COUNCIL COMMUNICATION

TO: THE CITY COUNCIL COUNCIL MEETING DATE: DECEMBER 21, 1988

FROM: THE CITY MANAGER'S OFFICE

SUBJECT: APPROVE AGREEMENT WITH POWER ENGINEERS, INC. FOR GRAFT ENVIRONMENTAL IMPACT REPORT AND PRELIMINARY SUPPORT SERVICES FOR THE PROPOSED INDUSTRIAL SUBSTATION CONSTRUCTION, AND AUTHORIZE THE CITY MANAGER AND CITY CLERK TO EXECUTE THE AGREEMENT.

RECOMMENDED ACTION: Approve agreement with Power Engineers, Inc for Draft Environmental impact Report and preliminary support services for the proposed Industrial Substation construction, and authorized the City Manager and City Clerk to execute the agreement.

SACKGROUND INFORMATION: Negotiations' between City staff and PG&E have produced mutual letters of Intent which initiate the environmental impact review stage of the proposed substatiort project.

This new substation will be the power supply interconnection point between the City's electrical system and the 60-kv PG&E transmission system. PG&E has agreed to upgrade its system to provide reliable and adequate power transfer to the City.

Additionally, this new substation will alleviate a serious maintenance and operation problem with which the City has had to cope for many years.

ower Engineers Incorporated has prepared a project plan and supplied preliminary ngineering design support for our negotiations.

The commitment of the parties and the project plan are at a point where the City needs to deveiop a Graft Environmental Impact Report (DEIR) which will require a preliminary general arrangement plan and substation design criteria.

Following is a budget for professional services to accomplish the above DEIR and associated support services.

tabor (1300 hours)	$71,973
Expenses	17,500
Total Estimated Labor and Expenses through February 198	$89,473

Henry J. Rice
Electric Utility Director

CCPOWER/TXTU.01D

CITY OF LODI

CITY HALL, 221 WEST PINE STREET
CALL BOX 3006
LODI, CALIFORNIA 95241-1910
(209) 334-5634
TELECOPIER: (209) 333-6795

January 10, 1989

Mr. Randy Pollock, P.E.
Project Manager
Power Engineers, Inc.
1020 Airport Way
P. O. Box 1066
Hailey, Idaho 83333

Dear Mr. Pollack:

Enclosed herewith please find an executed copy of an agreement between the City of Lodi and Power Engineers, Inc. for the draft environmental impact report and preliminary support services for the proposed Industrial Substatio.. construction. This agreement was approved by the Lodi City Council at its regular meeting of December 21, 1988.

Should you have any questions regarding this matter, please do not hesitate to call this office.

Very truly yours,

Alice M. Reimche
Alice M. Reimche
City Clerk

AMR:jj

POWER
Engineers Incorporated

RECEIVED
DEC 15 10:18
ALICE M. REIMCHE
CITY CLERK
CITY OF LODI

December 12, 1988

City of Lodi
221 West Pine Street
Lodi, CA 95241-1910

Attention: Henry Rice - Electric Utility Director

Subject: industrial Substation - Interim Budget

Dear Henry:

ou requested, reviewed the Project Plan to determine which tasks POWER would be working on through February, 1989. The activities POWER would pursue through February include the following:

Preparation of the Project Plan; preliminary engineering design support services; begin development of the Draft Environmental Impact Report in concert with the City of Lodi; preparation of the preliminary substation plan and design criteria; Technical support in negotiations with PG&E.

The portion of POWER's budget required to pursue these tasks through February 1989 is estimated to be:

LABOR (Hours)	LABOR ($)	EXPENSES ($)	LABOR + EXPENSES ($)
1301	71,973	17,500	89,473

POWER will pursue these tasks as outlined in the Project Plan dated November 16, 1988, and will not exceed $89,473 without the City of Lodi's approval.

Please advise if you have any questions.

Sincerely,

POWER Engineers, Incorporated

Randy Pollock by JH

Randy Pollock, P.E.
Project Manager

RP/nq
cc: John Henning (POWER)
Frank Rowland (POWER)
File 1345.20.0.1

1020 Airport Way • P.O. Box 1066 • Hailey, Idaho 83333 • (208) 788-3456

POWER ENGINEERS, INCORPORATED

AGREEMENT FOR PROFESSIONAL SERVICES

CLIENT and POWER Engineers, Incorporated, an Idaho corporation, agree to the following professional assignment:

CLIENT: City of Lodi
ADDRESS: 221 West Pine St.
Lodi, CA 95241-1910

PROJECT NUMBER: 1345
PROJECT NAME:
Industrial Substation

PROJECT LOCATION: Lodi, CA
CLIENT REFERENCE NUMBER:

DESCRIPTION, SCOPE OF SERVICES, SCHEDULE, AND FEE:

As outlined in POWER's letter of December 12, 1988 to the City of Lodi through February 1989, and subsequently in accordance with the November 16, 1988 Project Plan all work to be performed by POWER will be as directed and approved by the City of Lodi.

TERMS AND CONDITIONS:

1. POWER Engineers, Incorporated (POWER) intends to perform the above services in accordance with generally accepted professional practices, but makes no warranty, either express or implied.

2. Specifically excluded from our services and this Agreement are all design and construction review service: relating to the construction contractor's safety precautions, methods, or procedures required for the contractor to perform his work, but not relating to the final or completed Project.

3. POWER agrees, subject to the limitations of Paragraph 5 below, to hold harmless and indemnify CLIENT from and against liability arising out of POWER's negligent performance of the Work. It is specifically understood and agreed that in no case shall POWER be required to pay an amount disproportional to its culpability, or any share of any amount levied to recognize more than actual economic damages. POWER shall hold harmless and indemnify CLIENT from and against liability on account of infringement of any patent, copyrighted or uncopyrighted work, secret process, trade secret, unpatented invention, article or otherwise arising from POWER's performance under this Agreement. Should POWER develop any trade secret, prepare any copyrighted material, make any improvement, originate any invention develop any process, or otherwise in the performance of the Work, such trade secret, copyright, improvement, invention, or process shall be the property of POWER. But POWER shall grant to CLIENT the right and/or license, free of any cost, to permanently use for the benefit of CLIENT any such trade secret, copyright, improvement, design, invention, or process for so long as CLIENT desires to use same.

4. CLIENT agrees to forever hold harmless and indemnify POWER, its officers, agents, and employees from and against all liability for any and all claims, lawsuits, or other actions involving this project which are based upon the release or saturation by gases, liquids, or any other materials, irritants, contaminants, or pollutants in or into the atmosphere, or on, onto, upon, in, or into the surface or subsurface, whether sudden or not. CLIENT also agrees to forever hold harmless and indemnify POWER, its officers, agents, and employees from and against all liability for any and all claims, lawsuits, or other actions involving this project arising from or related to (a) Asbestos or any material containing asbestos or any disease directly or indirectly related to asbestos; (b) Any act, error, or omission, professional or otherwise, involving the existence, use, detection, removal, elimination of, or exposure to asbestos or any material containing asbestos. All drawings, plans, specifications, and all other documents prepared by POWER for the Project are instruments of service for this project only and shall remain the property of POWER whether the Project is completed or not. Reuse of any of the instruments of service of POWER by CLIENT on extensions of this project or any other project without the written permission of POWER shall be at CLIENT'S risk and CLIENT agrees to defend, indemnify, and hold harmless POWER from all claims, damages, and expenses, including attorneys' fees, arising out of such unauthorized reuse of POWER's instruments of service by CLIENT or by others acting through CLIENT.

5. CLIENT agrees to limit POWER'S liability to CLIENT and all construction contractors and subcontractors on the Project, due to professional negligent acts, errors, or omissions of POWER such that the total aggregate liability of POWER to all those named shall not exceed POWER's total fee for Services rendered on the Project or $50,000, whichever is greater.

6. CLIENT shall not be liable to POWER and POWER shall not be liable to CLIENT for any consequential damages incurred by either due to the fault of the other, regardless of the nature of this fault, or whether it was committed by CLIENT or POWER, their employees, agents, or subcontractors. Consequential damages include, but are not limited to, loss of use and loss of profit.

7. Should litigation or other action occur between the two parties to this Agreement, except for any litigation which might arise under the topics of Paragraph 4, all related expenses, collection expenses, witness fees, court costs, and attorney's fees shall be borne by the respective parties proportional to their Proven or mutually agreed upon culpability. This Agreement and all the rights, obligations, liabilities, and responsibilities of the parties hereto shall be governed by, construed, and enforced in accordance with the laws of the State of Idaho. In the event any provision of this Agreement is found to be null and void, or otherwise ineffective, the remaining provisions or portions thereof shall remain in full force and effect.

8. POWER agrees to keep confidential and not to disclose to any person or entity, other than POWER's employees and subcontractors, without the prior consent of CLIENT, all data and information not previously known to and generated by POWER, or furnished to POWER and marked CONFIDENTIAL by CLIENT in the course of the performance hereunder, provided, however that this provision shall not apply to data which are in the public domain, or were previously known to POWER, or which were acquired by POWER independently from third parties nor under any obligation to CLIENT to keep said data and information confidential. These provisions shall not apply to information in whatever form that comes into the public domain through no fault of POWER, nor shall they be interpreted to in any way restrict POWER from complying with an order to provide information or data when such order is issued by a court, administrative agency, or other authority with proper jurisdiction. CLIENT agrees that POWER may use and publish CLIENT's name and a general description of POWER's services with respect to the Project in describing POWER's experience and qualifications to other clients and prospective clients.

9. Either party shall have the right to terminate this Agreement at any time after giving ten (10) days written notice to the other party. CLIENT shall pay POWER for all services rendered and expenses and obligations incurred to date of termination; such sum shall not include anticipated profits on work not yet performed. POWER shall submit to CLIENT project deliverables completed to that point. Should CLIENT terminate this Agreement for convenience, CLIENT shall pay POWER for reasonable expenses associated with demobilization/post-termination activities. Neither party shall assess penalty against the other. POWER shall not bear any liability to CLIENT for any work product incomplete at time of termination.

10. This Agreement represents the entire and integrated agreement between CLIENT and POWER and supersedes all prior negotiations, representations, or agreements, either written or oral. This Agreement may be amended only by written instrument signed by both CLIENT and POWER. CLIENT may from time to time change the Scope of Services by submitting to POWER written instructions directing POWER to perform additional work and/or to omit work previously ordered. Any oral instructions regarding change of work are ineffective unless and until confirmed by a written Change Order. Change Order Work shall commence subsequent to agreement between CLIENT and POWER on all matters pertaining to the changes and signing of the Change Order by both parties. The provisions of this Agreement shall apply to all Change Order Work.

11. Fees for all work, including Change Order Work, shall be computed in accordance with POWER's Schedule of Charges in effect at the time services are performed, unless otherwise agreed in writing. Invoices will be submitted monthly and/or upon completion of the Work and will be due and payable when issued. All accounts not paid within thirty (30) days from the invoice date will bear a FINANCE CHARGE OF 1.5% PER MONTH for each month the invoice is unpaid.

POWER ENGINEERS, INCORPORATED
By: Randy Pollock by J. W. Fightling
Title: Vice-President Secretary/Treasurer
Date: 12/14/88

CLIENT - City of Lodi
By: Thos. A. Peterson
Thomas A. Peterson
Title: City Manager
Date: December 21, 1988

Attest: Alice M. Reimche
Alice M. Reimche
City Clerk

88-89 #77

CITY OF LODI
SPECIAL ALLOCATION REQUEST

TO: FINANCE DIRECTOR
CITY MANAGER

DATE: December 21, 1988

FROM: ALICE M. REIMCHE, CITY CLERK

PROJECT NUMBER 016.1-650.37 - 323
Industrial Substation-PG&E Interccnnection

Description of Project — Estimated Cost

To cover agreement with Power Engineers, Inc. for Draft Environmental Impact Report and Preliminary Support Services for the proposed Industrial Substation Construction

Labor (1300 Hours)	$71,973
Expenses	17,500
	$89,473

Date of Approval - December 21, 1988 Amount Approved $89,473

Council XXX City Manager _____

FUND OR ACCOUNT TO BE CHARGED

Current Budget $_____ Prior Year Reserve $_____

Contingent Fund $_____ General Fund Operating Reserve $_____

Capital Outlay Reserve $_____ Sewer Operating Reserve $_____

12 Equipment Fund $_____

From Utility Outlay Reserve to 016.1-650.37

Robert H. Holm, Finance Director

Alice M. Reimche, City Clerk

Submit this form in triplicate to the Finance Director. Distribution after approval will be as follows: 1) City Manager 2) Originating Department 3) Finance Department

12/12/88
F4
CCC

MEMORANDUM

To: **Alice Reimche**, City Clerk

From: Bob McNatt, City Attorney

Date: December 8, 1988

Re: **Conflict** of Interest Code

I have reviewed the proposed draft of our resolution updating the conflict of interest reporting provisions, and believe it adequately addresses the topic. As to your second question regarding possible inclusion of a statement advising of penalties for a late filing, we may wish to insert in the council communication (but not necessarily the resolution) a sentence to the effect that "Failure to file the required statement in a timely fashion may result in the imposition of monetary sanctions under Government Code §91013(a)."

If I can be of further assistance, please let me know.

Bob

Bob McNatt
City Attorney

BM:vc

COICODE/TXTA.01V

Power
Engineers Incorporated

Project No.: 1163-04
Copy No.:
issued To:

DRAFT
ENVIRONMENTAL IMPACT REPORT
FOR
THE CITY OF LODI

DIRECT INTERCONNECTION PROJECT

APRIL 1988

FOR INFORMATION REGARDING THIS DOCUMENT, CONTACT:

- FRANK ROWLAND
- MARY ANN MIX

AIRPORT WAY
P.O. BOX 1066
HAILEY, IDAHO 83333
(208) 788-3456

Project No.: 1163-04
Copy No.:
Issued To:

DRAFT
ENVIRONMENTAL IMPACT REPORT

FOR

THE CITY OF LODI

DIRECT INTERCONNECTION PROJECT

APRIL 1988

FOR **INFORMATION** REGARDING
THIS DOCUMENT, CONTACT:

- FRANK ROWLAND
- **MARY** ANN MIX

TABLE OF CONTENTS

References

Appendices

- Initial Study
- Project Economic Analysis
- Line Cost Estimates
- Route & Site Evaluation Criteria Definitions
- Route & Site Evaluation Worksheets
- Carpenter Letter
- Agencies Consulted
- Routing Map

CITY OF LODI
DIRECT INTERCONNECTION PROJECT
ENVIRONMENTAL IMPACT REPORT

1.0 SUMMARY

1.1 introduction

The City of Lodi, through its membership in the Northern California Power Agency (NCPA), is proposing to construct an electrical transmission line direct interconnection with Western Area Power Administration's (WESTERN) existing transmission system. The proposal, if approved and implemented, would consist of a double circuit 230kV, single steel pole line, a 230kV switching station to connect to WESTERN transmission lines, and a 230kV-60kV substation. The Project will be financed entirely by the City of Lodi. This document was prepared pursuant to the California Environmental Quality Act (CEQA);(40 CFR Part 1500, Sec. 102(2), and CA PRC Sec. 21000). See Appendix A for Initial Study conducted pursuant to CEQA.

1.2 Purpose and Need

Construction of the Direct interconnection Project with WESTERN would allow the City to meet its long range electric service cost, capacity and reliability goals by:

1. Minimizing the long-term cost of service to the City's electric customers through rate stabilization, by reducing transmission service charges.

2. Enabling the City to purchase power on a direct basis from low cost sources.

3. Providing additional firm, reliable transmission capacity to serve new consumers, particularly for anticipated industrial growth.

1.3 Alternatives

Since the selection and discussion of alternatives considers informed decision-making and informed public participation, this EIR did not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.

The assessment of the proposed action considers five alternative actions:

A. No Action

B. PG & E Upgrade

C. Alternative Technologies

D. Energy Conservation

E. Direct Interconnection with WESTERN

1.3.1 No Action

By maintaining the status quo, the City would continue with its connection to the PG&E system with no action to increase power transmission capacity, improve voltage regulation and reliability, or reduce the cost of electric service.

PG&E has indicated the 60kV transmission planning capacity between their Lockeford and Lodi substations is 77 MW. The city's peak load exceeded 77 MW in 1987. Load growth projections for PG&E and City loads, which are served from Lockeford Substation, indicate that the 230/60kV transformer capacity at Lockeford Substation may be exceeded in the early 1990's.

No action would result in City power transmission capacity limitations in the near future, preclude the City *from* providing any benefits to the City's rate payers, and inhibit the City's abitity to meet its long term electric power supply and reliability goals. It is not considered a viable alternative action for meeting the stated need.

1.3.2 PG & E Upgrade

This alternative would have the City remaining connected to the PG&E system with PG&E assuming responsibility for upgrading the 60kV transmission capacity between their Lockeford and Lodi substations, and for increasing the Lockeford Substation 230-60kV transformer capacity, as required to serve the City's load.

While this alternative would be responsive to the City's future capacity goals, it does not:

- allow long term rate stability that would be possible through elimination of transmission charges associated with the City's WESTERN power allocation and reduction of wheeling charges on the City's power requirements.

- eiiminate the potential for a city wide blackout due to single contingency conditions, such as loss of the Lockeford 230-60kV Substation transformer, an outage on the 60kV line with the greatest capacity between PG&E's Lockeford and todi substations, or loss of the 60kV tie between PG&E's Lodi Substation and the City's Killelea Substation.

The PG&E Upgrade Alternative is not considered to be in the City's best interest.

1.3.3 Alternative Technologies

Available technologies for meeting increased demand would include the installation of City-owned thermal generation within, or immediately adjacent to the city. The high capita! investment and potentially adverse environmental effects, as well as the inherent increase in cost to rate payers, combine to preclude this option from consideration.

An additional alternate technology to be considered is that of underground construction. Although there has been underground construction of transmission systems in the United States since the late 1920s for iower voltage distribution lines and some high voltage (HV) systems, most HV systems (greater than or equal to 69kV) have been constructed in areas where overhead lines were not an option such

as short sections in central-city locations. It is important to note that technological requirements for underground HV transmission lines are markedly dissimilar from those for lower voltage distribution lines. Undergrounding of HV transmission lines is vastly more comptex and costly, primarily because of problems associated with dissipating cable heat. Design parameters and other restrictions combine to limit the use and application of underground transmission systems to short distances, typically less than two miles. Undergrounding of 230kV is limited to short sections in special circumstances.

Of the underground 230kV transmission systems in service, or concepts under development, only three cable systems are feasible. These are: the high-pressure, oil-filled, pipe-type (HPOF) systems; the self-contained, low-pressure, oil-filled (SCOF) systems; and the gas insulated type systems.

The preference *in* the United States is for HPOF or gas insulated systems, based on their relative durability, installation costs and reduced obstruction of vehicular and pedestriantraffic, as well as avoidance of congestion during installation.

The basic cost of undergrounding a 230kV line using HPOF would be at least four to ten times the cost of building an overhead line. While underground lines are relatively unaffected by weather conditions, they remain vulnerable to leaks, dig-ins, washouts, seismic events and cooling-system failures. These complications can result in service outages lasting days or weeks, rather than the hours usually required to locate and correct overhead failures. Outages of long duration would be unacceptable for the City.

During construction, the environmental impacts of an underground system would be similar to those resulting from pipeline construction, which requires a continuous iine of trenching and backfilling between terminal points. Somewhat greater short term adverse environmental impacts could be expected from underground construction than from construction of an overhead line. Moreover, access to an underground system following construction would be required throughout its length for repairs and regular maintenance, in contrast to the overhead system which requires, for the most part, structure access only.

The principal environmental benefit of undergrounding a transmission system is the reduction of adverse visual and aesthetic impacts (although ancillary facilities on, or adjacent to, the right of way would be visible). However, on balance, the environmental benefits of undergrounding do not appear to outweigh the adverse impacts.

Considering the technical complications, economic and environmental costs, and accessibility requirements, an underground transmission system--either in part or in total--is not a viable alternative for the proposed action.

1.3.4 Energy Conservation

The City Electric Utility Department has instituted a variety of energy conservation programs. Load Management studies are being conducted that provide customers with computer models of their energy use pattern. These data are used to aid the customer in determining options for more efficient energy use and a subsequent decrease in their demand charges. The reduction in customer demand due to load management ultimately reduces the City's demand and cost of power purchases. Through load control, the City has a goal to achieve a 2 megawatt reduction in energy usage in 1987, the first operational year of the program, and a 6 megawatt reduction by 1992.

Conservation and load management recommendations are provided to customers through an energy audit program.

The Electric Utility Department has conducted energy audits of city facilities and has initiated the installation of high efficiency lighting in public facilities and in the City's street lights.

In order to detect and correct inefficient equipment, the Electric Department has conducted infra-red scanning of their lines and substations.

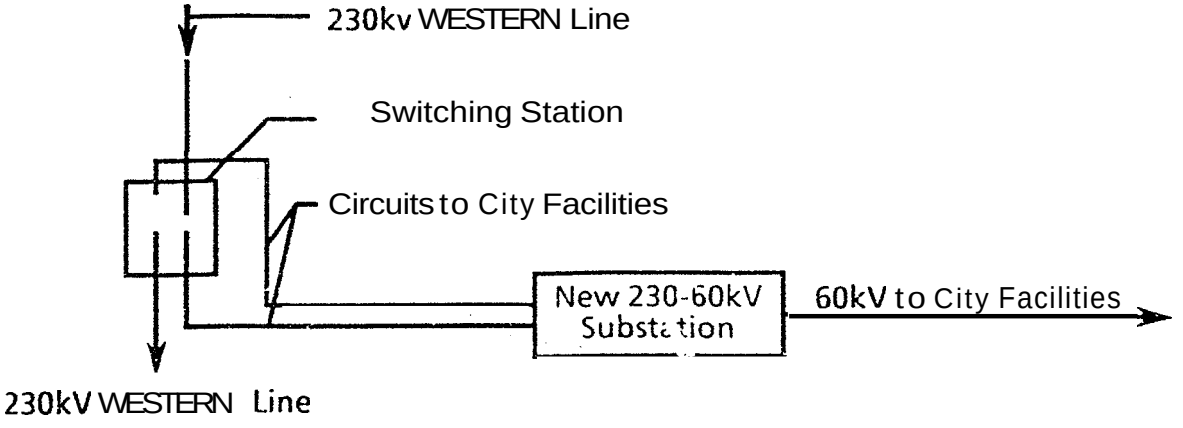
The "Pull the Plug" public awareness load management program is in effect during the air conditioning season to bring down the 1-7 p.m. peak load during the hottest days of the month.

