 H
T-182 A
T-182 F
T-184 B
T-185 A
T-185 E
T-186 A
T-186 E
T-187 A
T-187 E
T-188 A
T-188 E
T-189 A
T-189 E
T-190 A
T-190 E
T-191 A
T-191 E
T-192 A
T-192 E
SL- 18 C
SL- 39 A
SL- 65 C
SL- 65 D
SL- 66 B
SL- 82 E
SL- 99 B
SL- 99 E
SL- 99 F
SL- 99 OO
SL-104 B
SL-104 H
SL-106 D
SL-107 A
SL-108 A
SL-111 A
SL-115 D
SL-116 D
SL-120 G
SL-121 O
SL-123 B
SL-126 A
SL-127 A
ST- 7 C
ST- 11 E
ST- 12 A
ST- 13 B

Routing/
Substations
(General)

L- 13 B
L-115 B
L-130 C
L-189 A
L-193 D
L-195 A
L-295 S
L-331 L
T- 78 A
T- 82 D
T-117 B
T-192 E
SL-120 I
SL-120 J
SL-123 E
ST- 11 G
ST- 30 F

Routing/
John Cross
Alternative

L- 4 A
L- 21 B
L- 21 C
L- 27 C
L-155 B
L-156 B
L-157 K
L-160 B
L-161 B
L-162 B
L-163 B
L-184 G
L-184 I
L-195 C
L-206 A
L-214 D
L-251 F
L-264 G
L-286 B
L-297 J
L-298 A
L-298 E
L-307 K
L-310 G1
L-310 E3
L-310 K3
L-310 M3
L-322 E
L-322 F
L-330 G
L-330 H
L-330 I
L-330 J
L-330 K
L-330 L
L-330 M
L-330 KK
L-330 B1
L-330 A2
L-330 B2
L-330 J2
L-330 M2
L-330 Y2
L-330 Z2
L-330 A3
L-330 W3
L-330 X3
L-330 Y3
L-330 A4
L-330 H4
L-330 A5
L-330 I5
L-330 J5
L-330 K5
L-330 O5
L-330 V5
L-330 Z5
L-330 A6
L-330 C6
L-330 D6
L-330 J6
L-330 L6
L-330 A7
L-330 B7
L-330 G7
L-330 U8
L-330 W8
L-330 Z8
L-330 A9
L-330 H9
L-330 I9
L-330 J9
L-330 W9
L-330 C10
L-330 J10
L-330 K10
L-330 S10
L-330 Z10
L-330 A11
L-330 G11
L-330 J11
L-330 L11
L-330 M11
L-330 R11
L-330 S11
L-330 T11
L-330 U13
L-330 Y13
L-332 NN
L-340 C
L-340 D
T- 1 A
T- 4 L
T- 8 C
T- 9 C
T- 9 D
T- 9 J
T- 9 K
T- 9 Q
T- 10 A
T- 10 F
T- 11 M
T- 12 C
T- 13 B
T- 13 B
T- 14 H
T- 15 A
T- 17 D
T- 18 F
T- 19 D
T- 20 C
T- 21 H
T- 22 F
T- 25 A
T- 26 H
T- 28 B
T- 29 G
T- 31 A
T- 31 B
T- 32 C
T- 33 K
T- 34 A
T- 35 A
T- 36 D
T- 40 A
T- 41 F
T- 43 A
T- 44 A
T- 45 C
T- 45 D
T- 47 A
T- 49 A
T- 50 A
T- 51 A
T- 51 I
T- 55 A
T- 57 B
T- 58 E
T- 59 A
T- 60 F
T- 61 A
T- 64 A
T- 65 A
T- 67 B
T- 67 C
T- 68 A
T- 71 A
T-115 B
T-118 B
T-119 J
T-121 C
T-129 B
SL- 86 A
SL- 95 B
SL-104 A
SL-120 B
SL-120 C
SL-120 D
SL-120 E
SL-120 I
SL-120 K
SL-120 N
ST- 11 A
ST- 11 B
ST- 11 C
ST- 11 G
ST- 11 H
ST- 12 B
ST- 13 A
ST- 13 C
ST- 13 D
ST- 14 A
ST- 14 B
ST- 14 C
ST- 14 E
ST- 15 A
ST- 16 A
ST- 16 D
ST- 17 A
ST- 18 A
ST- 20 A
ST- 22 A
ST- 23 A
ST- 24 A
ST- 26 A