These conservation measures reflect responsible Electric Department management. However, the City's purpose as stated is not to reduce energy consumption through the proposed action, but to provide for a growing population. Because energy conservation can affect energy demand but not provide the means of transferring electric power, conservation cannot be considered as an alternative action for meeting the project purposes.

1.3.5 Direct Interconnection to WESTERN

After consideration of the inability to achieve ?he project purpose and need through the aforementioned alternatives, the City would best be served by analyzing the opportunities represented by constructing and operating a doubie circuit 230kV overhead transmission line. The line would originate at a point of interconnection with a WESTERN line iocated approximately five miles west of Lodi. Alternative points of interconnection exist adjacent to Thornton Road between Kettleman Lane and Turner Road. From the point of interconnection the line would extend south-easterty approximately six miles to a new substation.

The double circuit transmission line would provide two power sources to the City of Lodi.



1.3.5.1 Switching Station Alternatives

Two alternative points of WESTERN interconnection were identified as follows:

IC-1 is located just east of Thornton Road on the south side of Turner Road. IC-2 is approximately three-quarters of a mile south of Turner Road, east of Thornton Road. IC-2 is the preferred location due to the favorable location of the existing 230kV line structures and shorter 230kV fines to Lodi.

1.3.5.2 Substation Alternatives

New substation facilities would be required to provide step-down transformation of the 230kV to 60kV. The City currently accepts power delivery at 60kV; therefore, modifications to existing substation facilities would be minor, or not be required.

Three alternative substation sites were considered: SS-1, a site approximately 700 feet south of the southwest corner of Kettleman Lane *arid* Lower Sacramento Road, SS-2 on the southeast corner of this intersection; and 55-3, a site adjacent to the west side of the Henning Substation. All three sites are presently outside the Lodi City Limits and are zoned EA-40 (an older zoning designation) or GA-40. The proposed substation represents a permitted use within this zoning designation as described in the Planning Code of San Joaquin County:

"SECTION 9-3236. PUBLIC UTILITIES. All public utilities shall be subject to the following regulations:

(b) Other public utilities facilities, transmission lines and substations shall be permitted in all zones subject to a Development Plan. New parcels, with areas less than the minimum zoning requirement, may be created to accommodate such facilities. Parcels created under this provision of this Section may not be used for uses other than the public utility."

SS-1 or SS-2 would allow a shorter transmission line, requiring not only less right of way but also seven-tenths of a mile less of structures, conductor, and appurtenant hardware. Currently, the Henning Substation, which is adjacent to 55-3, is served by a **60kV** circuit that originates at the Killelea Substation. That circuit runs along the east side of Lower Sacramento Road, turning east on the south side of Kettleman Lane and extends to the Henning Substation at Ham Lane. Present SS-1 land use is in a row crop of sugar beets; SS-2 land use is a gas station, which operates as a "grandfathered" non-conditional use. At the Kettleman Lane/Lower Sacramento Road intersection, the commercial zoning *is* a Limited Combining Zone (C-2/L) on the northeast corner, which allows for the continuation of the existing non-conforming use of the land by a convenience store. All other land at this intersection is zoned EA-40 or GA-40, and is currently in pasture, row crops, and vineyard.

The SS-3 substation site alternative is on the west side of the Henning Substation across the Woodbridge Irrigation District canal. This parcel is bounded on three sides by the Lodi City Limits and is zoned EA-40. The site is presently a vineyard. Development of this site would require extending the double circuit 230kV line the additional 3,500 feet from Lower Sacramento Road.

1.3.5.3 Transmission Line Route Alternatives

Transmission line routing alternatives were considered based upon their ability to satisfy the project purpose and need, and the City's routing criteria as follows:

- Avoid excessive impacts upon agricultural lands.
- Utilize existing access.
- Minimize routing through areas of general residential and commercial development.
- Avoid areas representing engineering hazards or requiring costly design measures.

- Minimize the line length.

- Avoid areas of critical environmental concern.

Construction of project facilities is scheduled to begin in April 1989 with completion by October 1989. Facilities planners generally assign a project life of 35-50 years for high voltage transmission lines; however, the line would likely be perpetual.

Preliminary screening of potential alternative routes was conducted to determine areas of substantial conflict based upon environmental reasons, obvious potential or stated public and agency opposition, and inability to conform substantially with the primary routing criteria. Five routing alternatives were identified from the preliminary screening process. The routes, shown on the project area map (Appendix H) are: Turner Road Alternative; Sargent Road Alternative; Kettleman Lane Alternative, the Cross-country Alternative, and Harney Lane Alternative. In addition to the major alternative routes, several cross link routes were examined that would serve as alternative north-south running segments to connect the east-west running segments.

Alternative cross links examined in detail were as follows: Western Pacific Railroad alignment; Davis Road; and Lower Sacramento Road.

Additional cross link routings were preliminarily examined, and ultimately rejected based upon their inability to offer truly alternative solutions differing from the more accessible cross link alignments as aforementioned.

An additional alternative was considered that would eliminate the possibility of a single event causing an outage to the City. This would involve physical separation of the two 230kV lines into the City by construction of single circuit lines on any combination of route alternatives. Further discussion on this alternative occurs on pages 36 & 37.

1.4 Significant Effects and Proposed Mitigation

Environmental consequences of the proposed action and alternatives would be those residual impacts remaining subsequent to the process that has identified, evaluated, and integrated initial impacts with appropriate mitigation measures. That process involved assessing impacts by comparing the proposed action with the pre-action environment, and determining mitigation that would avoid, reduce, or eliminate long term impacts.

Potential significant impacts were identified during routing studies and with discussions with City and County personnel. Additional comments on impact or issue identification were solicited from state and federal agencies through the filing of the project Notice of Preparation. Potentially significant impacts identified through this process were: effects upon agricultural activities; effects on existing orchards, shade, and ornamental trees; effects on existing high density residential and commercial areas; and overall visual impact of project facilities.

Perhaps the most significant potential impacts of those listed would be effects on agricultural patterns and practices, the line's presence in farm and residential areas relative to the visual effects, and the potential for tree removal to accommodate the right of way. In addressing the impact upon area agriculture, it is noted that the San Joaquin County General Plan discourages the unnecessary conversion of prime farm land to incompatible uses. The range of alternatives vary in their right of way requirement from *36* acres to 84 acres. Each alternative route would traverse prime farm land; therefore, appropriate mitigation would address measures to minimize effects upon those lands. Such measures would inciude:

- Select as short a route as is practicable.

- Place facilities to minimize their effect on agricultural operations and residential and commercial developments, such as on field edges and adjacent to roads.

The implementation of these procedures would, in large measure, offset project impacts to farm and rural residential areas mentioned above.

An additional issue of concern is the line's affect on aircraft operations. This issue addresses aircraft operations relative to agricultural practices, and the project proximity to Kingdon Air Park. It is recognized that transmission lines pose a hazard to ag-air operations. This problem is reduced by avoiding diagonal routing across fields, routing along existing roadway edges, and routing in-line with the predominant flight path over fields, rather than at right angles to those flight paths. Portions of the project study area are within the Kingdon Air Park Area of Influence; however, project facilities would not be constructed closer than one and one-half miles from the nearest point of the Kingdon runway. Also, towers would be approximately 90 feet below the Federal Aviation Administration's minimum requirement for notification of airway obstructions. Project notification has been made to the California Division of Aeronautics and the Federal Aviation Administration and comment solicited. (See Appendix G).

Project related impacts to earth resources would be those which may accelerate the rate of soil erosion, or cause soil compaction. Disturbance of ground cover and soil compaction would occur as a result of construction activities on the right of way. However, these effects are not considered to have significant long term consequence. Fugitive dust caused by construction activities would be easily controlled by requiring contractors to implement common dust curtailment measures such as watering construction travel ways and other areas of surface disturbance. Individual right of way agreements would stipulate appropriate revegetation according to the grantor's specifications.

Concern for biological resources would include project affects upon threatened or endangered plant and animal species, critical habitats, unique vegetative types, or areas of low vegetative potential. An examination of California Natural Diversity Data Base, as well as consultation with natural resource management agencies, indicates no potential adverse effects upon biological resources would result from project implementation. Detailed examination of these areas may be found in Section 4.

To satisfy compliance with Section 106 of the National Historic Preservation Act, as implemented through **36 CFR** 800, the California Office of Historic Preservation and the Central California Information Center have been consulted for comments relative to historical or cultural resources. Their response is noted in Section **4** and

Appendix G.

The proposed Project would effect short-term increases in noise levels from the use of various vehicles and machinery during construction and maintenance. During periods of rain and fog some hissing and crackling may be noticed in the immediate line vicinity. This noise level may reach 45dBA at 50 feet from the outer conductor of a line such as that being proposed. This level is approximately the same as the ambient noise experienced in most residences located in urban areas. Noise generated by the substation equipment would also be confined to a level of approximately 45dBA. The San Joaquin Council of Governments allows a noise level of 65dBA at the property line in residential developments.

Normally there are no adverse perceivable effects of electric fields from those lines that operate at a voltage of 230,000 volts or less. No adverse effects are anticipated to be perceived as a result of Project facilities. This subject area is addressed in more detail in Section 4 of this document.

1.5 Areas of Controversy

Some level of controversy is anticipated to arise over the project's visual impacts, effects upon agricultural practices, and the line's electrical and magnetic effects.

7.6 Issues to be Resolved

Of primary concern will be the certification of the environmentally and technically preferred transmission line route, switching station site, and substation site. Mitigation of **areas** of controversy may be stipulated by the project proponent (the City) and are discussed in detail in Section 4.

1.7 Environmentally Preferred Route and Sites

Based upon the review of potential impacts, route and site evaluation worksheets, individual routing preferences and agency comments, the cumulative land use, engineering and environmental consequences of each route were summarized (see Tables 2-4 and Section 5). The preferred route, interconnection point/switching station site, and substation site of least environmental impact were identified based upon a review of these data in relation to evaluation criteria.

Subsequent to the release of this Draft EIR, public comment will be solicited through a public hearing and invitations to present written and verbal testimony. The final project disposition will result from an analysis of all data presented.

The prefcrrec! point of interconnection is located approximately 7,600 feet north of the I-5/Kettleman Lane interchange, east of Thornton Road. Three 230kV lines pass in a general north-south alignment through this area. The eastern-most line is owned by Pacific Gas & Electric Company (PG&E). The westerly two lines are owned by the Western Area Power Administration (WESTERN), an agency of the U.S. Department of Energy. A tap point will occur on the middle line of that (WESTERN) circuit. This tap point will require constructing a 260' x 350' 230kV switching station. The station (Figure 3, page 23) would include four breakers initially to allow for the two transmission lines to the city alternated with two source lines from WESTERN. Space will be made for expansion to include up to six more lines in the future Maintaining national and California standards for crossing and ground clearance, the new transmission line would pass under the PG&E line and proceed south westerly to Thornton Road. Turning south, the route parallels Thornton Road to the Kettleman Lane intersection. Turning east at that point, the route parallels the north side of Kettleman Lane and north of the Woodbridge Irrigation District canal easement for approximately 7,200 feet, to a location just east of Ray Road, at which point the line would cross to the south side of Kettleman Lane. An alternate route considered crossed Kettleman Lane at Thornton Road and turned east. This option was rejected because *of* the constraint imposed by the extra wide CALTRANS right of way in that area of Kettleman Lane. This controlled access right of way is approximately 160 feet from the highway centerline and extends approximately 4,800 feet east of Thornton Road. No encroachment is allowed within this right of way, therefore forcing the line route into the recreationai and highway commercial

development known as Saddle City, thus necessitating a series of angle structures.

At the aforementioned Kettleman Lane Crossing 7,200 feet east of Thornton Road, the preferred route encounters the standard CALTRANS right of way, which is 55 feet either side of the highway centerline. From that point, the preferred route would extend east along Kettleman Lane immediately adjacent to the CALTRANS right of way and on private land. The preferred route would terminate at the preferred substation site (SS-1) approximately 700' south of the southwest corner at the intersection of Lower Sacramento Road and Kettleman Lane. The requirement for this site would be approximately ten acres.

From the preferred substation, three 60kV wood pole lines will emanate to interconnect into the City's existing system. Additional switching capability and system reliability would be gained by running the 60kV line from McLane Substation through the new substation on its path to the Killelea Substation. Two new 60kV circuits would extend to the Henning Substation as follows: (1) On a route that crosses Lower Sacramento Road approximately 1,130 feet south of Kettleman Lane, extending easterly approximately 1,280 feet until reaching the new road to be constructed on the west side of the Meadows 2 Subdivision, at which point, the route runs to the north side of Kettleman Lane and along Kettleman Lane east until reaching Henning Substation. The existing PG&E 12kV line along the Kettleman Lane route segment would be placed on the new transmission line poles. The present PG&E poles would be removed. (2) The second 60kV circuit would extend easterly from the substation to the east side of Lower Sacramento Road. Turning north, the line would connect to the existing 60kV line on the south side of Kettleman Lane. This configuration would require removal of a short section of the existing McLane 60kV line, and building a new 60kV line from near the northeast corner of Lower Sacramento Road and Kettleman Lane along the west side of Lower Sacramento Road and into the new substation. Figure 1, page 16 portrays the discussed circuit arrangements.

Potential project land use conflicts along the preferred route are anticipated to be those relative to visual affects, and impacts upon agricultural operations. With the implementation of appropriate mitigation, these conflicts would be reduced, and characterized as moderate to low. For a discussion on the criteria used to determine potential impacts, see Section 4.

A summary of the land use, engineering, and environmental evaluation criteria associated with the preferred and alternate sites and routes is presented in Appendix D and section 5. The locations of alternate sites and routes are shown in Appendix H. Correspondence solicited through the State Clearinghouse and public meetings is contained in Appendix G.

2.0 INTRODUCTION AND PROJECT DESCRIPTION

2.1 History

The City of Lodi (City) operates transmission and distribution systems that provide eiectric service to the City's customers. At present, the City does not independently own or operate any generation facilities. However, through its membership in the Northern California Power Agency (NCPA) and through participation in several NCPA resource projects, the City has access to several long-term power resources. The City, through its membership in the Transmission Agency of Northern California (TANC), is also participating in the development of the California-Oregon Transmission Project (COTP) which will enable the City (through NCPA) to participate in the power market in the Pacific Northwest. The City also has an allocation of federal power from. the Western Area Powe: Administration's (WESTERN) Central Valley Project (CVP).

Under its present operating configuration, the City must wheel all its WESTERN and non-WESTERN resources through the interconnected transmission system of the Pacific Gas and Electric Company (PG&E).

The existing system, which serves the City, consists of four 60kV feeders from PG&E's Lockeford Substation to PG&E's Lodi Substation, which is adjacent to and connected to the City's Killelea Substation. The terms and conditions that control the City-PG&E Interconnection are detailed in a 1983 Interconnection Agreement between PG&E and NCPA. Based upon NCPA forecasts of peak loads, and PG&E's earlier forecasts of available capacity between Lockeford and Lodi, this agreement provides for approximately 77 megawatts (MW) of firm transmission capacity between the PG&E system and Lodi in the year 1988, prior to system reinforcement. PG&E has agreed to provide for additional load on the existing transmission lines. This system will require yet to be determined reconstruction in the near future. This condition is being reviewed on a yearly basis and will eventually result in a request by PG&E for the City to

pay for reconstruction of PG&E's lines. An alternative would be for the City to construct the proposed interconnection with WESTERN.

2.2 Description of the Proposed Action

2.2.1 Action and Benefits

The City is currently contemplating the construction of a direct transmission interconnection between the City's system and the WESTERN transmission system. The construction of the Direct Interconnection Project with WESTERN would allow the City to meet its long range electric service cost, capacity and reliability goats by:

1. Minimizing the long-term cost of service to the City's electric customers, through rate stabilization, by reducing transmission service charges.

2. Enabling the City to purchase power on a direct basis from the lowest cost available source.

3. Providing additional firm, reliable transmission capacity to serve new consumers, particularly for anticipated industriai growth.

The interconnection of WESTERN and City facilities is proposed by means of an interconnection point into WESTERN's system and construction of a 230kV switching station, a 230kV double circuit transmission line, and a 230-60kV substation. The interconnection would provide an energy source for the City and accommodate City load growth, and provide assurance to large industriai customers that the City's electrical system can accommodate significant load growth.

Project feasibility analyses show that cost savings can potentially be realized through the implementation of this Project. With a direct

interconnection in place, the City would receive a direct service discount on power purchases from WESTERN. Based on preliminary calculations, the wheeling savings could be significant (See section 2.2.3 for an economic analysis discussion).

2.2.2 Technical Characteristics

Conceptually, the project wouid consist of three major elements:

- Connection to WESTERN Transmission Lines via a 230kV switching station
- 230kV double circuit Transmission tine
- 230-60kV Substation

Siting analysis has identified suitable sites to interconnect with the WESTERN Transmission line about 7,600 feet north of State Highway 12 (Kettleman Lane), east of Thornton Road (See Project Area Map - Appendix H). This interconnection would require constructing a 260' x 350' switching station on approximately seven acres.

From the switching station which interconnects with WESTERN's system, a double circuit 230kV transmission line would be constructed. As presently conceived, the line would be built using single tubular steel poles. The transmission line would terminate at a **new** 230-60kV substation. The new substation would be designed for reliability and flexibility. Two (2) 230-60kV, 90/120/150 MVA transformers would be included, each having the capacity to provide for the entire City load under most conditions. The 60kV portion of the new station would be designed as a six (6) breaker ring bus. This would allow the McLane, Killelea, and Henning Substation to be served from separate circuits and would provide for one (1) future 60kV circuit which would be used to support future growth. Construction of the proposed new substation and its integration into the **City's** existing electrical system will not require extended outages or extensive modifications to existing

substations. Several alternative interconnection points, substation sites, and transmission line routes have been identified, and an environmentally preferred site/route combination has been selected.

A typical transmission line structure (Figure 2, Page 22) consists of a single tubular steel pole approximately 107 feet in height above ground line and about four feet in diameter at the base. Davit arms, approximately eighteen feet long on each side of the pole would support the conductors. In the event an overhead groundwire is required, it would be attached at the pole top and would require an additional nine feet in pole height. The structure design and ail conductor spacing and ground clearances would conform to California General Order 95 requirements.

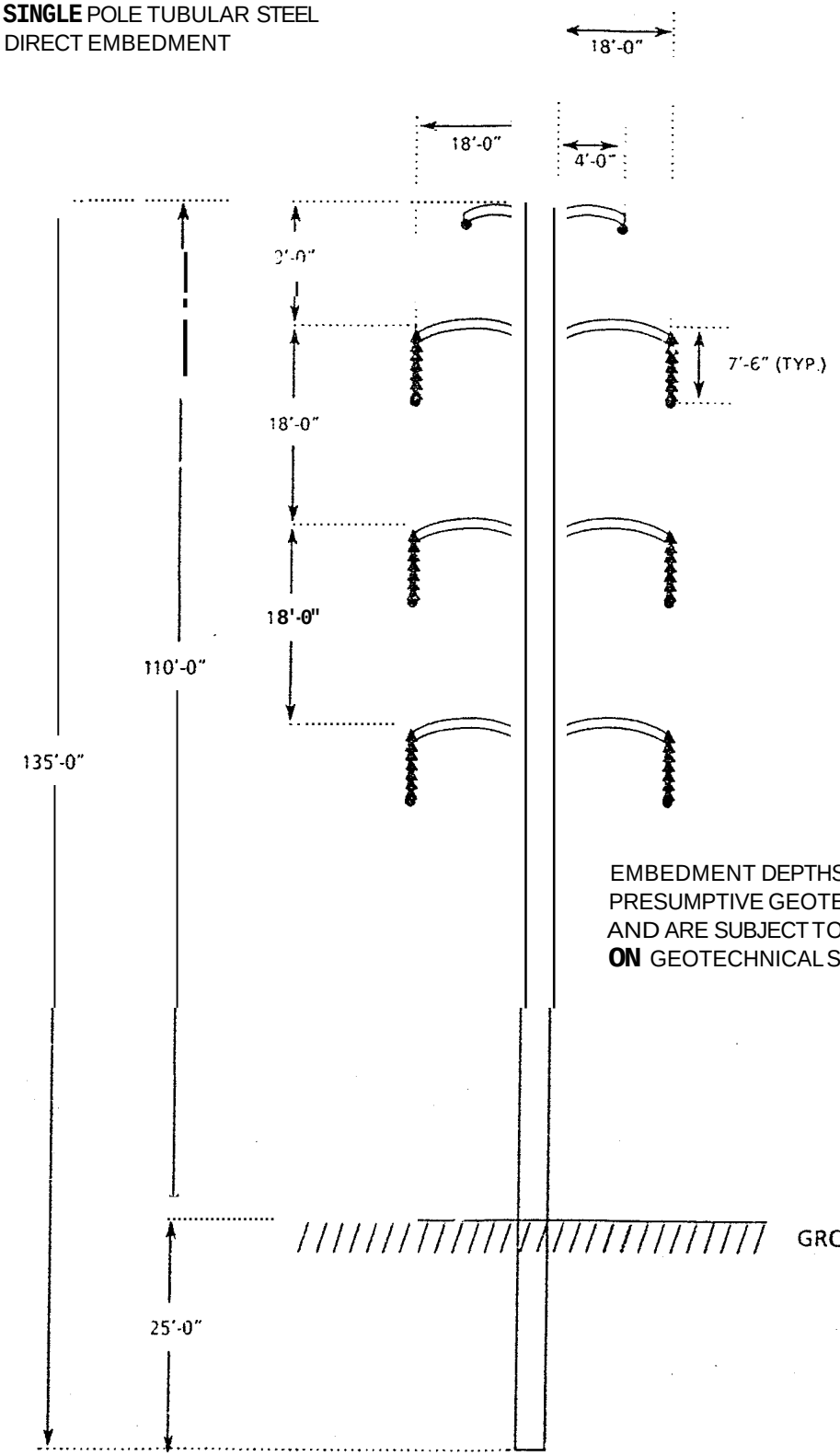
A fifty foot wide right of way on private land would be required to accommodate the transmission line with an additionai twenty-five foot overhang easement required from CALTRANS. The total amount of private land required for the preferred route right of way would be approximately twenty eight acres. The right of way would be acquired by the City as an easement. Negotiations with landowners for easement rights would be conducted according to the California Uniform Relocation and Property Acquisition Act. Landowners would be compensated for the easement on a basis of fair market land value. If negotiations are not successful, condemnation proceedings would be undertaken. While many uses are allowed within transmission line easements, certain restrictions are imposed. These would primarily concern the erection of structures within the easement, or the conduct of activities that might pose a safety hazard or impede the operation and maintenance of the line.

The point of interconnection with WESTERN would require the construction of a switching station dedicated to accommodate a source circuit to the City, and the return circuit to WESTERN. It is anticipated that this switching station and associated facilities

would encompass approximately seven acres. The switching station will be designed as a breaker and one-half bus arrangement although initially energized as a four (4) breaker, four (4) terminal ring bus. Addition of two (2) future circuit breakers will complete the arrangement and will allow for operation at a full breaker and one-haif. Space will also be provided for addition of a two (2) terminal breaker and one-half bay. Initially, two (2) of the four (4) terminals will accommodate WESTERN's 230kV line, and the other two (2) terminals will feed the City of Lodi substation to be constructed west of the current Lodi city limits. It is anticipated that this switching station would be placed partly within the existing WESTERN right of way and that WESTERN lines would not have to be rerouted.

FIGURE 2

DOUBLE CIRCUIT
SINGLE POLE TUBULAR STEEL
DIRECT EMBEDMENT



EMBEDMENT DEPTHS ARE BASED ON PRESUMPTIVE GEOTECHNICAL DATA AND ARE SUBJECT TO CHANGE BASED **ON** GEOTECHNICAL STUDY.

60L:(12'87)FR:ss

FIGURE: 3

230kV SWITCHING STATION

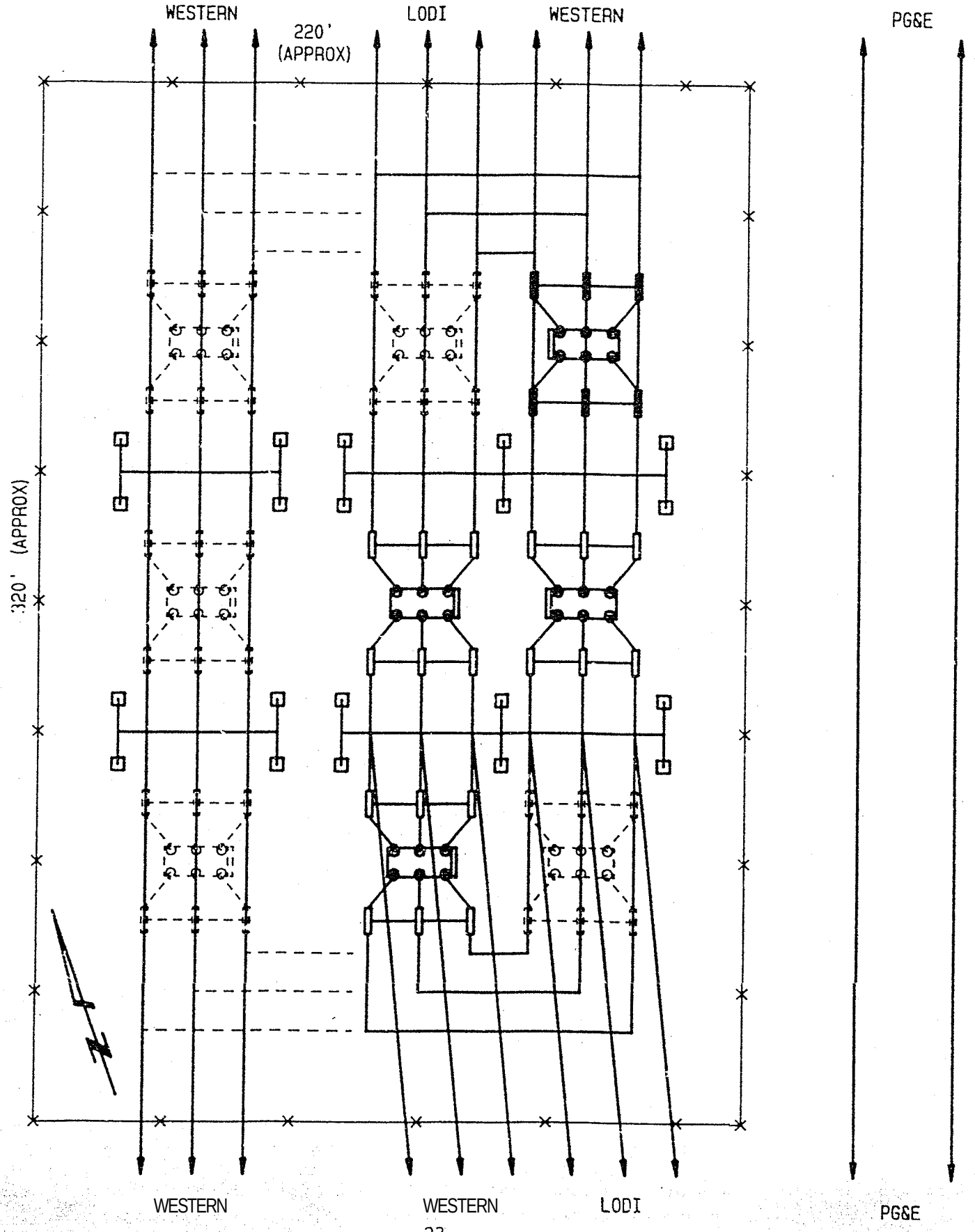
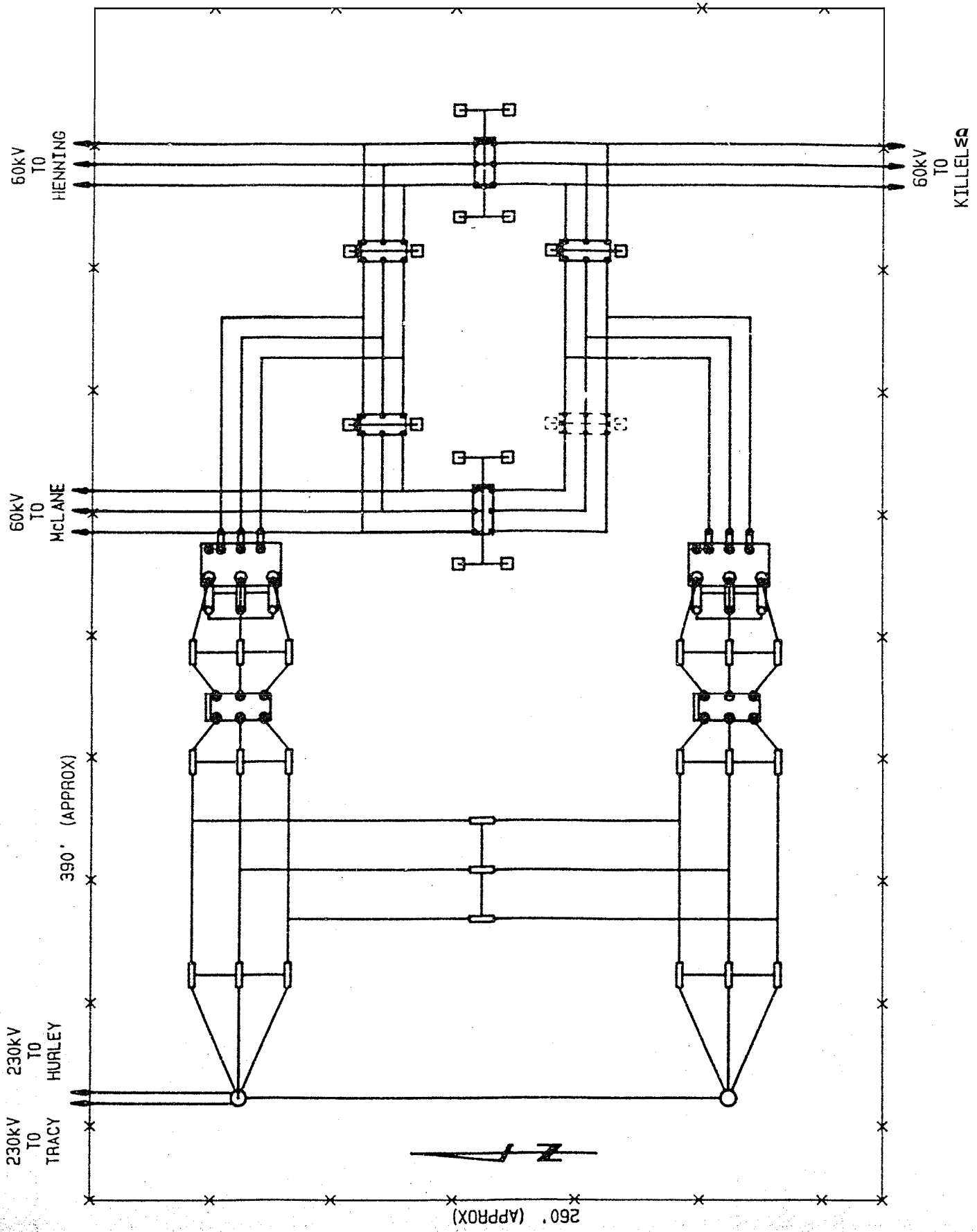


FIGURE 4

230-60kV SUBSTATION CIRCUIT ARRANGEMENT



Substation and associated facilities would require a site of approximately ten acres. The enclosed portion of the site would contain transmission line entry and exit structures, 230 and 60kV power circuit breakers, two, 230kV power transformers, rigid bus work, a small control house, and various pieces of ancillary operating, metering, and safety devices (Figure 4, Page 24j. The power circuit breakers would utilize an arc extinguishing gas compound called SF_6, in circuit breaker tanks. SF_6 is a non-toxic, non-explosive, inert gas; however, because the gas displaces oxygen, under enclosed conditions there is a risk of suffocation. The tanks for the 230kV-60kV power transformers would each contain 21,000 gallons of insulating mineral oil. Standard oil containment devices, either sealed earth berms or concrete pad and walls, would be constructed around the transformers to contain oil in the unlikely event of a leak or spill.

2.2.3 Project Cost

An analysis of costs attributable to project alternatives is necessary to arrive at a balance between cost and environmental affects. Engineering, right-of-way, and construction costs have been estimated for each alternative, and weighed against the benefits to be derived in terms of satisfying the City's stated need.

No Action

By maintaining the status quo, the City would continue with its connection to the PG&E system with no action to increase power supply capacity, improve voltage regulation and reliability, or reduce the cost of electric service.

PG&E has indicated the 60kV transmission capacity between their Lockeford and todi substations is 77 MW. The city's peak load exceeded 77 MW in 1987. toad growth projections for PG&E and City loads, which are served from Lockeford Substation, indicate

that the 60kV transformer capacity at Lockeford Substation will be exceeded in the early 1990's.

No action would result in City transmission supply capacity limitations in the near future, preclude the City from providing the project's benefits to the City's rate payers, and inhibit the City's ability to meet its long term electric transmission supply and reliability goals. It is not considered a viable alternative action for meeting the stated need.

PG&E Upgrade

PG&E estimates the 60kV transmission upgrade will be required in 1989 or 1990 and will cost approximately $1,000,000. The Lockeford Substation transformer capacity increase is estimated to be required in the late 1990's and will cost approximately $3,000,000. These costs were assumed to accrue to the City, for the purposes of this study.

While this alternative would be responsive to the City's. future capacity goals, it does not:

- allow long term rate stability that would be possible through elimination of loss charges associated with their WESTERN power allocation and reduction of transmission wheeling charges on the City's required power purchases.

- eliminate the potential for a city wide blackout due to single contingency conditions, such as loss of the Lockeford 230-60kV Substation transformer, or loss **of** the **60kV** tie between PG&E's todi Substation and the City's Killelea Substation.

The Preferred Alternative

Within the preferred alternative, the City would fund all facilities required for direct connection to WESTERN, and would

own and operate the transmission line and a step-down substation to serve the City's existing **60kV** transmission system. WESTERN will own and operate the switching station.

This alternative would provide the City with savings frorn reductions in loss and wheeling costs sufficient to pay for the new facilities in five to ten years- The total estimated cost of the preferred alternative is $9,684,000.

The following are summaries of cost estimates for the three primary alternatives described previously:

Estimated Cost (1987 $)		
Alternative 1, No Action		$ 0
Alternative 2, PG&E Upgrade		
• Line Reinforcement		$ 895,000
• Transformer Replacement		$3,183,000
	TOTAL:	$4,078,000
Alternative 3, WESTERN Direct Interconnection (Preferred Option)		
• Switching Station		$ 2,475,000
• 230kV Double Circuit Line		$2,353,000
• 60kV Line Additions		$351,000
• 230-60kV Substation		$4,505,000
	TOTAL:	$9,684,000

The Alternative 3 cost estimates are for the preferred line routing and substation location. The cost estimates for other Alternative options are generally higher than for the proposed option because of longer line routings, relocating existing circuits, tree trimming costs, and other environmental mitigation.

A cost analysis was also conducted for other doubie circuit and single circuit routing options. Table 1, Page 29 summarizes those estimates.

TABLE 1[1]
COST SUMMARY
WESTERN DIRECT INTERCONNECTION PROJECT
230kV TRANSMISSION LINE COST ESTIMATES

Route Option	Path Links	Line Miles	Estimated cost[2]
Doubfe Circuit (using single steel poles)			
Preferred	(3.1)-(3.2)-(3.3)	6.18	$2,353,000
1-DC	(1.1)-(1.2)-(1.3)-(2.4)	7.01	3,889,000
2-DC	(2.1)-(2.2)-(2.3)-(2.4)	6.43	3,183,000
1A-DC	(1.1)-(1.1.1)-(2.1.1)-(3.2)-(3.3)	6.17	2,443,600
1B-DC	(1.1)-(1.1.1)-(2.2)-(2.3)-(2.4)	6.59	3,361,600
IC-DC	(1.1)-(1.2)-(1.2.1)-(2.2.1)-(3.3)	6.89	2,693,000
ID-DC	(1.1)-(1.2)-(1.2.1)-(2.3)-(2.4)	7.00	3,371,000
2A-DC	(2.1)-(2.1.1)-(3.2)-(3.3)	6.01	2,351,400
2B-DC	(2.1)-(2.2)-(2.2.1)-(3.3)	6.32	2,505,000
4-DC	(4.1)-(4.2)-(4.3)	6.27	2,365,000
5-DC	(5.1)-(5.2)-(5.3)-(5.4)	7.54	2,794,800
Single Circuit (using single wood poles and steel poles at angles)			
1-SC	(2.1)-(2.2)-(2.3)-(2.4) (3.1)-(3.2)-(3.3)	12.61	$3,137,000
2-sc	(2.1)-(2.1.1)-(3.2)-(3.3) (4.1)-(4.2)-(4.3)	12.28	2,648,000
3-sc	(2.1)-(2.2)-(2.2.1)-(3.3) (5.1)-(5.2)-(5.3)-(5.4)	13.86	2,958,000

(1) Line cost estimates prepared by POWER Engineers, Inc.

(2) See Appendix C for line cost details.

*SUBSTATION **OPTIONS:*** Three sites near the City's Henning Substation have been considered for the new 230-60kV substation:

Substation Option SS-1: SS-1 is the preferred site located approximately 700' south of the southwest corner of Kettleman Lane and Lower Sacramento Road. Significant concerns exist regarding the possible commercial value of the corner and the impact of the new substation on this value. For this reason, the substation was sited well away from the corner intersection on Kettleman Lane and Lower Sacramento Road. The estimated acquisition, site preparation, and construction costs for a substation at the SS-1 site are $4,505,000.

Substation Option SS-2: The site is located on the southeast corner of Kettleman Lane and Lower Sacramento Road. An existing gas station would have to be removed from the site. This established commercial use on this location has an apparent effect of increasing the land value. The estimated acquisition, site preparation, and construction costs of a substation at the SS-2 site are $4,905,000.

Substation Option SS-3: This site is currently a vineyard located on the north side of Kettleman Lane just west of the Woodbridge Irrigation District canal adjacent to Henning Substation. To use this site, the 230kV line would have to be extended, with distribution underbuild, from Lower Sacramento Road to the substation. The estimated acquisition, site preparation, and construction costs for a substation at the SS-3 site are $4,505,000.

Substation Option SS-4: Construction of the 230-60kV substation at the site of the WESTERN interconnection was also considered, but rejected for the following reasons:

- Three (3) 60kV circuits would have to be constructed from the new station to the City's 60kV transmission system to provide the same capacity, reliability and flexibility as the proposed 230kV interconnect line.

- A double circuit 60kV line would likely be constructed along the route of the **proposed** 230kV line, resulting in almost identical ROW requirements and environmental considerations.

- An additional single circuit 60kV line would be constructed parallel to Turner Road, Sargent Road, Harney Lane, or a route across the fields requiring additional ROW and increasing the environmental impacts.

- Losses on the 60kV lines would be significantly greater than 230kV lines.

- Voltage regulation on the 60kV circuits would be questionable.

- Future load growth would require additional 60kV lines and therefore, this alternative would necessitate continuing additional environmental impact.

QUANTIFIABLE BENEFITS

There are two quantifiable benefits to be realized by the City through direct interconnection with WESTERN.

- Power Cost Savings: Estimated at $2-3 million present value dollars over a **30** year project life depending on the discount rate used in the calculation.

- Wheeling Cost Savings: Estimated at $25-41 million present value dollars over the 30 year project life depending on the discount rates and relative PG&E and WESTERN wheeling charges used in the calculations.

POWER COST SAVINGS: Currently, the City receives all of its power through PG&E transmission facilities. The City's Federal Power allocation is adjusted for losses by PG&E to deliver WESTERN's 12.5 MW monthly allocation to the City. These loss costs are passed on to the City by WESTERN. If the City receives power directly from WESTERN, as a result of the Direct Interconnection Project, the PG&E loss charges to WESTERN would be reduced and WESTERN would pass appropriate savings on to the City. WESTERN has estimated that the pass-through savings to the City for its 12.5 MW allocation would be approximately $1.43/kW/mo., or $215,000 per year.

Tables 5.1 and 5.2 in the Appendix B show NCPA calculations of the present value loss cost pass-through savings for discount rates of 7% and 10%, respectively.

WHEELING ***COST SAVINGS:*** Presently, the City pays PG&E for transmission delivery of its power requirements, at PG&E's area transmission wheeling rate. The Direct Interconnect Project will eiiminate the City's need for area transmission service from PG&E, providing the City with WESTERN's lower wheeling charge for all of its power requirements. Due to the present and projected difference in PG&E and WESTERN wheeling rates. the Direct Interconnection Project would provide the City with significant savings in wheeling costs.

Tables 5.1 through 5.10 in the Appendix **6** show NCPA calculations of present value wheeling cost savings, at two discount rates, for several scenarios involving different assumptions for future PG&E and WESTERN wheeling charges.

NON-QUANTIFIABLE BENEFITS

There are other non-economic factors associated with the Direct Interconnection Project that will benefit the City in a non-quantifiable manner.

- The installed project capacity will be great enough to provide a significant margin for future growth and the City should not require any further large capital outlay for near term power transmission system reinforcement.

- The capacity margin and rate stabilizing benefits that should accrue from the Direct Interconnection Project may allow the City to attract new industrial and commercial loads.

- System reliability will be enhanced as a result of the two 230kV lines serving the City being tied to separate high-voltage area substations.

BENEFIT/COST ANALYSIS

Based on the results of the power cost saving and wheeling cost saving analyses, total potential benefit dotlars can be calculated. Dividing these benefit dollars by the project capital costs results in a benefit/cost ratio for the proposed alternative which ranges from 2.69 to **4.36,** depending on the assumptions used in calculating the benefit dollars. These benefit/cost values differ somewhat from the figures in

the NCPA economic analysis because better defined construction cost estimates became available subsequent to preparation of the NCPA economic analysis.

The Direct Interconnection Project could, depending .on the assumptions used to define the potential savings, result in present value savings to the City equal to the project's capital costs within 5 to 10 years.

2.2.4 Intended Use of EIR

This Environmental Impact Report (EIR) is intended to be used as an informational source document to inform public agency decision-makers and the general public of the potential significant environmental effects of the proposed City of Lodi Direct interconnection Project. This document also identifies possible ways to minimize the significant effects, and describes reasonable alternatives to the project

The City of Lodi is the CEQA Lead Agency for the project. The Western Area Power Administration as a project participant will conduct an in-house review for consistency with WESTERN's requirements. Public agencies that have been informed of the project and have been invited to comment are:

Bureau of Indian Affairs
U.S. Department of Housing and Urban Development
Federal Aviation Administration
U.S.D.A. - Soil Conservation Service
Federal Emergency Management Agency
U.S. Fish and Wildlife Service - Division of Ecological Services
US. Fish and Wildlife Service - Division of Wetlands inventory
California Energy Commission
CALTRANS - Division of Aeronautics
California Department of Food and Agriculture
California Department of Health
Native American Heritage Commission
California Public Utilities Commission
California Department of Transportation - District 10
California Department of Fish & Game
California Department of Parks and Preservation -
· Historic Preservation Office
San Joaquin County - Department of Public Works
San Joaquin County - Agricultural Commissioner
City of Lodi - Community Development Department

All agencies are expected to perform a review of the project to determine if there may be any conflicts between the proposed facilities and any agency plans or resource values.

In the event of EIR certification and the filing of a Notice of Determination, permits will be acquired during the right of way acquisition phase from the agencies that require them.