Routing
South of the
Sacramento River

L- 14 C
L- 15 J
L- 24 B
L- 26 B
L- 29 B
L- 31 B
L- 32 B
L- 34 B
L- 35 B
L- 40 B
L- 43 B
L- 48 B
L- 49 B
L- 53 A
L- 65 B
L- 78 C
L- 90 A
L- 90 B
L- 91 D
L- 96 A
L- 97 A
L-101 A
L-103 A
L-105 A
L-108 A
L-109 A
L-111 A
L-120 A
L-139 V
L-152 M
L-152 N
L-153 A
L-193 B
L-193 C
L-203 I
L-203 O
L-204 I
L-204 L
L-204 R
L-220 A
L-224 A
L-234 A
L-256 A
L-256 B
L-261 A
L-261 B
L-262 A
L-270 A
L-278 A
L-290 F
L-290 G
L-290 I
L-295 ZZ
L-299 E
L-300 E
L-305 K
L-305 L
L-309 E
L-309 I
L-309 T
L-309 OO
L-309 UU
L-309 VV
L-309 WW
L-309 XX
L-309 YY
L-309 ZZ
L-309 A1
L-309 B1
L-299 L
L-309 G2
L-309 I3
L-309 J3
L-309 L3
L-311 A
L-330 Y8
L-330 M9
L-330 N9
L-330 P9
L-330 Q9
L-330 H10
L-330 I10
L-330 M10
L-330 X10
L-330 W11
L-330 G12
L-330 I12
L-330 O13
L-330 L14
L-330 M14
L-330 I15
L-330 J15
L-330 N15
L-330 R15
L-330 U15
L-330 V15
L-334 C
L-363 A
L-365 A
L-369 A
L-370 A
L-372 R
L-372 T
T-139 U
T-142 C
T-157 G
SL- 1 A
SL- 3 A
SL- 3 B
SL- 4 B
SL- 5 A
SL- 14 A
SL- 16 A
SL- 16 B
SL- 29 A
SL- 31 A
SL- 44 A
SL- 60 A
SL-108 B
SL-123 A
SL-123 I
SL-125 L
SL-125 M
ST- 29 C
ST- 30 B
ST- 30 C
ST- 30 J

Routing Next
to Existing
Intertie

L-159 O
L-184 H
L-177 A
L-202 C
L-202 D
L-202 E
L-223 A
L-273 C
L-295 FF
L-322 C
L-333 F
L-345 HH
T- 72 C
T- 83 C
T- 83 D
T- 85 A
T-103 C
T-130 H
T-137 U
SL- 12 B
SL- 88 A
SL- 89 A
SL- 99 D
SL-100 F

(continued)

Route Next to Existing Intertie (continued)