3.0 ROUTING AND SITING ANALYSIS APPROACH

In order to identify a preferred transmission line route and associated sites for the interconnection point and substation, interrelated factors of engineering and environmental studies of identified alternatives have been evaluated.

3.1 General

From a strictly pragmatic sense, few constraints exist that make the placement of a transmission line impossible. However, given a choice of options governed by economic and environmental variables, the selection of a route may be made which represents a responsible assessment of these options. The environmental impacts of the proposed action are considered in a broad sense to include an assessment of both beneficial and adverse affects on the social, economic, and natural environments. While many impacts cannot be predicted with certainty, their probability of occurrence is made easier to predict through a systematic assessment process.

For the City *of* Lodi Direct Interconnection Project, alternatives have been selected for evaluation that represent relative degrees *of* validity.

While any number of environmental elements may be considered, not all would be relevant to the identification and evaluation of each alternative. Those elements that were considered relevant are discussed in Section 4. They are grouped into four general categories:

- Living Components
- Non-Living components
- Human Values
- Demographics and Socioeconomics

The probable effectsof the proposed action on each of the elements were weighed against the pre-action condition in selecting and evaluating alternate sites and routes. Only those primary routes and their sub-routes that represent unique opportunities were retained for an in-depth analysis.

Primary routes initially studied were Turner Road, Sargent Road, Kettleman Lane, a Cross-country route, and Harney Lane, all of which represent east-west corridors. Because of the City's need to tie the new line into the Henning Substation, several north-south route segments, or links that interconnect the east-west corridors, were examined. These links originally included the Western Pacific Railroad, Ray Road, DeVries Road, Davis Road, Moore Road, Woodbridge Irrigation District (WID) Canal, and Lower Sacramento Road. Field review of these links resulted in the determination that not all links offered unique solutions that are not made available via another link. Therefore given the desirability of examining truly unique link combinations, some links were excluded from further study. Those excluded links were: DeVries Road, Ray Road, Moore Road, and the WID Canal. DeVries, Ray, and Moore Roads are very similar in representative land uses to those existing along Davis road; and quantitatively present a larger number of potential confiicts, i.e. homes, barns, distribution lines, irrigation ditches, and additional angles. The WID Canal is inherently exclusive of transmission lines because of their hazard to canal maintenance activities.

Two separate single circuit alternatives have been considered as a means of providing additional transmission line reliability. Within the context of this scenario, the source circuit from WESTERN to the City and the return circuit from the City back to WESTERN would be constructed on separate pole lines and within geographically separated rights of way. The rationale for this alternative is to provide redundant electrical paths as a precaution

for continued service in the event one circuit is lost due to an accident or environmental occurrence. This alternative mould have approximately double the environmental impacts of those experienced by the double circuit, single pole line proposal. Additionally, the costs for engineering, design, right of way, and construction would be greater than for the double circuit line. While avoiding an outage to both circuits, the risk of a single occurrence causing an outage is increased by the presence of a greater number of facilities to which an incident may occur. In spite of apparently excessive environmental and economic costs, this alternative was considered for in-depth analysis because it does represent a unique solution.

Cross-country routings were considered for study but eventually eliminated since the area surrounding the City is all land defined as prime agricultural land that is currently held in preserve, and has been rezoned to GA-40. In consideration of the Williamson Act, it was determined that the impact of such a route upon agricuitural operations during construction, as well as access needs for maintenance activities, would be unwarranted especially when lesser impact alternatives exist.

A route analysis and weighting scheme was developed to optimize an objective analysis of link segments, see Appendix D - Route Evaluation/Weighting Analysis Criteria, and Appendix E - Route and Site Evaluation Worksheets. The preferred alternative is defined as the set of switching station/interconnection point, route segments, and substation site that offers the best balance between environmental, engineering, land use concerns, and probable project impacts while satisfying the stated need for the project.

The preferred alternative selection process proceeded as follows:

1. Identify a study area that is large enough to provide alternatives for study within the parameters of prudent economic, engineering, and environmental constraints. Confine the study area to allow the entire area to be studied at a satisfactory level of detail.

2. Prepare a study area environmental data base and constraint analysis.

3. Assuming a requirement for a fifty foot right of way, a seven acre switching station site, and a ten acre substation site, select apparent "least impact" routes and sites.

4. From the identified alternatives, select a "preferred alternative.''

5. Assess potential impacts of each alternative.

6. Develop proposed mitigation.

7. Assemble a Draft EIR

The study area for this proposed action is believed to contain all feasible alternatives for the placement of a switching station, a double circuit 230kV transmission line and a 230kV - **60kV** substation while fulfilling San Joaquin County'sand the City'srouting/siting criteria:

- Avoid excessive impacts upon agricultural lands.
- Utilize existing access.
- Minimize routing through areas of general residential and commercial development.
- Avoid areas representing engineering hazards or requiring costly design measures.
- Minimize the line length.
- Avoid areas of critical environmental concern.

Alternate routes within the study area were identified based on field inspection and on the information presented in this report. These routes

are presented with the understanding that their position on the study area map does not represent an exact centerline location. Detailed engineering, surveying and design may result in minor deviations from the routes as mapped in this report. Individual structure locations would be determined through a process of design requirements and public comment.

3.2 Route Evaluation Criteria

Route and site evaluation criteria that represent the engineering, land use and environmental concerns present within the study area are listed in Tables 2, 3, & 4. Each criterion is assigned a relative value of importance or weighting. These weights range in value from 5, which represents a high potential for conflict and/or cost, to 1, which represents a low potential for conflict and/or cost. When the weighting is multiplied by the number *of* occurrences along a given route segment or **link,** the resulting score refiects the compatibility of the link with the specific criterion. When the links are combined and totaled, the route and/or site with the fewest occurrences, or lowest numerical score is considered the best. Appendix D contains a detailed discussion of all route evaluation and site evaluation criteria, and their respective weight assignments.

3.2.1 Link/Site Development

Each route is composed of route segments or links. The double circuit configuration consists *of* twenty-two links that were joined in various combinations to form five primary alternative routes and six sub-routes. The single circuit configuration consists of three primary routes, each comprised of two separate roctes. The links, routes, and sub-sites are shown on the project area map included in Appendix H.

3.2.2 Link/Site Inventory and Scoring

Each link, switching station/interconnection point, and substation site was reviewed using the route and site evaluation criteria worksheets. The inventory process involved counting the number

of occurrences (i.e. number of road crossings, miles requiring new access) for each route, or site evaluation criteria.

These tabulated occurrences of environmental, land use and engineering conditions along each link or within each site were then multiplied by their respective weights, and a total score was calculated. For example, in the engineering category, the criterion "miles of difficult access" has a weight of four. If a link has two miles of difficult access then it would have a score of 8 (two miles times a weight of four). If a substation site experiences the above exampled criteria, one full weight of four is scored unless the impact is perceived to be severe in which case a representative multiplier is applied to the weight. For example, in the environmental considerations the criterion "sensitive wildlife habitat" has weight of three. If the substation site is located within critically sensitive wildlife habitat it would have a score of six or possibly nine depending on the perceived severity. The weighted scores were then added together respectively to obtain a total score for each link and site. The lower the number, the more acceptable the link. Appendix E shows the result of the inventory and total scoring for all links and sites.

3.2.3 Route and Site Scoring

Route scores were determined by adding the individual scores of links that make up each route. For example, the total score for Route 1 was obtained by adding the totals of links 1.1, 1.2, 1.3, and 2.4. The route totals were also broken down into totals of the three major criteria categories: land use, engineering and environmental. The land use score for Route 1, for example, was obtained by adding the land use scores for all iink segments that made up Route 1. Table 4 is the form developed to summate these totals and also to assign the route ranks discussed below.

Interconnection and substation site scores were also obtained by adding up the totals of the three major criteria categories. The

scores of these project elements are then incorporated into the route totals to arrive at a total route/site score.

TABLE 2
ROUTE EVALUATION

*** ANALYSIS CRITERIA ***

LAND USE CONSIDERATIONS

	WEIGHT
Number of Buildings Requiring Removal/Relocation	5
Miles of Line of Existing Distribution/Communication	4
Miles Requiring Special Restoration Efforts	3
Miles Crossing Agricultural Land on a Diagonal	5
Miles Along Field Edge	2
Acres in Conflict with Land Use Planning Goals	5

ENGINEERING CONSIDERATIONS

Miles of Line	5
Miles Requiring New Construction/Maintenance Access	5
Miles of Urban Development	5
Miles Along Poorly Drained Floodplain/Wetlands Area	3
Number of Angles Greater Than 60°	4
Miles Requiring U.G. of Railroad Communication Lines	3

ENVIRONMENTAL CONSIDERATIONS

Number of Cultural Resource Conflict Areas	5
Miles Through Sensitive Wildlife Habitat	5
Miles of Prominent Visual Intrusion (<1/4 miles)	4
Miles Requiring Tree Trimming/Removal	5
Miles of Residential Development Exposed to Electro/Magnetic Fields	2

The range of weights represents a high potential for conflict or cost (5), to a low potential for conflict or cost (1).

TABLE 3
SUBSTATION EVALUATION

*** ANALYSIS CRITERIA ***

LAND USE CONSIDERATIONS

	WEIGHT
Number of Buildings Requiring Removal/Relocation	5
Number of Private Land Owners Affected by Acquisition	2
Offsite Construction impacts	2
Long Term Effects on Adjacent Land Uses	2
Siting on Cultivated Cropland	5

ENGINEERING CONSIDERATIONS

Difficulty of Site Preparation	2
Site Acquisition Costs	4
Routing of 60kV Line	4

ENVIRONMENTAL CONSIDERATIONS

Cultural Resource Conflict Areas	5
Sensitive Wildlife Habitat	5
Visually Prominent From Major Highway	3
Visually Prominent From Residential Area	3

The range of weights represents a high potential for conflict or cost (5), to a low potential for conflict or cost (1).

TARLE 4
INTERCONNECTION POINT EVALUATION

*** ANALYSIS CRITERIA ***

LAND USE CONSIDERATIONS

	WEIGHT
Number of Building Requiring Removal/Relocation	5
Number of Private Land Owners Affected by Acquisition	2
Offsite Construction Impacts	2
Siting on Cultivated Cropland	5

ENGINEERING CONSIDERATIONS

Difficulty of Site Preparation	2
Site Acquisition Costs	4

ENVIRONMENTAL CONSIDERATIONS

Cultural Resource Conflict Areas	5
Sensitive Wildlife Habitat	5
Visually Prominent From Major Highway	3
Visually Prominent From Residential Area	3

The range of weights represents a high potential for conflict or cost (5), to a low potential for conflict or cost (1).

4.0 ENVIRONMENTAL CONCERNS AND IMPACTS

For the purposes of this report, environmental impact has been defined as a modification, or anticipated modification, to the environment as it presently exists resulting from the proposed action. Environmental impacts could result:

- if environmental change or stress occurs to biotic populations or natural resources affecting their safety, health, abundance, productivity or aesthetic or cultural values.

- If the change or stress affects the diversity and variety of individual choice, the standard of living, or the extent of sharing life's amenities.

- If the change or stress affects the quality of renewable resources or the recycling of depletable resources.

Significant effect on the environment means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself would not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is potentially significant.

Environmental impacts can be positive (beneficial) or negative (adverse) as a primary result of the action (direct) or as a secondary result (indirect). These impacts can be permanent or long-lasting (long-term), or temporary or short duration (short-term). They can vary in degree or magnitude from no change, or only slightly discernable change (no identifiable impact), to a total change in the environmental condition or system (high impact). The level of impact is described as follows:

High impact - A high level of impact would result if the construction, operation, maintenance or abandonment of the proposed Project would potentially cause a significant or substantial adverse change or stress to an

environmental resource or resources.

Moderate Impact - A moderate impact would result if the construction, operation, maintenance or abandonment of the proposed Project would potentially cause some adverse change or stress (ranging between significant and insignificant) to an environmentat resource or resources.

Low Impact - A low impact would result if the construction, operation, maintenance, or abandonment of the proposed Project would potentially cause an insignificant or small adverse change or stress to an environmental resource or resources.

No Identifiable Impact - No identifiable impact would be indicated where no measurable impact would occur to the specific resource(s) under investigation.

Duration of impacts has been defined for the potential and residual impacts described as follows:

Short-term impacts are those changes or stresses made upon the environment during construction. Such change would generally revert to preconstruction conditions at, or within a few years of, the conclusion of the construction phase. Although short in duration, such impacts are normally obvious and often highly disruptive in nature.

tonq-term impacts are those changes or stresses made to the environment during construction and operation that would substantially remain for the life of the proposed project (35-40 years) and beyond.

4.1 Environmentat Setting

The City of Lodi is located in the north-central portion of San Joaquin County, which is the northernmost county in the San Joaquin Valley, and is a part of the Central Valley. The most recent population estimate (January 1,1987) for Lodi is 45,794. In Lodi the land slopes at a rate of approximately five feet per mile from the northeast to the southwest. The climate in the

project area is characterized by hot, dry summers, and mild, wet winters. Temperatures may dip below freezing in winter with an average January minimum of 48°F. In summer, temperatures often exceed 100°F; the average July temperature is near 90°F. The mean annual rainfall is about seventeen inches and generally occurs during storms between October and April. Dense fog can occur in late autumn and early winter but as the daytime temperatures rises, it usually disperses unless a stagnant atmospheric condition exists during which time the fog may last for weeks.

3.2 Flora and Fauna

The nut and fruit orchards, the grape vineyards, the assortment of row crops, the grass and mixed grass woodlands all comprise the vegetation found in the project area. The vegetation serves as habitat for animals, erosion control, a contributor of oxygen to the atmosphere, and possibly, a neutralizer of noxious air pollution.

Since much of the project area has been in agricultural production for over one hundred years, little native California vegetation remains. However, there are numerous cherry, almond and walnut orchards, canopies of California live oak, isolated palm trees, and other ornamental and shade tree species.

The presence of mammals, birds, and reptiles occurs in direct association with vegetative communities. The agricultural land provides a food source for wildlife. In the study area, there are no natural streams that flow year round.

Impacts and Mitigating Measures: The proposed project is not expected to pose a long-term impact to wildlife species, or to degrade wildlife habitat. Project actions will not impact riparian zones, so mitigation is not necessary.

4.2.1 Threatened and Endangered Species

Consultation with the California Natural Diversity Database, the California Department of Fish & Game, and the U.S. Fish & Wildlife Service indicates there are no state or federally listed threatened or endangered species found within the immediate project area. However, several locations near the project area are identified habitat of the Giant Garter Snake. The closest known site is approximately eight-tenths of a mile west of the Thornton Road/Kettleman Lane (Highway 12) intersection.

Correspondence from the U.S. Fish & Wildlife Service (see Appendix G) indicates that the Valley Elderberry Longhorn Beetle, which is a federally listed threatened species, occurs in portions of San Joaquin County, primarily in streamside habitats. A Biological Assessment was conducted in March 1988 to determine if this species occurs within the project area, and if so, how it may be affected by the project action. According to the Jones & Stokes Associates resource ecologist, no elderberry plants were found growing in the study area. Since the beetle is a live wood pith borer that exclusively uses elderberry shrubs as its host, the beetle cannot be present in the area (Appendix G).

Impacts and Mitigating Measures: The clearance between conductors for the 230kV line single pole structure will be 18 feet at a minimum. This distance will provide ample clearance for any raptors, therefore precluding concern for mitigation, such as raptor-protecting the line. In the event threatened or endangered species are discovered and their habitat directly affected by the proposed action, agency recommended mitigation would befollowed.

4.3 Soils

The area is dominated by moderately deep to very deep soils of nearly level to gently sloping alluvial fans. These soils, Hanford - Greenfield Association loam, have a Class I capability rating assigned by the U.S. Department of Agriculture's Soil Conservation Service, and have virtually no limitations for

agricultural purposes, as is evidenced by the wide variety of crops grown in the area.

For the purpose of switching station, substation and structure construction, the bearing capacity of the soil is adequate at approximately 2,000 pounds per square foot with no expansive characteristics.

impacts and Mitigating Measures: Right of way clearing, augerinq holes for structures, switching station and substation site preparation are project activities that will have varying degrees of impacts to the area soils.

Soil disturbing activities along the rights of way will be short term and can be minimized by efficient construction methods, thereby reducing vehicular traffic. Since there is very little gradation of slope, there will be little erosional threat as a result of construction activities. The inherent productivity of the area soils will allow rapid re-establishment of native vegetation in the areas that are not cultivated.

4.4 Floodplains and Wetlands

According to FEMA Floodplain Maps Nos. 140, 145, 280, and 285 for San Joaquin County, issued March 31, 1987, and a letter dated December 18, 1987 from the Regional Director of FEMA, the project area does not !ie within a 100-year floodplain. The area east of 1-5 to just west of Lower Sacramento Road is in Zone B, which is a 500-year floodplain area, while east of Lower Sacramento Road, the area is located in Zone C, which is a minimal flooding area.

In the western-most portion of the project, small sections of unmaintained irrigation ditches represent man-made wetlands; however, this area is very small. No unique wetland wildlife habitat occurs in the project area.

The California Department of Fish & Game in their ietter dated December **14,** 1987 (Appendix G) stated, "If the project either avoids or mitigates the project's potential impact upon the wetlands (small drainage ditches), we

would concur with the finding for a mitigated Negative Declaration under CEQA guidelines."

Impacts and Mitigating Measures: Any of the small, man-made wetlands that may be affected will be spanned, or avoided entirely.

4.5 Geology and Seismicity

During the last several million years, the Great Valley filled completely with sediment eroded from the canyons of the Sierra Nevada and became dry land. Underlying these sediments are many thousands of feet of the monotonous Great Valley Sequence rocks, which appear to have begun as sediments on the floor *of* the ocean, just as the same kinds of sediments are being deposited offshore today. Most of these sediments are muddy sandstones, layered with a few layers of black basalt lava flows and beds of chert, a rock composed of the skeletons of microscopic animals all welded together by recrystallization.

The Great Valley of California, also known as the Central Valley, is about 450 miles long with an average width of about 50 miles. The northern portion of the valley is called the Sacramento Valley and the southern portion the San Joaquin Valley. The northern-most fault, the Stockton fault, which is about 14 miles south of Lodi, is the boundary generally used by geologists to separate the Great Valley into the two sub-basins. Lodi is located directly in the middle of the separation point.

Although Lodi is in seismic zone 3, which according to the 1985 Uniform Building Code requires the most stringent design factors to resist laterai forces, potentially the most active fault in closest proximity is located 22 to 32 miles west of Lodi in the Rio Vista-Montezuma area. The Stockton fault is considered inactive while the nearest historically active fault is the Antioch fault located about 30 miles southwest. The infamous and active San Andreas fault is about 70 miles southwest.

Fine grained cohesionless soils and sands of low permeability, loose to medium density in a saturated state are most susceptible to a phenomenon

called liquefaction. Liquefaction refers to the instantaneous, partial to complete loss of soil strength, and can result in a catastrophic failure of foundations.

impacts and Mitigating Measures: The line will be designed to meet eartnquake standards. It is anticipated that explosives would not be necessary because bedrock would not be encountered during pole structure placement.

The preliminary review *of* reasonably available geotechnical data for the City of Lodi does not indicate that deposits with liquefaction potential exists. When a final route has been selected, loading and structure types finalized, and a geotechnical program completed, a foundation analysis will address specific liquefaction potential.

4.6 Air Quality

The project area is located in the northern-most portion of the San Joaquin Valley Air Basin. The Basin air quality regularly violates the standards for ozone, carbon monoxide, and total suspended particulates.

From May to October, the prevailing west and northwest winds may bring poilutants from the more heavily populated Bay Area into the Lodi area. From October to February temperature inversions may occur that trap pollutants near the earth's surface.

Corona, which is the ionization of air around a charged object, occurs at the surface of a power line because the electric field strength exceeds the insulating capability of the surrounding air. During a heavy rain, corona production increases, but the noise of the rain falling is usually greater than the sound from the line.

The corona phenomenon also generates ozone and oxides of nitrogen in the air around lines. Ozone forms naturally from lightning discharge and from reactions between solar and ultraviolet radiation and air pollutants.

In the home, electronic air purifiers and some wastewater treatment systems produce ozone.

Impacts and Mitigating Measures: The proposed project would have no long term deleterious effect on air quality; however, during construction some short term increase in dust and vehicle emissions may be experienced. Typical mitigation would call for the construction contractor to provide water trucks or other dust abatement measures in areas along dirt roads where dust may be a problem.

The estimated maximum incremental ozone levels at ground level due to the proposed transmission line are insignificant - 1.129725 parts per billion (PPB). Corona-produced oxidants from the proposed line would not have an impact.

4.7 Noise

Motorized transportation corridors represent the major noise problem areas with decibel levels decreasing as the distance between the source and listener increases. Agricultural machinery and aircraft operations also contribute to background noise. Areas exposed to less than day/night average noise levels (Ldn) of 60 dBA are considered acceptable for residential development.

The noise level generated by the proposed transformers from 200 feet would be approximately 45 dBA. During periods of rain and fog some hissing and crackling may be noticed in the immediate line vicinity although the noise level for a 230kV transmission line would not exceed 45 dBA at 59 feet from the outer conductor.

Impacts and Mitigating Measures: The greatest noise impact from the proposed project would result from construction. Impacts associated with construction activities are short term in nature and not considered significant.

Noises associated with the operation and maintenance of transmission lines and substations are minimal. Substation noises are caused by vibration induced in the laminated cores of transformers as a result of the alternating magnetic flux field. Cooling fans may emit high frequency noise. However, fan noise rarely contributes to the overall noise level of the transformer. Other substation noises are the result of maintenance vehicles frequenting the site approximately once or twice weekly Eight foot tall masonry walls coupled with site landscaping will be used to abate substation noise.

4.8 Electrical and Maqnetic Field Effects

Transmission and distribution lines generate electric fields in their vicinity because of the unbalanced electric charge on the conductors, which is associated with the voltage on the transmission line. Magnetic fields are caused by current flowing in the line conductors. These magnetic and electric fields produced by power lines can induce voltage on nearby paraltei conductors such as long fences and irrigation pipes.

Because the voltage and charge on the conductors change polarity at a rate of 60 times per second, the electric fields near a transmission line also are time varying at a frequency of 60-Hz. (Hertz [Hz] is a measurement of cycles per second.) Electric fields are expressed in units of volts per meter (V/m) or kilovolts (thousands of volts) per meter (kV/m).

A 60-Hz magnetic field induces an electric field and current in conducting biological tissue. The field and current distributions from magnetic field induction are different from those from electric field induction. For a human standing erect and grounded in a vertical electric field, the induced body currents tend to be vertical while the largest total currents are present in the lower parts of the body. For magnetic fields, the induced current flows in closed loops in accord with Faraday's law -- a changing magnetic field through an area generates a voltage around the loop enclosing the area. The magnetically induced currents are largest at the periphery of the body. Generally speaking, the electric fields from transmission and distribution lines will induce larger currents than will the

magnetic fields. However, electric fields are effectively shielded by buildings, trees, shrubs, and other structures, while magnetic fields are not.

Since the mid 1960's, the main electrical environmental issues associated with power transmission systems have been corona phenomena, visual impact, and audible noise. However, in the mid-1970's, the issue of potential health impacts from electric and magnetic fields surfaced in New York State.

Under a 1980 agreement negotiated between the New York State Public Service Commission and the New York Power Authority, a five million dollar research project was conducted over a five year period. The goal of this project was to determine whether there are health hazards associated with electric and magnetic fields produced by power transmission lines, especially 765kV lines. The results of this study, *Biological Effects of Power Line Fields. New York State Power Lines Project, Scientific Advisory Panel Final Report,* were published in July 1987.

This project conducted research in seven general subject areas. The results in one of these areas, epidemiology of cancer incidence in children, has produced a great deal of controversy. This David O. Savitz, PhD. study was conducted to verify the results of a similar study completed *in* 1979 by Wertheimer & Leeper. Both of these studies used incidence data from the Denver, Colorado area.

The earlier study had been criticized for the following reasons:

- The wire coding scheme used did not take into account magnetic field contributions from sources other than external electric power lines, such as household appliances and unbalanced return currents.

- Procedures used for estimating the level of the magnetic field strengths from the wire coding scheme could have poor correlation to actual magnetic field strengths.

The latest results of the Savitz study were introduced at the November 1987 DOE/EPRI Contractors Review in Kansas City. Dr. Savitz has pointed out on several occasions during the past several months that the results of his study are "suggestive" only.

"The study by Savitz confirms the results of the previous studies to some extent and adds to the credibility of the hypothesis that exposure to extremely-low-frequency magnetic fields might be a cause of childhood cancer. It is important to bear in mind, however, that research in basic sciences has not revealed any mechanisms that could explain the role of the magnetic fields in the origin of cancer. Furthermore, the strengths of the magnetic fields observed in these studies are low, in the sense that one might be exposed to such fields almost anywhere in the environment; they are also low in the sense that they are approximately only 1/1000 of the strength of the fields usually used in experimental settings."

The Electromagnetic Energy Policy Alliance report concluded that the "epidemiological studies yield negative or equivocal results," and that most of the laboratory studies "are either negative, suffer from poor experimental design, or give rise to several unresolved questions which must be answered before their conclusions can be accepted." Further, it stated that "the overall statistical quality of these papers was low."

The IEEE has revised and expanded Standard 644-1979, *Recommended Practices for Measurement of Electric and Magnetic Fields for* **AC *Power* Lines.** The revision, IEEE Standard 644-1987, states the purpose of the standard is "to establish uniform procedures for the measurement of power frequency electric and magnetic fields from alternating current (AC) overhead power lines and for the calibration of meters used in these measurements. These procedures apply to the measurement of electric and magnetic fields close to ground level. They can also be tentatively applied to electric field measurements near an energized conductor or structure with limitations outlined (in this standard]."

Currently, electric field regulations exist in six states and one city. The following is a state by state summary of electric field limit regulations:

- Minnesota, administered by the Environmental Quality Board, allows 8kV/meter within the right of way for li es that are 200kV and above.

- Montana Board of Natural Resources & Conservation specifies 1kV/m at the edge of the right of way for lines operating above 69kV except for those 230kV or less that are ten miles in length or less. However, the landowner from whom the easement is obtained may waive the 1kV/m edge of right of way limit.

- New Jersey Department of Environmental Protection has no formal line routing process but does specify a guideline of 3kV/m for the edge of right of way limit.

- **New** 'fork Public Service Commission's routing jurisdiction applies to lines that are one miie or longer with an operating voltage of 125kV or higher, and those lines operating between 100 and 125kV that are ten miles or longer. The limit is 1.6kV/m at the edge of the right of way.

- North Dakota Public Service Commission applies an informal requirement of 9kV/m within the right of way to lines with an operating voltage of 115kV or higher.

- Oregon Energy Facility Siting Council imposes a formal administrative rule of 9kV/m within the right of way for lines that operate at 230kV and above, are longer than ten miles, and are routed through two or more political subdivisions.

To date, the City of Austin, Texas is the only municipality that sets criteria for lines that are 345kV and over with an acceptable level of 2kV/m at the center of the right of way.

The calculated electric field for the City of Lodi's proposed transmission line for both similar and different phasing (the configuration) of the conductors would be below 1kV/m at the edge of the ROW. The actual calcutated vaiues are 0.358kV/m for similar phasing and 0.406kV/m for different phasing. These levels are considered to be acceptable and are consistent with other existing 230kV lines.

The predicted maximum current for the transmission line would be 750 amps per conductor. The resulting maximum magnetic field would be 135 milligauss at the center of the ROW, and 69 milligauss at the edge of the ROW.

Magnetic fields within houses typically range from 0.1 *to* 50 milligauss. Within several inches of hausehold appliances, typical levels can be 10 to 20 times higher.

Based on the low levels of magnetic fields from the proposed line and the comparable levels to typical exposure within homes, it is highly unlikely that the levels of magnetic fields from the proposed line would have any adverse effect on biological systems.

Impacts and Mitigating Measures: In the area of the substation, trees and shrubs may be used to effectively shield the electrical fields. The walls, sheet rock, and other building materials of a dwelling also act as a shield against electrical fields.

As part of an effort to inform the public about the latest research on the effects of magnetic fields, a letter prepared by Dr. David O. Carpenter, Executive Secretary of the New York State Powerlines Project will be mailed *to* any affected landowner who requests additional information. (See Appendix F.)

4.9 Visual Resources

The proposed transmission line structures would be approximately 101 feet tall. At the base, the in-line structure diameter would be four feet. Several structures (deadend or angle structures) will require bases up to six feet in diameter. The davit arms for supporting the conductors would extend approximately eighteen feet from either side of the structure.

The project area presently contains man-made facilities that impose a variety of patterns and contrasts upon the landscape. These existing structures include electrical transmission lines, and communication towers in excess of one hundred feet in height, and other utility poles varying in height from forty to seventy feet. Other air space intrusions consist of outdoor advertising signs, highway and railroad crossing signs, and buitdings.

The low topographic relief of the San Joaquin Valley does not allow transmission lines to be screened by natural features. Native and domestic vegetation is of low heights and density so as to provide intermittent screening of structure bases only. Therefore, the contrast of the vertical structures and aerial horizontal lines of the conductors will be evident to the foreground and middle ground views in the project vicinity.

Impacts and Mitigating Measures: The addition of the transmission line structures to the existing visual setting of the area would be a residual impact, evident during the entire lifetime of the facilities. With the exception of the railroad link and the cross country alternative, all of the proposed routes are along existing roads. Therefore, the line would be seen mainly by persons living and traveling along the roads. The City of Lodi is committed to avoiding structure placement in front of any residential or commercial dwelling. The desires of the local landowners and residents will be considered when making those placement decisions.

Design features of the transmission line that will mitigate visual effects include: minimizing the number of structures by designing for spans of

800-1,300 feet; and using single steel poles that represent a narrow profile of 4-6 feet in diameter.

Additional action to be taken to mitigate visual impact of the project will be screening the substation from the roadway with masonry walls and plantings.

4.10 Cultural Resources

Consultation with the Central California information Center (Appendix G) has indicated that there are "two registered cultural resources or sites found within a one mile radius *of* the northern periphery of the project area, and one cultural resource located about 7,500 feet north of Route 12 between Ray and Free Roads." This information has been forwarded to the California State Office *of* Historic Preservation (SHPO) for their review,

fmpacts and Mitigating Measures: Since the preferred route avoids the recorded sites, no impacts are anticipated. However, should construction uncover any remains, impacts can typically be mitigated by spanning the site.

Since the entire area has been extensively disturbed by agricuiture and other land uses, it is improbable that significant cultural resources wouid be discovered as a result of project-related activities. However, in the event an archaeological site and/or any historical remains are discovered during construction activities, the City of Lodi shall immediately notify the California SHPO and solicit mitigation recommendations for appropriate action.

4.11 Socio-economics and Community Resources

The economic base *of* the area is as a center for the processing and delivery *of* the agribusiness products of the surrounding rural area. Lodi also serves as a bedroom community for many residents who commute for employment, primarily to Stockton or Sacramento, and more recently the Bay Area.

The major employers in the Lodi labor market area, which includes nearly 75,000 persons, are General Mills, Goehring Meat, Inc., Pacific Coast Producers, Holz Rubber Company, Guild Winery, and Valley Industries. The proposed facilities expansion by General Mills represents substantial and reliable productivity.

Major non-manufacturing employers include: Lodi Unified School District, Lodi Memorial Hospital, Lodi Community Hospital, The City of Lodi, Farmers and Merchants Bank, Pacific Telephone and Mervyns department store.

Social and economic impacts resulting from implementation of the proposed action would be positive. The contractor performing construction on the facilities would be encouraged to hire local labor, while the goods and services pertinent to construction personnel and operations (e.g., motels, restaurants, service stations, and recreational facilities) as well as sundry construction materials would be purchased from the local commercial sectors, thereby further bolstering the area's economy. All contractors and subcontractors must be equal opportunity employers. Probably the most significant impact of the proposed construction would be the positive impact that a more adequate and reliable energy supply would have on the lifestyle and livelihood of the City's consumers. Existing income producing operations may be expanded or utilize more modern technological methods; opportunity for new industry may be enhanced. Consumers will be assured of the quality of electric service to which they are entitled.

Impacts and Mitigating Measures: The potential impacts of the proposed transmission line on population and income are indirect. Yet the transmission line could have secondary impacts by removing an obstacle to population growth thereby allowing development at general planned densities.

4.12 Land Use

Land use adjacent to the alternative routes, includes residential, commercial, highway services, agricultural, and religious facilities. Agricultural uses include row crops, pasture, horse farms, dairies, nurseries, greenhouses, vineyards, orchards, wineries, and farm produce stands. Most of the zoning in the county is GA-40, or general agriculture with a forty acre minimum subdivision of land.

The California Land Conservation Act, known as the Williamson Act, of 1965 (as amended) provides one means of encouragement for the preservation of agricultural land. One of the provisions of the program is that agricultural land to be included in the conservation program must first be designated as an agricultural preserve by the County Board of Supervisors. Land within the preserve may be restricted to agricultural uses and uses compatible with agriculture by means of contracts between the owner and the County.

The Williamson Act has been implemented in San Joaquin County, with the first agricultural preserves being established by the Board of Supervisors in 1969. The area surrounding the City of Lodi is all land defined as prime land that is currently in preserve, and has been rezoned to GA-40, the minimum zoning classification.

The Williamson Act does allow for the taking of land within an agricultural preserve that may be required by a public agency for a public use, as long as the location is not based primarily OR a consideration of the lower cost of acquiring the land in an agricultural preserve.

Over the past ten years, the City of Lodi has also been faced with the issue of controlling expansion and growth of residentiai and other uses while protecting tl.e .gricultural lands. The Williamson Act has created pressures on local government resulting in numerous difficult questions. In an effort to control and plan for future development, the City enacted legislation by which any parcel of land to be annexed into the City would require a

majority vote of the electorate. This action is intended to improve the quality of the environment for the residents and serve to protect the air quality by retaining land in agricultural production.

impacts and Mitigating Measures: The project as proposed would take approximately seventeen acres out of agricultural production; subsequently being replaced with transmission line poles, switching station, and substation facilities. To ensure as little an impact as possible upon agricultural activities, the structure placement, although occurring on private land, would be as close to the highway right of way as possible, and utilize existing access; assuming use of the preferred alternative.

Pursuant to the Williamson Act, the San Joaquin County Board of Supervisors will be notified and their comments solicited with respect to the effect of the location of public improvements on the land within agricultural preserve.

Current patterns of crop dusting may be affected by the presence of these structures; however, this problem would be reduced by avoiding diagonal routing across fields, routing along existing roadway edges, and routing in-line with the predominant flight path over fields, rather than at **right** angles to those flight paths.

Consultation with the California Division of Aeronautics resulted in the following statement from Jack D. Kemmerly, Chief, "The preferred aiternative **wilt** place transmission lines approximately 1 and 1/2 miles to the north of Kingdon Airpark. This location plus the proposed tower heights of between 90'-110' should result in no impact to aircraft operation at the airport." (Appendix G)

5.0 EVALUATION OF ALTERNATE ROUTES

This section draws a comparison between the preferred and alternative routes, and also to the environmental concerns and potential impacts described in Section 4.0. Alternate rsutes are shown on the project area map in Appendix H. The Route Evaluation Worksheet provides the basis for this evaluation and comparison of alternatives.

5.1 Comparison of Alternate Routes

Based on the the two preceeding sections (3.0 and 4.0) in which the routes are evaluated, analyzed and ranked, and environmental impacts are illustrated, one preferred route and four aiternative routes are recommended. The alternative routes are described below and are compared in Appendix E, Table 4, Alternate Route Totals and Ranking.

As stated in section 3.0, criteria were developed to evaluate potential interconnection points, routes, and substation sites. These evaluation criteria (listed in Appendix D) represent the engineering, land use, and environmental concerns present within the study area. Each criterion is assigned a relative value of importance or weighting. These weights range in value from 5, which represents a high potential for conflict and/or cost to 1, which represents a low potential for conflict and/or cost. When the weighting is multiplied by the number of occurrences along a given route segment or link, the resulting score reflects the compatibility of the link with the specific criterion. This assumes that all occurrences relative to each criterion are of equal value. When the links are combined and totaled, the interconnection point, route and/or site with the fewest occurrences, and lowest numerical score is considered the best. Appendix E contains all route and site evaluation worksheets and a summary sheet representing the preferred route and sites. The reader is encouraged to refer to the project area map in Appendix H to visually connect the route descriptions that follow.

5.1.1 Preferred Route = Route 3

This route includes construction of a switching station at interconnection point IC-2, substation site SS-1, and link segments 3.1, 3.2, and 3.3.

This route is 6.18 miles long with a total estimated cost of $2,353,000. Route 3 has the lowest weighting score of 103.25, and provides for maximum use of existing road access, and minimal impact upon agricultural and residential land uses. The route would begin at the IC-2 point, travel south to Kettleman Lane, and proceed in an easterly direction to 700 feet west of the intersection at Lower Sacramento Road. At this juncture, the route would turn south and travel along the property line for a distance of approximately 700 feet to the extreme southwest corner.

The existing land use at IC-2 would not be excessively impacted by the project. Soils would be compacted by the travel of construction equipment; however, that condition would be short-term. There do not appear to be any long-term cumulative adverse affects.

A primary advantage of the preferred substation site, SS-1, is its present use relative to its existing and future development. This site, at the extreme southwest corner of Kettleman Lane and Lower Sacramento Road is presently zoned EA-40, and is planted in sugar beets, in the second year of their two-year cycle. The parcel is flat, appears well-drained, and is of suitable size and shape to be well-utilized. In addition, the termination of the transmission line at this location precluded the use of link 3.4, which would require an additional seven-tenths of a mile of transmission line with its accompanying cost and environmental impacts.

By siting the substation in the extreme southwest corner of this 22 acre parcel, the corner lot of 12 acres at the intersection of tower Sacramento Road and Kettleman Lane is protected for future

commercial development.

5.1.2 Alternate Route 1 (links IC-1, 1.1, 1.2, 1.3, 2.4)

This alternate would have a total distance of 7.01 miles with the switching station constructed at interconnection point IC-1 on Turner Road. The route would then proceed east along Turner Road until reaching Lower Sacramento Road, at which point the route would turn south, extending to the substation site south of Kettleman Lane.

The greatest impacts and conflicts associated with this route are the miles of existing distribution and communication lines, which parallel both sides of Turner Road and tower Sacramento Road, the special restoration efforts required in an urban area, e.g. curb, gutter, sidewalk, and street cuts, and the visual impact along residential areas in the City limits, all of which combine for a weighting score of 165.26.

5.1.3 Alternate Route 2 (links IC-2, 2.1, 2.2, 2.3, 2.4)

This route would have the interconnection point at IC-2, from which the line would travel southwesterly along Thornton Road for approximately 1,200 feet. Since Sargent Road does not extend all the way *to* Thornton Road, the route would traverse easterly, bisecting agricultural fields to connect with Sargent Road. The route then parallels Sargent Road to Lower Sacramento Road, at which point it turns south until reaching SS-1, south of Kettleman Lane for a total distance of 6.43 miles. The impact on agricultural land, as well as the number of miles requiring new construction and maintenance access, contributed to a weighting score of 149.88, and eliminated alternate route 2 from consideration.

5.1.4 Alternate Route 4 (links IC-2, 4.1, 4.2, 4.3)

This alternate would also emanate from IC-2, and would travel

south along Thornton Road until reaching Kettleman Lane, at which point, it would turn east and run to Ray Road. At Ray Road, the route would run south until reaching the old railroad grade, a distance of approximately 1,400 feet, where the route would travel cross country in an easterly direction for approximately 3.4 miles There are high impacts on agricultural operations along this alignment due to the fields siting, as well as the number of miles requiring new construction and maintenance access. These impacts contributed to a weighting score of 119.05 with a total distance of 6.27 miles.

5.1.5 Alternate Route 5 (links IC-2, 5.1, 5.2, 5.3, 5.4)

Alternate Route 5 would have the switching station constructed at IC-2, the route would then travel south along the east side of Thornton Road until reaching Kettleman Lane, at which point it would run in an easterly direction to the railroad tracks. After crossing the tracks, the route would turn south and travel along the east side of the railroad, on private agricultural land, to Harney Lane. At this location, the line parallels Harney Lane on the south side for 2.35 miles to the Lower Sacramento Road intersection where it runs north to SS-1. This route alignment would not only remove land from agricultural production and require an additional $84,800 in construction costs to underground the existing railroad communication lines but would also parallel miles of existing distribution and communication line along Harney Lane, along with irrigation ditches on both sides of Harney Lane. This route would necessitate a number of angle structures. These impacts contributed to a weighting score of 174.02 and a distance of 7.54 miles.

5.1.6 Alternate Route 1A (links IC-1, 1.1, 1.1.1, 2.1.1, 3.2, 3.3)

Alternate Route 1A received the fourth lowest ranking as a result of having 6.17 total miles of distance with a cumulative total score of 128.44. IC-1 would serve as the interconnect point, with the line

running east along Turner Road until turning south and paralleling the railroad to Kettleman Lane. By paralleling the tracks, the line would avoid the miles of existing distribution and communication line along' Turner Road, but would increase the construction costs by $180,000 through mitigation efforts to avoid interference on the railroad's communication lines. In addition, this route alignment would remove land from agricultural production, and create difficulty for agricultural operations by placing pole structures in the fields.

5.1.7 Alternate Route 1B (links IC-1, 1.1, 1.1.1, 2.2, 2.3, 2.4)

This alternate would also emanate from IC-1, and would travel east along Turner Road until turning south and paralleling the railroad to Sargent Road, along which it would travel until reaching Lower Sacramento Road. At Lower Sacramento Road, the route proceeds south to Kettleman Lane and SS-1 site for a total distance of 6.59 miles. The miles of existing distribution and communication tines along Sargent Road, the increase in construction costs by $93,600 for undergrounding the railroad's communication line, and the mites requiring tree removal or trimming eliminated this alternate route with a score of 154.26

5.1.8 Alternate Route 1C (links IC-1, 1.1, 1.2, 1.2.1, 2.2.1, 3.3)

Beginning at IC-1, this route would travel along Turner Road until turning south at Davis Road and extending to Kettleman Lane, at which point it would run in an easterly direction *to* SS-1 for a total distance of 6.89 miles. The major impacts aiong this route are a result of the visual intrusion along Davis and Turner Roads and Kettleman Lane, as well as the miles of existing distribution and communication lines, and tree trimming or removal, with a weighting score of 140.18.

5.1.9 Alternate Route 1D (links 1C-1, 1.1, 1.2, 1.2.1, 2.3, 2.4)

Alternate Route 1D is similar to 1C with the exception that the route would travel south along Davis Road to Sargent Road, at which point it would turn east to Lower Sacramento Road, and would travel south to Kettleman Lane to the substation site. The location of the line on Lower Sacramento Road would require special restoration efforts, would have several angles greater than 60°, and would visually impact the medium density residential developments within the City limits. The weighting score is 155.05 with a total distance of 7.00 miles.

5.1.10 Alternate Route 2A (links 1C-2, 2.1, 2.1.1, 3.2, 3.3)

With the switching station constructed at 1C-2 east of Thornton Road, this route would travel south along Thornton Road and connect to Sargent Road via a field edge dirt road rather than interrupting agricultural activities and creating the necessity of totally new construction and maintenance access by cutting straight east across cultivated fields. At the intersection of Ray and Sargent Roads, the line would follow an easterly direction until turning south at the railroad tracks and would parallel the tracks until reaching Kettleman Lane, at which point it would travel east to just before the intersection of Lower Sacramento Road where it would turn south and proceed to the substation site. Since the route would parallel the railroad tracks and create interference on the railroad's communication lines resulting in an increase of $86,400 to construction costs to underground the communication lines, this alternate has a score of 124.06 and a total distance of 6.07 miles,

5.1.11 Alternate Route 2B (links 1C-2, 2.1, 2.2, 2.2.1, 3.3)

Following the same departure from the switching station site as Alternate Route 2B, this route would travel east along Sargent Road until reaching Davis Road, at which point it would turn south to Kettleman Lane where it would proceed in an easterly direction to

the intersection of Lower Sacramento Road where it would turn south and proceed to the substation site. The constraints are similar to Alternate Route 2A, with a total weighting score of 135.01 for a distance of 6.32 miles.