SL-100 H
SL-107 N
SL-123 M
ST- 17 B
ST- 25 F

Schedule

L- 19 A
L-310 D
SL-101 F
SL-124 G

Siting of Towers

L- 349 F
L- 372 R
SL-104 F
SL-118 D
SL-129 D

Socioeconomics

L- 73 C
L-189 C
L-249 C
L-264 B
L-264 F
L-276 E
L-295 P
L-297 C
L-297 D
L-297 E
L-297 F
L-297 G
L-298 D
L-299 K
L-300 K
L-304 A
L-304 B
L-305 H
L-307 S
L-309 P
L-309 I1
L-309 N1
L-309 Z2
L-310 F
L-310 N
L-310 II
L-310 JJ
L-310 KK
L-310 T2
L-321 OO
L-325 N
L-325 R
L-329 R
L-329 S
L-329 T
L-329 U
L-329 PP
L-329 TT
L-329 UU
L-329 VV
L-329 G1
L-330 HH
L-330 II
L-330 F2
L-330 G2
L-330 N2
L-330 U2
L-330 D3
L-330 R4
L-330 S4
L-330 Y4
L-330 E5
L-330 G5
L-330 F8
L-330 G8
L-330 H8
L-330 I8
L-330 J8
L-330 K8
L-330 L8
L-330 M8
L-330 N8
L-330 O8
L-330 P8
L-330 Z9
L-330 W10
L-330 C11
L-330 Q11
L-330 J13
L-330 V13
L-330 W13
L-330 J14
L-330 T14
L-330 V14
L-330 T15
L-330 Z15
L-330 E16
L-339 F
L-362 OO
L-362 PP
L-371 R
L-371 S
L-371 T
L-371 W
T- 10 C
T- 10 D
T- 10 E
T- 15 K
T- 16 A
T- 18 E
T- 26 F
T- 29 B
T- 29 F
T- 37 F
T- 37 G
T- 40 B
T- 41 B
T- 41 D
T- 43 C
T- 45 A
T- 46 A
T- 47 C
T- 52 C
T- 54 C
T- 56 A
T- 58 C
T- 58 H
T- 60 B
T- 60 C
T- 63 G
T- 64 E
T- 73 D
T- 77 I
T- 77 L
T- 82 C
T- 86 C
T- 89 J
T- 95 A
T-146 F
T-146 I
T-153 C
T-153 G
T-154 A
T-157 D
T-162 A
SL- 30 A
SL- 83 C
SL- 99 AA
SL-109 C
SL-121 Z
SL-121 EE
ST- 1 G
ST- 4 B
ST- 4 D
ST- 4 F
ST- 10 C
ST- 16 E
ST- 27 A

Southern Oregon Switching Station

L-310 J
L-330 I2
L-330 T3
L-330 U3
L-330 G4
L-330 C5
L-330 S8
L-371 J
L-371 K
T- 1 B
T- 1 D
T- 1 G
T- 5 A
T- 5 C
T- 7 B
T- 11 H
SL-121 H

Study Process

L-130 B
L-159 B
L-159 C
L-159 I
L-184 B
L-184 D
L-300 M
L-306 A
L-309 D1
L-309 P1
L-309 W1
L-309 H3
L-309 Q2
L-313 G
L-330 D
L-330 B9
L-330 N14
L-339 A
T- 4 K
T- 9 L
T- 22 C
T- 83 A
T- 99 D
T-130 B
T-137 B
T-139 W
T-140 B
T-140 C
SL- 99 G
SL-102 A
SL-102 H
SL-106 F
SL-121 Y
SL-125 B
ST- 1 D
ST- 31 A

Towers

L- 3 Q
L- 53 B
L-117 B
L-176 A
L-203 M
L-204 P
L-205 B
L-205 C
L-205 F
L-205 G
L-212 E
L-213 A
L-290 D
L-295 B1
L-295 E2
L-295 F2
L-302 A
L-305 J
L-309 H
L-309 PP
L-309 QQ
L-309 R2
L-314 E
L-321 NN
L-324 A
L-324 B
L-330 R3
L-330 L12
L-330 M12
L-330 E13
L-330 K13
L-330 E14
L-330 B16
L-348 B
L-349 C
L-372 N
T- 35 C
T- 81 D
T-142 E
T-142 H
T-150 D
T-181 F
SL-125 I

Unclassified Comments

L-150 B
L-292 A
L-292 B
L-292 F
L-295 T
L-295 OO
L-295 O1
L-295 T2
L-295 I2
L-295 J2
L-307 A
L-307 T
L-307 U
L-307 V
L-307 W
L-307 X
L-307 Y
L-307 Z
L-307 AA
L-307 BB
L-307 EE
L-307 FF
L-307 GG
L-307 HH
L-309 W
L-309 X
L-309 Y
L-309 Z
L-309 AA
L-309 BB
L-309 CC
L-309 DD
L-309 EE
L-309 FF
L-309 GG
L-309 HH
L-309 II
L-309 JJ
L-309 KK
L-309 LL
L-309 NN
L-330 K6
L-334 E
L-334 F
L-334 G
L-342 N
L-345 GG
L-371 A
L-371 B
L-371 C
L-371 F
L-371 L
L-371 M
L-371 N
L-371 Q
L-371 U
L-372 K
T- 6 I
T- 26 G
T- 88 A
T-105 A
T-106 A
T-107 A
T-113 D
T-116 B
T-119 B
T-119 G
T-121 D
T-131 A
T-135 B
T-142 A
T-142 D
T-163 A
T-169 A
T-171 A
T-184 C
SL- 58 B
SL-103 I
SL-122 B
SL-123 E
ST- 30 A
ST- 30 F