5.2 Comparison of Alternate Single Circuit Routes

Since two separate single circuit alternatives have been considered as a means of providing additional transmission line reliabiiity, and these routes represent unique opportunities, three primary single circuit routes have been examined.

Although there are no new primary routes within the single circuit scenario, the link combinations reflect the necessity *of* maintaining integrity for each circuit - no circuit or pole occupies a common right of way.

The same constraints exist for the alternate single circuit routes as for the double circuit alternate routes.

5.2.1 Alternate Single Circuit Route 1 (links IC-2, 2.1, 2.2, 2.3, 2.4 and IC-2, 3.1, 3.2, 3.3)

With the switching station located at IC-2, one single circuit route follows Route 3, while the second single circuit follows Route 2 to the preferred substation site south of the intersection of Kettleman Lane and Lower Sacramento Road. The combined distance for these single circuit routes is 12.61 miles with a weighting score *of* 238.20.

5.2.2 Alternate Single Circuit Route 2 (links IC-2, 2.1, 2.1.1, 3.2, 3.3 and IC-2, 4.1, 4.2, 4.3)

These routes also emanate from IC-2 with one circuit following the path of Route 4, and the other circuit following the direction of Route 2A, with both terminating at SS-1. The distance covered for both single circuits is 12.28 miles with a weighting score of 228.22.

5.2.3 Alternate Single Circuit Route 3 (links IC-2, 2.1, 2.2, 2.2.1, 3.3 and IC-2, 5.1, 5.2, 5.3, 5.4)

One single circuit departs IC-2 and follows the path of Route 2B while the other single circuit takes the same direction as Route 5. This configuration, as is the case with the other two separate single circuit routes, avoids a common right of way. The weighting score is 294.58 and the total distance is 13.86 miles.

5.3 Comparison of Substation Sites

Three sites near the City's Henning Substation have been considered for the new 230-60kV substation. While all three locations are acceptable, the preferred site at this time is located approximately 700 feet south of the southwest corner of the intersection of Lower Sacramento Road and Kettleman Lane

5.3.1 Substation Option SS-1

This site is located on the south side of Kettleman Lane at the extreme southwest corner of Kettleman and Lower Sacramento Road. Its major advantages are a shorter 230kV line than option SS-3 and lower site purchase and preparation costs than SS-2. Its disadvantage is that the 60kV lines required to connect to the City's existing transmission system are more complicated and costly than for the other sites. However, there is enough acreage at this location to accommodate the ten acre substation and associated facilities site, as well as a 12 acre site for future commercial development at the intersection of Lower Sacramento Road and Kettleman Lane. The estimated acquisition, site preparation, and construction costs for a substation at the SS-1 site is $4,505,000.

5.3.2 Substation Option SS-2

This site is located on the southeast corner of Kettleman Lane and

Lower Sacramento Road. Advantages of this site include less 230kV line than option SS-3 and less new 60kV line than option SS-1. The disadvantages are this site has the highest purchase cost of all alternatives, has recently been acquired as the site for future commercial development, and has an existing gas station that would require removal. The estimated acquisition, site preparation, and construction costs of a substation at the SS-2 site is $5,255,000.

5.3.3 Substation Option *SS-3*

This site is located on the north side of Kettleman Lane just west of the Woodbridge Irrigation District (WID) canal that is adjacent to Henning Substation. It is an acceptable site physically and electrically. Its advantage is easy access to the 60kV line to Henning Substation and the 60kV loop to Killelea and McLane Substations. Its disadvantages are additional 230kV line with distribution underbuild would be required from Lower Sacramento Road to the substation, and the proximity of the WID canal with the resultant operations and maintenance difficulties. The estimated acquisition, site preparation, and construction costs for a substation at the SS-3 site is 84,505,000.

5.3.4 Substation Option SS-4

Construction of the 230-60kV substation at the site of the WESTERN interconnection was also considered, but rejected for the following reasons:

- Three (3) 60kV circuits would have to be constructed from the new station to the City's 60kV transmission system to provide the same capacity, reliability and flexibility as the proposed 230kV interconnect line.

- A double circuit 60kV line would likely be constructed along the route of the proposed 230kV line, resulting in almost

identical right of way requirements and environmental considerations.

- An additional single circuit 60kV line would be constructed parallel to Turner Road, Sargent Road, Harney Lane, or along the cross-country route requiring additional right of way and increasing the environmental impacts.

- Losses on the 60kV lines would be significantly greater than 230kV lines.

- Voltage regulation on the 60kV circuits would be questionable.

5.4 Comparison of Interconnection Point Alternatives

Two alternative points of Western interconnection have been identified. The points are located approximately five miles west of Lodi within the right of way of an existing WESTERN 230kV transmission line. A second WESTERN 230kV transmission line and a PG&E 230kV transmission line are also present in this right of way corridor.

5.4.1 Interconnection Point #1 (IC-1)

This location is immediately east of Thornton Road on the south side of Turner Road. The spacing of existing WESTERN and PG&E transmission line towers presents a somewhat difficult arrangement for the design and construction of a switching station/interconnection point at this location. Other constraints at this site are imposed by the proximity of a residence and farm buildings (within 300 feet), and the impacts of a switching station within 300 feet of existing towers, thereby causing a cumulative negative effect upon agricultural operations.

5.4.2 Interconnection Point #2 (IC-2)

This site is approximately three-quarters of a mile south of Turner

Road, east of Thornton Road. The spacing of existing transmission line towers at this location optimizes the ability to construct a switching station that would allow for enough clearance under the structures. While the area has historically been cultivated (although currently fallow), the proposed 260' x 350' switching station and associated facilities would encompass seven acres stretching from the edge of Thornton Road, which would not create as great of an impact to agricultural operations as siting a facility in the middle of the field.

6.0 ENVIRONMENTAL CONSEQUENCES

6.1 Significant and Unavoidable Environmental Effects

As has been stated several times in preceding sections of this document, there are no significant environmental effects associated with the City of Lodi's 230kV transmission line, switching station, and associated substation facilities.

Potential significant impacts, such as effects upon agricultural activities, effects on existing high density residential and commercial areas, visual impacts, and the unknown effects of electric and magnetic fields, were identified during routing studies and from discussions with governing agencies' personnel. However, since ***each*** alternative route would traverse prime farm land, would pass residential and commercial areas, and would expose humans and animals to electric and magnetic fields, these unavoidable project impacts would be minimized by appropriate mitigation as described in Section 4.

Public comment will be received subsequent to the availability of the Draft EIR. Public comment will be addressed and incorporated into the Final Environmental impact Report and factored into the overall project evaluation.

6.2 Mitigation Measures Proposed to Minimize the Environmental Effects

Types of impacts were first identified by considering what effects activities associated with the proposed action could have on the pre-project environment. Each alternative corridor identified for the project encompasses a 50 foot wide right of way. All potential impacts occurring within 1,300 feet of the right of way were analyzed and evaluated in Section 3, tables 2, 3, 4; examined in Section 4, and summarized in fection 5. Mitigating measures were also identified within each er vironmental category and were specific to the impact in Section 4.

6.3 The Relationship Between Local Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity.

For purposes of this section, short-term has been defined as 35-40 years (the estimated life of the proposed project), and long-term as the period thereafter.

Within the life of the project, the construction phase would represent the period of greatest environmental impact involving approximately six miles of 230kV transmission right of way for the preferred route.

Construction within the preferred corridor would result in disturbance to approximately seven acres for transmission structure and line installation, seven acres for construction of a switching station, and ten acres for installation of the new **230kV-60kV** substation and associated facilities.

Following the construction phase of the project, the majority of the land disturbed would begin to revert to its preconstruction use. At each location an approximate 150 square foot area would be disturbed by the construction **with** about one-half of the disturbed area to be rehabilitated. **The** total area to be occupied by the typical tangent single pole structure would be approximately 80 square feet. The final area surrounding the substation site would occupy approximately ten acres.

Most resources within the physical, biological, human, and cultural environments would experience short-term impacts resulting from construction activities. Long-term effects and productivity would depend on the continued existence of the proposed project's facilities, or the continued use of the right of way as a utility corridor.

6.4 Significant Irreversible Environmental Changes and Commitment of Resources

Resources committed to the proposed project would be material and non-material, and would include financial resources. Irreversible commitment of resources for the purpose of this section have been interpreted to mean those resources that are committed to the project and would continue to be committed throughout the estimated 35-40 year life of the project, and beyond as the line would remain in service as long as electricity to the City's subject areas is required.

irreversible commitment of resources would apply to biological and visual resources. Biological resources would be irreversibly committed due to the disturbance and loss to vegetation and wildlife during construction and operation. Visually the line would represent a degradation of the natural scenic quality for the life of the project.

6.5 Growth inducing Impacts

Growth inducing impacts resulting from construction of the proposed project would not directly foster economic or population growth. The City's peak load is presently exceeding the stated capacity of the PG&E transmission facilities over which the City currently receives all of its power. Residential and industrial subdivisions, and any future annexation impacts must be assessed when long-term needs are considered, and water, sewer, roads, and electricity eventually provided. The project would provide adequate, reliable electric service to these steadily growing areas.

The areas of todi that the project is proposed to service are areas that have steadily increasing populations and commercial development. Despite the

fact that annexation initiatives continue to be defeated, thereby precluding the need for immediate community services for new property, the growth and expansion of existing industrial developments continue to occur. One such expansion is anticipated to require an additional 10 to 12 megawatts of power by 1990.

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APPENDIX A

INITIAL STUDY

Power
Engineers Incorporated

Project No.: _____
Copy No.: _____
Issued To: _____

INITIAL STUDY

FOR

THE CITY QF LODI

DIRECT INTERCONNECTION PROJECT

SEPTEMBER 1987

FOR INFORMATION REGARDING THIS DOCUMENT, CONTACT:

- FRANK ROWLAND

AIRPORT WAY
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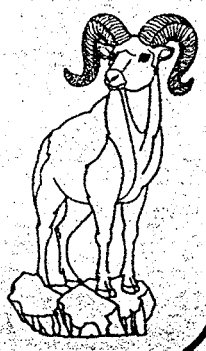


CITY OF LODI
DIRECT INTERCONNECTION PROJECT
INITIAL *STUDY*

TABLE OF CONTENTS

Date Filed _____

INITIAL STUDY

CITY OF LODI
DIRECT INTERCONNECTION PROJECT

Project Purpose

The City of Lodi (City) operates transmission and distribution systems which provide reliable electric service to the City's customers. At present, the City does not independently own or operate any generation facilities. However, through its membership in the Northern California Power Agency (NCPA) and through participation in several NCPA resource projects, the City has access to several long-term power resources. The City, through its membership in the Transmission Agency of Northern California (TANC), is also participating in the development of the California-Oregon Transmission Project (COTP) which will enable the City (through NCPA) to participate in the power market in the Pacific Northwest. The City also has an allocation of federal power from the Western Area Power Administration (WESTERN) Central Valley Project (CVP).

Under its present operating configuration, the City must wheel its non-WESTERN resources through the interconnected transmission system of the Pacific Gas and Electric Company (PG&E).

The existing system, which serves the City, consists of four 60kV feeders from PG&E's Lockeford Substation to PG&E's Lodi Substation, which is adjacent and connects to the City's Killelea Substation. The terms and conditions which control the City-PGSE interconnection are detailed in a 1983 Interconnection Agreement between PG&E and NCPA. Based upon NCPA forecasts of peak loads, and PG&E's earlier forecasts of available capacity between Lockeford and Lodi, this agreement provides for approximately 77 megawatts (MW) of firm transmission service between the PG&E system and Lodi in the year 1988, prior to system reinforcement. PG&E has agreed to provide for additional load on the existing transmission lines. This system will require yet to be determined reconstruction in the near future. This condition is being reviewed on a yearly basis and will eventually result in a request by PG&E for

the City to pay for reconstruction of PG&E's lines. An alternative would be for the City to construct the proposed interconnection with WESTERN.

The City is currently contemplating the construction of a direct transmission interconnection between the City's system and the WESTERN transmission system. The construction of a Direct tnterconnection Project (Project) with WESTERN would provide the City with several benefits. The benefits inciude the following:

1. Provide for transmission service for the City's WESTERN power allocation and the City's share of other joint projects (NCPA *Resources, and purchases through the California-Oregon Transmission Project).

2. Improve the reliability of service and voltage regulation to the City's customers in the face of load growth by increasing the number of ties to the City with the Northern California Transmission system.

3. Provide firm, reliable capacity to new customers, particularly to anticipated industrial growth.

4. Enable the City to enter into future transactions on a direct basis with WESTERN and others.

5. Reduce the long-term cost of service to the City's power customers through rate stabilization.

Given the present phase of project feasibility cost savings can potentially be realized through the implementation of this Project. first, with a direct interconnection in place, the City would receive a direct service discount on power purchases from WESTERN. Second, there are considerable differences between the wheeling rates charged by **WESTERN** and those charged by PG&E. Based on preliminary calculations, the wheeling savings could be significant. An in-depth cost analysis will be conducted by NCPA during fate 1987- early 1988.

As the project progresses, detailed economic analyses and engineering planning studies will be conducted. These data will be used to further assess the potential project benefits, and would be incorporated into subsequent project documentation.

Project Description

Conceptually, the project would consist of three major elements:

- Connection to WESTERN Transmission Lines
- 230kV Transmission Line
- 230-60kV Substation

Preliminary siting analysis has identified suitable sites to interconnect with the WESTERN Transmission line north of State Highway 12 (Kettleman Lane) between I5 and Thornton Road. (See Project Area Map - Appendix A) This interconnection would require either installing a new structure mid-span between two existing transmission towers, or replacing an existing tower.

From the point of interconnection with WESTERN's system, a double circuit 230kV transmission line would be constructed. As presently conceived, the line would be built using single tubular steel poles (see drawing, Appendix B). The transmission line would terminate at a new 230-60kV substation to be constructed adjacent to the City's Henning Substation at Kettleman Lane and Ham Lane. The new substation will be designed for reliability and flexibility. Two (2) 230-60kV transformers will be included, each having the capacity to provide for the entire City load under most conditions. The 60kV portion of the new station will be designed as a six (6) breaker ring bus. This will allow the Mctane Substation and the Henning Substation to be on separate circuits and will provide for two (2) future 60kV circuits which will be needed to support future growth. No remodeling of the existing Henning Substation will be required and no outage will be required to make the new connections. Several alternative transmission line routes have been identified. Prior to final route selection it may be necessary to define the probable impacts upon alternative routes, and to define the most environmentally preferred and cost effective route. However, preliminary studies indicate a feasible alternative may be to parallel Kettleman Lane from near the I5/Thornton Road intersection to the new substation, a distance of approximately six miles. The transmission line right of way

would require the acquisition of easements on private lands, and an encroachment permit from CALTRANS.

To accommodate the capacity and voltage of the transmission line, a new substation would be required. In order to connect to the City's existing system, the new substation, requiring approximately three acres, would be constructed adjacent to the Henning Substation on Kettleman Lane.

The interconnection of WESTERN and City facilities would enable WESTERN to loop its system through City facilities. That interconnection would enhance reliability and accommodate City load growth, such as the facilities expansion proposed by General Mills.

CITY OF LODI - DIRECT INTERCONNECTION PROJECT
INITIAL STUDY

General Information - **CEQA** Appendix **H**

1. Name and address of developer or project sponsor: City of Lodi - Electric Utility Department, Henry Rice - Director, 221 West Pine Street, Call **Box 3006** Lodi, CA 95241-1910

2. Address of Project: N/A - See Project Area Map - Appendix A.
Assessor's **Block** and Lot Number: N/A

3. Name, address, and telephone number of person to be contacted concerning this project: Henry Rice - Electric Utility Director, 221 West Pine Street, Call Box 3005, Lodi, CA 95241-1910. **(209)333-6762**

4. Indicate number of the permit application(s) for the project to which this form pertains: N/A

5. List and describe any other related permits and other public approvals required for this project, including those required by city, regional, state and federal agencies: Certification and filing of Notice of Determination by the City; San Joaquin County Development Plan Permit for the Substation; CALTRANS Encroachment Permit; Environmental Determination by Western Area Power Administration.

6. Existing zoning district; GA-40, **H-S,** EA/AP-40, C-2/L

7. Proposed use of site (Project for which this form is filed): Double Circuit **230kV** Transmission tine - approximately **6** miles; associated interconnection structure and substation. See attached map and drawing, Appendixes A&B.

8. Site size: Linear right of way approximately 5.8 miles in length; approximately **1.5** miles requiring a 100 foot right of way; approximately **4.3** miles requiring a

45 foot overhanging easement; and a substation requiring approximately 3 acres.

9. Square footage: Approximately 41.6 R/W acres; 3 acres for substation.

10. Number of floors of construction: N/A

11. Amount of off-street parking provided: N/A

12. Attach plans: The project facilities would be constructed according to standards established by California General Order 95 and the National Electrical Safety Code. Project design phase has not begun. (See Schedule, Appendix C)

13. Proposed scheduling: (See Appendix C)

14. Associated project: None

15. Anticipated incremental development: May allow additional transmission reliability to new City load centers.

16. If residential, include the number of units, schedule of unit sizes, range of sale prices or rents, and type of household size expected. N/A

17. If commercial, indicate the type, whether neighborhood, city or regionally oriented, square footage of sales area, and loading facilities: N/A

18. If industrial, indicate type, estimated employment per shift, and loading facilities: N/A

19. If institutional, indicate the major function, estimated employment per shift, estimated occupancy, loading facilities, and community benefits to be derived from the project: (See Project Purpose and Project Description)

20. if the project involves a variance, conditional use or rezoning application, state this and indicate clearly why the application is required. No Variance, conditional use, or rezoninq would be required.

According to initial Study concerns (CEQA), the following items either apply or do not apply to the Project. Appropriate discussion follows items checked "Yes."

	Yes	No
21. Change in existing features of any bays, tidelands, beaches or hills, or substantial alteration of ground contours.	____	X
22. Change in scenic views or vistas from existing residential areas or public lands or roads. Change in pattern, scale or character of general area of project.	X	____

The proposed transmission line structures (see Appendix B) would be approximately eighty to ninety feet tall. At their base the structure diameter would be from four to six feet. The davit arms for supporting the conductors would extend approximately eteven feet from either side *of* the structure.

The presence of these structures along the edge of fields may affect current patterns of crop dusting.

A residual impact, evident during the entire lifetime of the facilities, would be the addition of transmission line structures to the existing visual setting of the area. However, the project area presently contains man-made facilities which impose a variety of patterns and contrasts upon the landscape. These existing structures include electricai transmission lines, and communication towers in excess of one hundred feet tall, and other utility poles varying in height from forty to seventy feet. Other air space intrusions consist of outdoor advertising signs, highway and railroad crossing signs, and buildings.

Substation site requirements would be approximately three acres. Currently available land for this facility is in agricultural use. Therefore,

the construction of this facility would take land out of agricultural production.

	Yes	NO
23. Significant amounts of solid waste OF litter.	____	X
24. Change in dust, ash, smoke, fumes or odors in vicinity.	X	____

Line and substation construction activities may generate short-term localized increases in dust and vehicle emissions. Standard dust abatement measures would be instituted in the event mitigation were necessary.

25. Change in ocean, bay, lake, stream or ground water quality or quantity, or alteration **of** existing drainage patterns.	____	X
26. Substantial change in existing noise or vibration levels in the vicinity.	____	X
27. Site on filled land **or** on slope of 10 percent or more.	____	X
28. Use or disposal of potentially hazardous materials, such as toxic substances, flammables or explosives.	____	X
29. Substantial change in demand for municipal services (police, fire, water, sewage, etc.).	____	X
30. Substantial increase **of** fossil fuel consumption (electricity, oil, natural **gas,** etc.).	____	X
31. Relationship to a larger project or series of projects.	____	X

Environmental Setting

introduction

The Project area is bounded roughly by I5 on the west, Ham Lane on the east, Turner Road on the north and Kettleman Lane (Hwy 12) on the south. The majority of the project area is within the County, except for a short connection between the proposed new substation and the Henning Substation, and two areas of residential development west of Lower Sacramento Road.

The scale and type of development along alternative routes varies greatly. Turner and Sargent Roads are typical quiet country lanes bordered by family farm operations. Kettleman Lane is a major transportation corridor through agricultural lands. Development is limited to isolated dwelling/agriculture/commercial related structures numbering fewer than a dozen. In contrast however, any alternative utilizing portions of Lower Sacramento Road would encounter much higher density residential and commercial/retail development.

1. Living Components

1.1 Vegetation

in areas of intensive agricultural practices, California's irrigated agriculture has largely replaced native vegetation. This is particularly true in the Central Valley where the importation of water from the Sierras has allowed extensive conversion of natural habitat to agricultural uses. Vegetation within the Project area consists almost exclusively of agricultural crops- Vineyards constitute the most agricultural acreage. Other crops of alfalfa, almonds, English walnuts, corn, sugar beets, and market produce are representative in lesser acreages. Minor plots of wasteland are present as drainage ditches, and areas severed from a larger parcel by other land uses.

Project vegetation removal would be confined to that displaced during structure placement, as well as some trampling and displacement by construction vehicles along the right of way.

1.2 Wildlife

A long history of intensive agricultural practices on lands within the Project area has eliminated most native wildlife habitats. Wildlife within the study area consists mainly of small mammals, common song birds and raptors, shore birds and ducks, and representative common reptiles and amphibians. No adverse impacts to area wildlife are anticipated as a result of placement and presence of proposed facilities.

1.3 Threatened and Endangered Species

No state or federally listed threatened or endangered taxa are found within the immediate project area. However, a check of the California Natural Diversity Data Base indicates the presence within close proximity to the study area of three species with state and/or federal protective status. The three species are: Swainson's Hawk, California Black Rail, and the Giant Garter Snake. Swainson's Hawk sitings have been fairly common four to five miles north and south of the project area; however, no nests have been found. California Black Rail are known to inhabit the headwaters of White Slough, approximately six miles southwest of the study area. Several locations near the Project area are known to harbor the Giant Garter Snake. The closest known site is approximately eight-tenths of a mile west of the Thornton Road, Highway 12 intersection.

The project would not displace any representative of a threatened or endangered species, nor would their habitats be adversely affected.

2. Non-Living Components

2.1 **Soils**

According to generalized Soil Classifications mapped and described in the San Joaquin County General Plan (pp. 14&15), the majority of lands in the Lodi area consist *of* **soils** of the Hanford-Greenfield Association. These lands are rated **by** the US. Soii Conservation Service as Class I and II. The capability definition of this classification is: "Land able to produce most locally adaptable crops and its ability to produce is only slightly limited by any characteristic of the soil itself." (U.S.D.A., S.C.S. Report and general Soil Map, San Joaquin County, California, March 1967.) These lands are considered prime farm lands, and represent a valuable county resource. The proposed action would not pose any long term impacts on area soils.

For engineering purposes, the Hanford-Greenfield Association has a bearing capacity of about 2000 pounds per square foot, and **no** expansive characteristics, making it a satisfactory load bearing soii.

2.2 Geology and Seismicity

The Project area is located in the San Joaquin Valley portion of the Central Valley of California. **A** sequence of sedimentary rocks up to 60,000 feet thick has filled the valley. These deposits are underlain by basement rocks composed of metasediments, volcanics, and granites. The Midland Fault Zone is the nearest seismic area, and lies approximately 20 miles west **of** Lodi. Based upon the inactive status of this fault, the area has not been identified as a Special Studies Zone within the definitions of the Alquist-Priolo Act. However, appropriate design elements would be utilized to conform to Seismic Zone 3 requirements.

2.3 Air **Quality**

The Project area is located within the San Joaquin Valley Air Basin. Violations of air quality standards occur periodically as a result of heavy vehicular traffic during stagnant atmospheric conditions.

The proposed project would have no long term deleterious affect on air quality. Some short term increase in dust and vehicle emissions may be experienced during construction .

2.4 Visual Resources

(See page 8, item 22)

2.5 Cultural Resources

According to records of the California State Office of Historic Preservation, no registered culturai resources or sites 3re found within the project area. As the entire area traversed by alternative routes has been extensively disturbed by agriculture and other land uses, it is highly unlikely that significant cultural resources would be discovered via Project related activities. In the event a culturally significant site were encountered, recommendations for mitigation would be solicited from the California SHPO and appropriate action taken.

2.6 Floodplains and Wetlands

No Project lands are within a 100 year floodplain. In the western-most project area, small sections of drainage-ways represent wetland areas. However, the area of wetland acreage is very small. No unique wetland wildiife habitat is found in t' : Project area. In the even. a structure must be placed in a wetland, appropriate design criteria wouid be utilized to ensure structure and line integrity. Subsequent to commencing line design, site specific analyses would be conducted and appropriate recommendations made. Typical options available to the designer include drilled pier and casing, driven pile, or spread footer foundation.

2.7 **Land** Use and Ownership

All lands traversed by proposed alternative routes are in private or CALTRANS ownership. The preferred route is entirely within San Joaquin County, and traverses lands mostly in agricultural uses. Commercial uses are represented by the Saddle City highway services complex at IS and Highway 12; a tackle and bait shop, and two roadside fruit and vegetable markets on Highway 12. Zoning within the Project Area is primarily GA-40 - General Agriculture - 40 acre minimum; HS - Highway Service; EA/AP-40 - Exclusive Agriculture/Agricultural Products - 40 acre minimum; C-2/L - Community Commercial/Limited Combining Zone; with the commercial developments being H-S, EA/AP-40, C-2/L. The project as proposed would take approximately 4.5 acres out of agricultural production; being replaced with transmission line poles and substation facilities.

2.8 Noise

In San Joaquin County, transportation corridors, both highway and railroad, represent the major noise problem areas. This is especially so within the Project area where traffic on I5, Highway 12, and Lower Sacramento Road generates the highest noise levels. Agricultural machinery and aircraft operations also contribute to the background noise.

The proposed Project would effect short-term increases in noise levels with the use of various vehicles and machinery during construction and maintenance. During periods of rain and fog some hissing and crackling may be noticed in the immediate line vicinity. This noise level may reach 45dBA at 50 feet from the outer conductor of a line such as that being proposed. This level is approximately the same as experienced in most residences located in urban areas. Noise generated by substation equipment would be confined to an approximate 45dBA level of the power transformers.

The San Joaquin Council of Governments allows a noise level of 65dBA at the property line in residential developments.

2.9 Electrical Effects

Electric fields in the vicinity of overhead high-voltage transmission lines are a result of voltage on the line conductors. Magnetic fields are caused by current flowing in the line conductors.

Normally there are no adverse perceivable effects of electric fields from those lines which operate at a voltage of 230,000 volts or less. No adverse effects are anticipated to be perceived as a result of Project facilities.

Magnetic field effects of overhead transmission lines are normally of much less significance than electric field effects. An exception might exist for very long, parallel metal objects. Electrical grounding of such objects to eliminate perceptible field effects may be necessary at more than one location and the electrical continuity of these objects may have to be broken.

Electric utilities normally ground or bond objects as necessary during line construction. The City would work with property owners to ensure that any new installations of fixed metal objects will not deliver annoying shocks. The City would also investigate and help resolve any reported instances of annoyance.

In general, overhead high-voltage transmission lines do not interfere with normal television or radio reception off the utility right of way. However, interference attributable to high-voltage lines is possible with a location close to the right of way, weak broadcast signals, an abnormal line condition, or poor receiving equipment. Utility experience has been that such occurrences are few and generally correctable. While transmission lines are not often found to be the cause of interference, the City would be prepared to investigate and resolve complaints.

3. Certification

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this initial evaluation to the best of my ability, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

September 28,1987
Date

Signature (Frank L. Rowland,
POWER Engineers, Inc.)

For City **of** Lodi Electric Utility Dept.

4. CEQA - APPENDIX I

ENVIRONMENTAL CHECKLIST FORM

I. Background

1. Name of Proponent City of Lodi - Electric Utility Department
2. Address and Phone Number of Proponent 221 West Pine Street
   Call Box 3006, Lodi, CA 95241-1910
3. Date of Checklist Submitted September 28,1987
4. Agency Requiring Checklist City of Lodi - Community Development
5. Name of Proposal, if applicable City of Lodi Direct Interconnection Project

II. Environmental Impacts

(Explanations of ail "yes" and "maybe" answers are included or referenced.)

	Yes	Maybe	No
1. Earth. Will the Proposal result in			
a. Unstable earth conditions or in changes in geologic substructures?	___	___	X
b. Disruptions, displacements, compaction or overcovering of the soil?	X	___	___

Soil disruption would occur on a localized basis as a result of augering holes for directly imbedded poles, or from excavations required for pole and substation structure foundations.

Some soil compaction would occur as a result of construction vehicle travel along the right of way.

	Yes	Maybe	No
c. Change in topography or ground surface relief features?	___	___	X
d. The destruction, covering or modification of any unique geologic or physical features?	___	___	X
e. Any increase in wind or water erosion of soils, either on or off the site?	___	___	X
f. Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet or lake?	___	___	X
g. Exposure of people or property to geologic hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards? (See page 12, item 2.2)	___	X	___
2. **Air.** Will the proposal result in			
a. Substantial air emissions or deterioration of ambient air quality?	___	___	X
b. The creation of objectionable odors?	___	___	X
c. Alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally?	___	___	

	Yes	Maybe	No
3. Water. Will the proposai result in:			
a. Changes in currents, or the course of direction of water movements, in either marine or fresh waters? -	___	___	X
b. Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	___	___	X
c. Alterations to the course of flow of flood waters?	___	___	X
d. Change in the amount of surface water in any water body?	___	___	X
e. Discharge into surface waters, or in any alteration of surface water quality, including but not limited to temperature, dissolved oxygen or turbidity?	___	___	X
f. Alteration of the direction or rate of flow of ground waters?	___	___	X
g. Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?	___	___	
h. Substantial reduction in the amount of water otherwise available for public water supplies?	___	___	X

	Yes	Maybe	No
i. Exposure of people or property to water related hazards such as flooding or tidal waves?	___	___	X

4. Plant Life. Will the proposal result in:

a. Change in the diversity of species, or number of any species of plants (including trees, shrubs, grass, crops, and aquatic plants)?	___	___	X
b. Reduction of the numbers of any unique, rare or endangered species of plants?	___	___	X
c. Introduction of new species of plants into an area, or in a barrier to the normal replenishment of existing species?	___	___	X
d. Reduction in acreage of any agricultural crop?	X	___	___

Substation site requirements would be approximately three acres. Currently, available land for this facility is in agricultural use. Therefore, the construction of this facility would take that land out of agricultural production.

Placement of transmission poles at the edge of fields could potentially affected approximately one and one-half acres of agricultural land.

5. Animal Life. Will the proposal result in:

a. Change in the diversity of species, or numbers of any species of animals (birds,			

	Yes	Maybe	No
land animals including reptiles, fish and shellfish, benthic organisms or insects)?	____	_____	X
b. Reduction of the numbers of any unique, rare or endangered species of animals.	____	_____	X
c. Introduction of new species **of** animals into an area, or result in a barrier to the migration or movement of animals?	____	_____	**X**
d. Deterioration to existing fish or wildlife habitat?	____	_____	X
6. Noise. Will the proposal result in:			
a. Increases in existing noise levels? (See pages 13 & **14,** item 2.8)	X	_____	___
b. Exposure of people to severe noise levels?	____	_____	X
7. Light and Glare. Will the proposal produce new light or glare?	X	_____	___

Under certain low sun angles the structures and conductor may produce specular conditions. These conditions are typically of low incidence and duration.

8. **Land** Use. Will the proposal result in a substantial alteration of the present or planned land use **of** an area?	____	_____	X

	Yes	Maybe	No
9. Natural resources. Will the proposal result in:			
a. Increase in the rate of use of any natural resources?	___	___	X
10. Risk of Upset. Will the proposal involve:			
a. A risk of an explosion or the release of hazardous substances (including, but not limited to, oil, pesticides, chemicals or radiation) in the event of an accident or upset conditions?	___	___	X
b. Possible interference with an emergency response plan or an emergency evacuation plan?	___	___	X
11. Population. Will the proposal alter the location, distribution, density, or growth rate of the human population of an area?	___	___	X
12. Housing. Will the proposai affect existing housing, or create a demand for additional housing?	___	___	X
13. **Transportation/Circulation.** Will the proposal result in:			
a. Generation of substantial additional vehicular movement?	___	___	X
b. Effects on existing parking facilities, or demand for new parking?	___	___	X

	Yes	Maybe	No
c. Substantial impact upon existing transportation systems?		_____	X
d. Alterations to present patterns of circulation or movement of people and/or goods?	____	_____	X
e. Alterations to waterborne, rail or air traffic?	____	_____	X
f. Increase in traffic hazards to motor vehicles, bycyclists or pedestrians?	X	_____	____

Transmission line structures could be placed at the edge of the State Highway 12 right of way for a distance of approximately five miles. Structure distance from highway centerline would be approximately 30-40 feet.

14. Public Services. Will the proposal have an effect upon, or result in a need for new or result in a need for new or altered governmental services in any of the following areas:

a. Fire protection?	____	_____	X
b. Police protection?	____	_____	X
c. Schools?	____	_____	X
d. Parks or other recreational facilities?	____	_____	X
e. Maintenance of public facilities, including roads?	X	_____	____

The facilities would represent an addition to the City of Lodi electrical system and, therefore, require maintenance by City personnel.

	Yes	Maybe	No
f. Other governmental services?	___	___	X
15. Energy. Will the proposal result in:			
a. Use of substantial amounts of fuel or energy?	___	___	X
b. Substantial increase in demand upon existing sources or energy, or require the development of new sources of energy?	___	___	X
16. Utilities. Will the proposal result in a need for new systems, or substantial alteration to the public utilities?	X	___	___

The proposal would require some modifications to the existing Henning Substation.

17. Human **Health.** Will the proposal result in:			
a. Creation of any health hazard or potential health hazard (excluding mental health)?	___	___	X
b. Exposure of people to potential health hazards? (See page **14,** item 2.9)	___	___	X
18. Aesthetics. Will the proposal result in **the** obstruction of any scenic **vista** or view open to the public, or will **the** proposal result in the creation of an aesthetically offensive site open to public view? (See page 8, item 22)	___	X	___

	Yes	Maybe	No
19. Recreation. Will the proposai result in an impact upon the quality or quantity of existing recreational opportunities?	___	___	X
20. Cultural Resources.			
a. Will the proposal result in the alteration or the destruction of a prehistoric or historic archaeological site?	___	___	X
b. Will the proposal result in adverse physical or aesthetic effects to a prehistoric or historic building, structure, or object?	___	___	X
c. Does the proposal have the potential to cause a physicai change which would affect unique ethnic cultural values?	___	___	X
d. Will the proposal restrict existing religious or sacred uses within the potential impact area?	___	___	X
21. Mandatory Findings of Significance.			
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	___	___	X

	Yes	Maybe	No
b. Does the project have the potential to achieve short-term impacts, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure welt into the future.)	___	___	X
c. Does the **project** have impacts which are individually limited, but cumulatively considerable? (A project may impact on **two** or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.)	___	___	X
d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly **or** indirectly?	___	___	X

III. Discussion of Environmental Evaluation

(For narrative description of environmental impacts, see pages 9-13)

IV. Determination

(To be completed by the Lead Agency.)

On the basis *of* this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared. a

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION WILL BE PREPARED. a

I find the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required. ☐

_____ _____

Date Signature

For _____

APPENDIX B

PROJECT ECONOMIC ANALYSIS

TABLE 5-1
D-G PROJECT ECONOMIC ANALYSIS

PASS-THROUGH SAVINGS

YEAR	LDI PEAK MONTHLY ALLOCATION	PASS-THROUGH UNIT SAVINGS	TOTAL PASS-THROUGH SAVINGS	PV PASS-THROUGH SAVINGS
	MW	$/MW-MO	IN-YEAR $	1989 $
1989	12.50	1.28	214,950	214,950
1990	12.50	1.43	214,950	200,978
1991	12.50	1.23	214,950	187,915
1992	12.50	143	214,950	175,700
1993	12.50	1.43	214,950	164,280
1994	12.50	143	214,950	153,602
1995	12.50	1.23	214,950	143,617
1996	12.50	143	214,950	134,282
1997	12.50	143	214,950	125,554
1998	12.50	143	214,950	117,393
1999	12.50	143	214,950	109,762
2000	12.50	143	214,950	102,628
2001	12.50	143	214,950	95,957
2002	12.50	143	214,950	89,720
2003	12.50	143	214,350	83,888
2004	12.50	143	214,950	78,435
2005	12.50	143	214,950	73,337
2006	12.50	143	214,950	68,570
2007	12.50	143	214,950	64,113
2008	12.50	143	214,950	59,946
2009	12.50	143	214,950	56,049
2010	12.50	143	214,950	52,406
2011	12.50	143	214,950	49,000
2012	12.50	143	214,950	45,815
2013	12.50	143	214,950	42,837
2014	12.50	143	214,950	40,052
2015	12.50	143	214,950	37,449
2016	12.50	143	214,160	35,015
2017	12.50	143	214,950	32,739
2018	12.50	143	214,950	30,611
			TOTAL	2,866,599

PRESENT VALUE DISCOUNT RATE = 7%

TABLE 5-2
D-C PROJECT ECONOMIC ANALYSIS

PASS-THROUGH SAVINGS

YEAR	LOST PEAK MONTHLY REDUCTION	PASS-THROUGH UNIT SAVINGS	TOTAL PASS-THROUGH SAVINGS	PV PASS-THROUGH SAVINGS
	MW	$/KW-MO	IN-YEAR $	1993 $
1993	12.50	1.43	214,950	214,950
1994	12.50	1.43	214,950	195,409
1995	12.50	1.43	214,950	177,626
1996	12.50	1.43	214,950	161,447
1997	12.50	1.43	214,950	146,726
1998	12.50	1.43	214,950	133,433
1999	12.50	1.43	214,950	121,261
2000	12.50	1.43	214,950	110,226
2001	12.50	1.43	214,950	100,196
2002	12.50	1.43	214,950	91,078
2003	12.50	1.43	214,950	82,798
2004	12.50	1.43	214,950	75,256
2005	12.50	1.43	214,950	68,408
2006	12.50	1.43	214,950	62,132
2007	12.50	1.43	214,950	56,524
2008	12.50	1.43	214,950	51,360
2009	12.50	1.43	214,950	46,705
2010	12.50	1.43	214,950	42,454
2011	12.50	1.43	214,950	38,591
2012	12.50	1.43	214,950	35,079
2013	12.50	1.43	214,950	31,887
2014	12.50	1.43	214,950	28,985
2015	12.50	1.43	214,950	26,348
2016	12.50	1.43	214,950	23,950
2017	12.50	1.43	214,950	21,771
2018	12.50	1.43	214,950	19,789
			TOTAL	2,227,126

PRESENT VALUE DISCOUNT RATE = 10%

TABLE 5-3
D-C PROJECT ECONOMIC ANALYSIS

YEAR	LOCI PEAK LOAD	NEW RESOURCES	FIXED AREA WHEELING	[illegible]	WHEELING SAVINGS	PU SAVINGS
		MW	$/KW-MO	$/KW-MO	IN-YEAR $	1993$
1989	99.8	7.3	1.424	0.567	757,125	757,125
1990	97.1	84.5	1.547	0.525	934,999	874,224
1991	99.0	86.5	1.711	0.653	1,033,014	955,540
1992	100.9	88.4	2.157	0.691	1,555,133	1,371,166
1993	102.7	90.2	2.572	0.726	1,933,110	1,537,[illegible]
1994	104.6	92.1	2.653	0.762	2,069,933	1,431,[illegible]
1995	106.5	94.0	2.746	9m	2,195,093	1,456,[illegible]
1996	108.3	95.8	2.822	0.840	2,285,405	1,427,724
1997	110.2	97.7	2.833	0.892	2,354,731	1,381,257
1998	112.0	99.5	2.981	0.926	2,453,670	1,340,043
1999	113.9	101.4	3.063	0.972	2,544,939	1,293,240
2000	115.8	13.3	3.140	1.021	2,626,712	1,254,123
2001	117.6	15.1	3.258	1.072	2,769,595	1,236,290
2002	119.5	107.0	3.326	1.126	2,914,560	1,216,593
2003	121.3	108.8	3.535	1.182	3,072,077	1,198,952
2004	123.2	110.7	3.673	1.241	3,230,693	1,178,872
2005	125.1	112.6	3.857	1.303	3,450,965	1,177,406
2006	127.7	115.2	4.049	1.368	3,706,214	1,182,301
2007	130.4	117.9	4.242	1.437	3,968,514	1,183,687
2008	133.1	120.6	4.465	1.509	4,277,923	1,193,036
2009	135.9	123.4	4.688	1.584	4,596,403	1,198,534
2010	138.8	126.3	4.922	1.663	4,939,340	1,204,239
2011	141.7	m2	5.168	1.746	5,305,469	1,209,426
2012	144.7	12.2	5.427	1.834	5,699,935	1,214,890
2013	147.7	135.2	5.698	1.925	6,121,315	1,219,838
2014	150.8	138.3	5.983	2m	6,573,676	1,224,894
2015	154.0	141.5	6.282	2.123	7,061,992	1,230,349
2016	157.2	144.7	6.596	2.229	7,582,859	1,235,226
2017	160.5	148.0	6.926	2.340	8,144,736	1,240,515
2018	163.9	151.4	7.272	2.457	8,747,892	1,245,776
					TOTAL	36,648,583

PRESENT VALUE DISCOUNT RATE = 7%

TABLE 5-4
D-C PROJECT ECONOMIC ANALYSIS

YEAR	LOAD PEAK LOAD	NCPA RESOURCES	PG&E AREA WHEELING	NCPA	WHEELING SAVINGS	PV SAVINGS
		MW	$/KW-MO	$/KW-MO	IN-YEAR $	1989$
1989	U8	77.3	1.424	0.470	854,930	854,930
1990	97.1	84.6	1.547	0.494	1,069,006	999,520
1991	99.0	86.5	1.771	0.518	1,238,334	1,082,583
1992	100.9	88.4	2.157	0.544	1,711,070	1,398,630
1993	102.7	90.2	2.572	0.571	2,195,882	1,675,318
1994	104.6	92.1	2.653		2,268,976	1,621,391
1995	106.5	94.0	2.745	0.630	2,366,848	1,594,757
1996	108.3	95.8	2.828	0.661	2,491,183	1,556,277
1997	110.2	97.7	2.893	0.694	2,585,142	1,510,001
1998	112.0	99.5	2.931	0.729	2,588,838	1,463,511
1999	113.9	101.4	3.053	0.766	2,794,990	1,427,236
2000	115.8	103.3	3.143	0.804	2,895,706	1,382,564
2001	117.6	105.1	3.268	0.844	3,057,149	1,364,759
2002	119.5	107.0	3.396	0.886	3,222,840	1,345,209
2003	121.3	108.8	3.535	0.931	3,399,782	1,326,825
2004	123.2	110.7	3.673	0.977	3,581,366	1,306,842
2005	125.1	112.6	3w	1.026	3,825,247	1,305,104
2006	121.7	115.2	4.049	1.077	4,108,493	1,310,629
2007	130.4	117.9	4.242	1.131	4,401,443	1,312,817
2008	133.1	120.6	4.465	1.188	4,742,474	1,322,591
2009	135.9	123.4	4.638	1.247	5,095,433	1,328,658
2010	138.8	126.3	4.922	1.309	5,475,863	1,335,046
2011	141.7	129.2	5.169	1.375	5,880,867	1,340,547
2012	144.7	m2	5.427	1.444	6,318,631	1,346,760
2013	147.7	135.2	5m	1.516	6,784,877	1,352,137
2014	150.8	138.3	5.933	1.592	7,287,304	1,357,867
2015	154.0	141.5	6.282	1.671	7,829,478	1,364,064
2016	1572	144.7	6.596	1.755	8,405,912	1,369,299
2017	160.5	148.0	6.926	1.842	9,029,184	1,375,225
2018	163.9	151.4	7.272	1.935	9,696,262	1,380,833
					TOTAL	40,726,320