Undergrounding of Transmission Lines

L-222 A
L-255 A
L-307 D
L-307 H
L-307 I
L-307 J
L-330 P14
L-331 I
T-109 A
SL- 39 C
SL- 45 B
SL-121 J
SL-121 N
SL-121 P
SL-121 DD
SL-121 FF
SL-121 HH

Upgrading of the Existing Intertie

L-299 I
L-300 I
L-306 V2
L-314 B
L-300 I
L-321 F
L-321 G
L-321 I
L-322 D
L-362 C
L-362 D
L-371 O
L-372 O
T- 70 B
T- 70 I
T- 89 D
T- 93 G
T- 99 C
T-108 C
T-109 C
T-158 B
SL-100 G
SL-124 E
ST- 4 G

Upgrading of Existing Western 230 kV Lines

L-305 M
L-372 P
L-372 S
T-133 A
T-142 F
T-157 C

Vegetation

L-295 K
L-295 VV
L-295 N1
L-302 B
L-302 D
L-302 F
L-306 D
L-306 E
L-306 N
L-306 M
L-309 Y1
L-309 A2
L-309 X2
L-310 VV
L-339 D
L-345 E
L-364 D
L-364 Y
L-364 AA
T-110 F
T-144 A
SL- 99 T
SL- 99 V
SL- 99 W
SL- 99 X
SL-107 F
ST- 25 B

Visual Resources

L- 3 B
L- 3 C
L- 3 D
L- 3 E
L- 3 F
L- 3 G
L- 3 H
L- 3 X
L- 13 A
L- 15 C
L- 15 E
L- 41 D
L- 52 A
L-111 B
L-121 G
L-139 B
L-175 D
L-202 A
L-202 B
L-203 L
L-204 O
L-222 B
L-231 A
L-273 A
L-295 O
L-295 PP
L-295 A1
L-295 C1
L-295 S1
L-295 V1
L-295 C2
L-295 N2
L-309 S
L-309 F1
L-309 J1
L-309 K1
L-309 F3
L-309 G3
L-313 D
L-317 B
L-318 D
L-322 K
L-323 A
L-325 O

(continued)

Visual Resources (continued)

L-327 A
L-327 B
L-327 C
L-327 D
L-330 F1
L-330 E2
L-330 T2
L-330 P4
L-330 Q4
L-330 H5
L-330 Q5
L-330 Z6
L-330 A8
L-330 B8
L-330 C8
L-330 D8
L-330 E8
L-330 R12
L-330 Q13
L-330 H14
L-332 W
L-332 HH
L-332 OO
L-345 B
L-345 BB
L-355 B
L-357 C
L-372 C
T- 1 H
T- 1 J
T- 4 B
T- 9 I
T- 11 F
T- 11 K
T- 14 E
T- 15 L
T- 28 D
T- 41 E
T- 51 B
T- 54 B
T- 75 B
T- 75 D
T- 77 J
T- 78 C
T- 92 A
T- 92 B
T- 92 E
T- 92 F
T-110 H
T-120 D
T-136 A
T-139 R
T-153 B
T-183 A
T-183 H
T-185 B
T-186 B
T-187 B
T-188 B
T-189 B
T-190 B
T-191 B
SL- 41 A
SL- 90 A
SL- 91 A
SL- 93 A
SL- 93 B
SL- 99 R
SL- 99 BB
SL-106 G
SL-107 E
SL-107 J
SL-123 G
ST- 30 G
ST- 30 H

Water Resources/ Fisheries

L-290 A
L-290 B
L-290 C
L-290 H
L-295 II
L-295 LL
L-295 TT
L-295 M1
L-295 H2
L-306 L
L-309 K
L-309 L
L-309 M
L-309 V
L-309 R1
L-309 T2
L-309 U2
L-309 W2
L-310 CC
L-310 DD
L-320 F
L-321 B
L-321 AA
L-321 BB
L-329 N
L-329 O
L-329 KK
L-329 OO
L-330 N6
L-330 N12
L-345 N
L-345 Q
L-345 U
L-345 Z
L-364 B
L-364 U
L-364 V
L-364 W
L-364 X
L-372 Q
T-136 B
SL- 99 P
SL-130 A

Wildlife

L- 3 L
L- 3 M
L- 3 N
L- 3 O
L- 15 I
L- 23 B
L- 55 B
L-117 C
L-157 I
L-175 C
L-203 F
L-203 K
L-204 N
L-205 A
L-215 A
L-223 B
L-244 B
L-248 C
L-248 D
L-248 E
L-276 D
L-295 M
L-295 JJ
L-295 KK
L-295 MM
L-295 OO
L-295 QQ
L-295 RR
L-295 WW
L-295 P1
L-295 Q1
L-302 C
L-302 E
L-302 H
L-306 O
L-309 N
L-309 Q1
L-309 V2
L-310 T
L-310 Y
L-310 EE
L-310 FF
L-310 GG
L-310 RR
L-310 WW
L-310 O1
L-314 G
L-315 C
L-318 A
L-318 C
L-321 O
L-321 FF
L-321 GG
L-321 II
L-321 JJ
L-325 H
L-325 I
L-325 L
L-325 N
L-325 P
L-329 MM
L-329 D1
L-329 H1
L-330 R1
L-330 S1
L-330 T1
L-330 K2
L-330 Q2
L-330 B4
L-330 C4
L-330 U4
L-330 F6
L-330 P6
L-330 Q6
L-330 X11
L-330 Y11
L-330 Q12
L-330 A14
L-330 F14
L-330 G14
L-330 Y14
L-330 K16
L-332 F
L-332 H
L-332 N
L-333 A
L-333 B
L-333 C
L-333 D
L-333 E
L-333 H
L-333 K
L-333 X
L-333 Y
L-336 B
L-345 D
L-345 F
L-345 G
L-345 H
L-345 I
L-345 J
L-345 K
L-345 L
L-345 O
L-345 P
L-345 R
L-345 S
L-345 T
L-345 V
L-345 W
L-345 X
L-345 Y
L-345 DD
L-345 FF
L-345 II
L-345 JJ
L-353 B
L-353 D
L-362 L
L-362 T
T- 4 C
T- 4 D
T- 15 M
T- 22 A
T- 33 H
T- 33 L
T- 48 D
T- 48 G
T- 48 H
T- 48 I
T- 55 H
T- 56 B
T- 63 C
T- 63 D
T- 64 C
T- 68 B
T- 68 C
T- 68 D
T- 68 E
T- 77 G
T- 77 H
T- 78 B
T- 82 B
T- 86 B
T-108 F
T-110 G
T-119 F
T-120 C
T-139 J
T-139 Q
T-142 G
T-144 B
T-153 D
T-155 C
T-181 C
T-183 E
T-185 C
T-186 C
T-187 C
T-188 C
T-189 C
T-190 C
T-191 C
T-192 C
SL- 18 F
SL- 65 F
SL- 83 B
SL- 90 A
SL- 91 A
SL- 93 A
SL- 93 B
SL- 99 Q
SL- 99 FF
SL- 99 LL
SL-100 P
SL-102 C
SL-102 D
SL-102 E
SL-102 F
SL-103 A
SL-103 B
SL-103 E
SL-106 G
SL-107 G
SL-109 B
SL-125 F
SL-125 G
SL-131 A
ST- 1 F
ST- 9 A
ST- 16 C
ST- 25 J