PRESENT VALUE DISCOUNT RATE = 7%

TABLE 8-5

D-G PROJECT ECONOMIC ANALYSIS

YEAR	LIDI PEAK LOAD	NCPA RESOURCES	PGE AREA WHEELING	NCPA WHEELING	WHEELING SAVINGS	PJ SAVINGS
		2A	$/KW-MO	$/KW-MO	IN-YEAR $	1992$
1989	93.3	77.3	1.414	0.470	864,930	864,930
1990	97.1	84.6	1.547	0.470	1,033,370	1,002,391
1991	99.0	88.5	1.711	0.470	1,233,158	1,161,140
1992	100.9	92.4	2.157	0.470	1,739,570	1,592,735
1993	102.7	96.2	2.572	0.470	2,275,205	1,933,369
1994	104.6	92.1	2.553	0.525	2,241,345	1,851,647
1995	106.5	94.0	2.746	0.525	2,532,493	1,993,535
1996	108.3	95.8	2.823	0.525	2,532,589	1,932,131
1997	110.2	97.7	2.899	0.525	2,656,058	1,967,253
1998	112.0	99.5	2.961	0.525	2,813,064	1,936,359
1999	113.9	ICi.4	3.063	0.831	2,715,898	1,806,850
2000	115.8	103.3	3.140	0.231	2,852,236	1,806,574
2001	117.6	id.I	3.258	0.831	3,073,544	1,872,678
2002	119.5	107.0	3.336	0.831	3,293,460	1,874,635
2003	121.3	108.8	3.535	0.831	3,530,342	1,877,778
2004	123.2	110.7	3.673	1.106	3,410,003	1,744,311
2005	125.1	112.6	3.857	1.106	3,717,151	1,768,224
2006	27.7	1152	4.049	1.106	4,068,403	1,797,841
2007	130.4	117.9	4.242	1.106	4,436,813	1,823,366
2008	133.1	120.6	4.405	1.106	4,861,145	1,855,636
2009	1359	123.4	4.668	1.471	4,763,734	1,742,166
2010	138.8	m.3	4.922	1.471	5,230,336	1,775,186
2011	141.7	129.2	5.168	1.471	5,731,829	1,806,618
2012	144.7	132.2	5.427	1.471	6,275,798	1,837,630
2013	1477	135.2	5.698	1.471	6,957,885	1,866,686
2014	150.8	138.3	5.983	1.956	6,683,209	1,745,304
2015	154.0	141.5	6.282	1.956	7,345,548	1,779,753
2016	8.2	144.7	6.596	1.956	8,056,806	1,812,445
2017	160.5	1480	6.926	1.956	8,826,720	1,844,387
2018	163.9	1514	7.272	1.956	9,658,109	1,875,399
					TOTAL	40,563,690

PRESENT VALUE DISCOUNT RATE = 7%

TABLE 5-6
D-G PROJECT ECONOMIC ANALYSIS

YEAR	LOAD PEAK LOAD	NSPA RESOURCES	PG&E AREA WHEELING	NSPA WHEELING	WHEELING SAVINGS	PV SAVINGS
		MW	$/KW-MO	$/KW-MO	IN-YEAR $	1993$
1993	8.8	77.3	1.424	0.567	767,125	767,125
1990	97.1	84.6	1.547	0.625	854,939	849,914
1991	99.0	86.3	1.711	0.658	1,033,014	998,157
1992	100.9	88.7	2.157	0.651	1,555,133	1,458,044
1993	102.7	32.2	2.572	0.725	1,998,110	1,864,190
1994	104.6	92.1	2.653	0.762	2,089,933	1,957,035
1995	106.5	94.0	2.746	0.800	2,195,008	1,988,327
1996	108.3	95.8	2.823	0.840	2,285,405	1,971,253
1997	110.2	97.7	2.899	0.882	2,394,731	1,982,282
1998	112.0		2.981	0.926	2,493,670	1,989,859
1999	113.9	101.4	3.063	0.972	2,544,329	979,958
2000	115.8	103.3	3.140	1.021	2,626,712	919,634
2001	117.6	105.1	3.208	1.072	2,789,595	881,420
2002	119.5	107.0	3.336	1.125	2,914,630	843,192
2003	121.3	108.8	3.535	1.182	3,072,077	807,642
2004	123.2	110.7	3.673	1.241	3,230,669	772,237
2005	125.1	112.6	3.857	1.303	3,450,965	749,830
2006	127.7	115.2	4.049	1.368	3,706,214	732,009
2007	130.4	117.9	4.242	1.437	3,968,514	712,438
2008	133.1	120.6	4.465	1.509	4,277,923	698,147
2009	135.9	123.4	4.688	1.584	4,596,403	681,861
2010	138.8	126.3	4.922	1.663	4,939,340	666,056
2011	141.7	m.2	5.168	1.746	5,305,469	650,323
2012	144.7	132.2	5.427	1.834	5,699,936	635,096
2013	147.7	135.2	5.698	1.925	6,121,315	619,980
2014	150.8	138.3	5.983	2.022	6,573,676	605,209
2015	154.0	141.5	6.282	2.123	7,061,982	591,000
2016	157.2	144.7	6.596	2.229	7,582,859	576,843
2017	150.5	148.0	6.926	2.340	8,144,736	563,204
2018	163.9	151.4	7.272	2.457	8,747,892	549,865
					TOTAL	25,137,883

PRESENT VALUE DISCOUNT RATE = 10%

TABLE 5-7

C-C PROJECT ECONOMIC ANALYSIS

YEAR	COST PEAK LOAD	NCPA RESOURCES	PSNM AREA WHEELING	WPPA WHEELING	WHEELING SAVINGS	PV SAVINGS
		MW	$/KW-MO	$/KW-MO	IN-YEAR $	1994$
1989	93.8	77.3	1.424	0.470	864,930	864,930
1990	97.1	84.0	1.547	0.494	1,089,000	971,725
1991	99.0	90.5	1.711	0.513	1,236,324	1,003,212
1992	100.9	98.4	2.157	0.544	1,711,080	1,235,187
1993	102.7	26.2	2.572	0.571	2,105,382	1,478,725
1994	104.6	92.1	2.053	0.600	2,206,976	1,436,151
1995	106.5	94.0	2.746	0.630	2,326,848	1,340,505
1996	108.3	95.8	2.828	0.661	2,491,183	1,277,476
1997	110.2	97.7	2.899	0.694	2,585,142	1,235,023
1998	112.0	99.5	2.961	0.729	2,686,868	1,188,325
1999	113.9	101.4	3.063	0.765	2,794,980	1,076,512
2000	115.8	103.3	3.140	0.804	2,886,706	1,013,811
2001	117.6	105.1	3.208	0.844	3,057,149	972,954
2002	119.5	107.0	3.306	0.886	3,222,840	932,329
2003	121.3	108.8	3.525	0.931	3,399,792	894,016
2004	123.2	110.7	3.673	0.977	3,581,306	856,066
2005	125.1	112.6	3.857	1.026	3,825,247	831,154
2006	127.7	115.2	4.049	1.077	4,103,433	811,463
2007	130.4	117.9	4.242	1.131	4,401,443	790,214
2008	133.1	120.6	4.465	1.188	4,742,474	773,900
2009	135.9	123.4	4.688	1.247	5,095,433	755,280
2010	138.8	126.3	4.922	1.309	5,475,863	738,454
2011	141.7	129.2	5.168	1.375	5,880,867	720,829
2012	144.7	132.2	5.427	1.444	6,318,631	704,032
2013	147.7	135.2	5.698	1.516	6,784,877	687,187
2014	150.8	138.3	5.983	1.592	7,287,304	670,910
2015	154.0	141.5	6.282	1.671	7,829,478	655,230
2016	157.2	144.7	6.596	1.755	8,405,912	639,455
2017	160.5	148.0	6.926	1.842	9,029,184	624,303
2018	163.9	151.4	7.272	1.935	9,696,262	609,476
					TOTAL	27,778,467

PRESENT VALUE DISCOUNT RATE = 15%

TABLE 5-8
D-C PROJECT ECONOMIC ANALYSIS

YEAR	LODI PEAK LOAD	NCPA RESOURCES	FIVE AREA WHEELING	WAPA WHEELING	WHEELING SAVINGS	PV SAVINGS
		MW	$/KW-MO	$/KW-MO	IN-YEAR $	1989$
1989	95.3	77.3	1.424	0.470	624,830	624,830
1990	97.1	84.5	1.547	0.470	1,055,570	959,674
1991	99.0	86.5	1.711	0.470	1,265,153	1,054,360
1992	100.9	88.4	2.157	0.470	1,723,570	1,344,127
1993	102.7	90.2	2.572	0.470	2,275,265	1,553,374
1994	104.6	92.1	2.653	0.625	2,241,346	1,391,604
1995	106.5	94.0	2.746	0.625	2,392,483	1,349,067
1996	108.3	95.8	2.808	0.625	2,532,508	1,298,083
1997	110.2	97.7	2.889	0.625	2,606,038	1,242,732
1998	112.0	99.5	2.961	0.625	2,813,064	1,191,949
1999	113.9	101.4	3.063	0.831	2,715,698	1,049,049
2000	115.8	103.3	3.140	0.831	2,882,256	1,002,063
2001	117.6	105.1	3.203	0.831	3,073,544	978,151
2002	119.5	107.0	3.335	0.831	3,233,400	952,759
2003	121.3	108.8	3.505	0.831	3,530,342	928,349
2004	123.2	110.7	3.673	1.106	3,410,063	815,104
2005	125.1	112.6	3.857	1.106	3,717,151	807,067
2006	127.7	115.2	4.049	1.106	4,003,403	803,545
2007	130.4	117.9	4.242	1.106	4,436,813	738,505
2008	133.1	120.6	4.455	1.106	4,861,145	793,327
2009	135.9	123.4	4.668	1.471	4,763,734	706,664
2010	138.8	126.3	4.922	1.471	5,230,336	705,235
2011	141.7	129.2	5.163	1.471	5,731,829	702,585
2012	144.7	132.2	5.427	1.471	6,275,736	689,258
2013	147.7	135.2	5.688	1.471	6,857,865	684,562
2014	150.8	138.3	5.963	1.956	6,663,209	615,233
2015	154.0	141.5	6.232	1.956	7,345,546	614,731
2016	157.2	144.7	6.596	1.956	8,056,836	612,904
2017	160.5	148.0	6.926	1.956	8,626,720	610,303
2018	163.9	151.4	7.272	1.956	9,068,103	607,676
					TOTAL	27,807,131

PRESENT VALUE DISCOUNT RATE = 10%

TABLE 5-9
D-C PROJECT ECONOMIC ANALYSIS
SUMMARY OF RESULTS
(WHEELING AND PASS-THROUGH SAVINGS)

NAPA WHEELING	DISCOUNT RATES:	7%	12%
$0.557/KW-MO IN 1989 ESCALATED 5% ANNUALLY		$39,715,122.00	$27,354,939.00
$0.47/KW-MO IN 1989 ESCALATED 5% ANNUALLY		$43,533,519.00	$30,005,613.00
$0.47/KW-MO IN 1989 ESCALATED 35% EVERY 5 YEARS		$43,430,483.00	$30,034,257.00

TABLE 5-10
D-C PROJECT ECONOMIC ANALYSIS
SUMMARY OF RESULTS
(RANGE OF TOTAL COSTS/SAVINGS)

(MILLIONS OF 1983$)

LODI ALTERNATIVE	CAPITAL COSTS	PASS-THROUGH SAVINGS	RELATIVE WHEELING COSTS	TOTAL COS
D-C PROJECT	$8.6 $9.4	$2.2 $2.3	"	
REMAIN ON PG&E	$0 $4	0	$25.1 $40.7	

APPENDIX C

LINE COST ESTIMATES

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE, DOUBLE CIRCUIT

LINK 1.1 TURNER-TAP TO H.R.

LENGTH = 1.04 mi

UNIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	6	4,000	24.000	11,400	68,400	15,400	92.400
STEEL POLE(DEAD END/HEAVY ANGLE 110')	2	6.200	12,400	18.700	37.400	24.900	49,800
TAP STRUCTURE	2	7.000	14,000	14.000	28,000	21,000	42,000
FOUNDATION(TANGENT)	6	1.250	7,500	550	3,300	1,800	10,000
CONCRETE FOUNDATION(DEAD END)	2	5.000	10.000	2.200	4.400	7.200	14,400
TAP STRUCTURE FOUNDATION	2	6.000	12,000	2,500	5,000	8.500	17.000
HARDWARE AND INSULATORS(TANGENT)	6	1,350	8,100	920	5.520	2.270	13.620
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	2	2.025	4.050	3,710	7.440	5.745	11,490
HARDWARE AND INSULATORS(TAP STRUCTURE)	2	2.500	5.000	7,000	14.000	9,500	19.000
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	34	480	16.320	1.150	39.100	1,630	55.420
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	12	280	3,360	250	3,000	530	6,360
TREE TRIMMING	1	3.000	3,000	0	0	3,000	3,000
RELOCATION OF DIST. & COMM. LINES	1	40,000	40.000	0	0	40.000	40.000
R I M OF WAY	1	0	0	73,200	73,200	73.200	73.200
SUBTOTAL							$448,000
CONTINGENCY 10%							$45,000
TOTAL COST							5493.000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE, DOUBLE CIRCUIT

LINK 1.1.1 R.R.-TURNER TO SARGENT
LENGTH = 1.17 mi

UNIT DESCRIPTION	QUANTITY	LABOR W I T	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	5	4.000	20.000	11.400	57,000	15,400	77.000
STEEL POLE(DEAD END/HEAVY ANGLE 110')	4	6.200	24,600	18,700	74.800	24,900	09,600
TAP STRUCTURE	0	7.000	0	14.000	0	21,000	0
FOUNDATION(TANGENT)	5	1.250	6,250	550	2.750	1,800	9.000
CONCRETE FOUNDATION(DEAD END)	4	5,000	20,000	2.200	8,800	7,200	28,800
TAP STRUCTURE FOUNDATION	0	6.000	0	2.500	0	8.500	0
HARDWARE AND INSULATORS(TANGENT)	5	1,350	6.750	920	4,600	2,270	11.350
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	4	2.025	8,100	3.720	14.880	5.745	22.980
HARDWARE AND INSULATORS(TAP STRUCTURE)	0	2,500	0	7.000	0	9,500	0
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	38	480	18,240	1,150	43.700	1,630	61,940
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	13	280	3,640	250	3.150	530	6.890
TREE TRIMMING	0	0	0	0	0	0	0
RELOCATION OF DIST. & COMM. LINES	0	3	0	0	0	0	0
RIGHT OF WAY	1	0	0	72,000	72.000	72,000	72.000
		SUBTOTAL					$390,000
CONTINGENCY 10%							$39,000
		TOTAL COST					$429,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE, DOUBLE CIRCUIT

LINK 1.2 TURNER-R.R. TO DAVIS

LENGTH 2.2 mi

UNIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	13	4.000	51.000	11.400	148,200	15.400	200,200
STEEL POLE(DEAD END/HEAVY ANGLE 110')	2	6.200	12,400	18,700	37,400	24,900	49,800
TAP STRUCTURE	0	7,000	0	14,000	0	21,000	0
FOUNDATION(TANGENT)	13	1.250	16,150	550	7.150	1,800	23.400
CONCRETE FOUNDATION(DEAD END)	2	5.000	10,000	2,200	4.400	7.200	14.400
TAP STRUCTURE FOUNDATION	0	6.000	0	2.500	0	8,500	0
HARDWARE AND INSULATORS(TANGENT)	13	1,350	17.550	920	11,960	2,270	29,510
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	2	2.025	4.050	3.720	7.440	5.745	11.490
HARDWARE AND INSULATORS(TAP STRUCTURE)	0	2.500	0	7.000	0	9,500	0
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	72	480	34.560	1,150	82,800	1,630	117,360
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	24	280	6.720	250	6,000	530	12,720
TREE TRIMMING	1	13,000	13.000	0	0	13.000	13,000
RELOCATION OF DIST. & COMM. LINES	1	85.000	85.000	0	0	85.000	85.000
RIGHT OF WAY	1	0	0	186.400	186,400	186.400	186.400
SUBTOTAL							$743.000
CONTINGENCY 10%							574.000
TOTAL COST							$817.000

LINE COST ESTIMATE
CITY OF LODI
DIKECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE, DOUBLE CIRCUIT

LINK 1.2.1 DAVIS-TURNER TO SARGENT
LENGTH = 1.1 mi

UNIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	7	4,000	28,000	11.400	79,800	15.400	107.800
STEEL POLE(DEAD END/HEAVY ANGLE 110')	2	6,200	12,400	18.700	37,400	24.900	49,800
TAP STRUCTURE	0	7,000	0	14.000	0	21,000	0
FOUNDATION(TANGENT)	7	1.250	8.750	550	3.850	1,800	12.600
CONCRETE FOUNDATION(DEAD END)	2	5,000	10.000	2,200	4.400	7.200	14.400
TAP STRUCTURE FOUNDATION	0	6.000	0	2.500	0	8,500	0
HARDWARE AND INSULATORS(TANGENT)	7	1,350	9.450	920	6.440	2.170	15.890
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	2	2.025	4,050	3.720	7.440	5.745	11.490
HARDWARE AND INSULATORS(TAP STRUCTURE)	0	2,500	0	7,000	0	9,500	0
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	36	480	17.283	1,150	41,400	1,630	58,680
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	12	280	3.360	250	3.000	530	6.360
TREE TRIMMING	1	2,000	1,000	0	0	2,000	2.000
RELOCATION OF DIST. & COMM. LINES	0	0	0	0	0	0	0
RIGHT OF WAY	1	0	0	91.600	91,600	91,600	91.600
SUBTOTAL							$371,000
CONTINGENCY 10%							$37,000
TOTAL COST							$408,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE, DOUBLE CIRCUIT

LINK 1.3 TUNER-DAVIS TO SARGENT & LOWER SACRAMENTO

LENGTH = 2.61 mi

UNIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL WIT	MATERIAL SUUTOTAL	LABOR AND MATERIAL WIT	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	16	4.000	64.000	11,400	182.400	15,400	246.400
STEEL POLE(DEAD END/HEAVY ANGLE 110')	2	6,200	12.400	18.700	17,400	24.900	49,800
TAP STRUCTURE	0	7.000	0	14.000	0	21,000	0
FOUNDATION(TANGENT)	16	1,250	20.000	550	8,800	1,800	28,800
CONCRETE FOUNDATION(DEAD END)	2	5.000	10.000	2.200	4,400	7.200	14,400
TAP STRUCTURE FOUNDATION	0	6.000	0	2,500	0	0.500	0
HARDWARE AND INSULATORS(TANGENT)	16	1.350	21,600	920	14.720	2,270	36,320
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	2	2.025	4.050	1.720	7.440	5.745	11.490
HARDWARE AND INSULATORS(TAP STRUCTURE)	0	2.500	0	7,000	0	9,500	0
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	85	480	40.800	1,150	97.750	1.610	138.550
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	29	280	8.120	250	7.250	510	15,170
TREE TRIMMING	1	16,000	16.000	0	0	16.000	16.000
RELOCATION OF DIST. & COMM. LINES	1	110.000	110,000	0	0	110.000	110,000
RIGHT OF WAY	1	0	0	617.400	637.400	637.400	617.400
SUBTOTAL							51.305.000
CONTINGENCY 10%							$110,000
TOTAL COST							31,435,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE, DOUBLE CIRCUIT

LINK 4.1 KETTLEMAN-TAP TO R.R.
LENGTH = 1.71 mi

UNIT DESCRIPTION	QUANTITY	LABOR W I T	LABOR SUBTOTAL	MATCK IAL W I T	MATCK IAL SUBTOTAL	LABOR AN) W I T	MATEK IAL SUBTOTAL
STEEL POLE (TANGENT 110')	19	4.000	76,000	11,400	216,600	15.400	292.600
STEEL POLE(DEAD END/HEAVY ANGLE 110')	11	6.200	68.200	18.700	205.700	24,900	273.900
TAP STRUCTURE	2	0	0	0	0	0	0
FOUNDATION(TANGENT)	19	1.250	23.750	550	10.450	1,800	34,200
CONCRETE FOUNDATION(DEAD END)	11	5,000	55.000	2.200	24,200	7.200	79,200
TAP STRUCTURE FOUNDATION	2	0	0	0	0	0	0
HARDWARE AND INSULATORS(TANGENT)	19	1.350	25,650	920	17.480	2,270	43.130
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	11	2,025	21.275	3.720	40.920	5,745	63.195
HARDWARE AND INSULATORS(TAP STRUCTURE)	2	0	0	0	0	0	0
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	121	480	58.080	1,150	139.150	1,630	197.230
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	41	280	11.480	250	10.250	530	21,730
TREE TRIMMING	1	1,000	1,000	0	0	1,000	1,000
RELOCATION OF DIST. & COMM. LINES	1	50.000	50,000	0	0	50,000	50,000
RIGHT OF WAY	1	0	0	190,400	190,400	190,400	190,400
			SWTOTAL				$1,247,000
CONTINGENCY 10%							$12s,000
			TOTAL COST				$1,372,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE, DOUBLE CIRCUIT

4.2 R.R. TO DAVIS ROAD

= 1.19 mi

UNIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	7	4,000	28,000	1,400	9 800	15,400	107,800
STEEL POLE(DEAD END/HEAVY ANGLE 110	0	6,200	0	8,700	0	24,900	0
TAP STRUCTURE	0	7,000	0	4,000	0	21,000	0
FOUNDATION(TANGENT)	7	1,250	8 750	550	3 850	1,800	12,600
CONCRETE FOUNDATION(DEAD END)	0	5,000	0	2,200	0	7,200	0
TAP STRUCTURE FOUNDATION	0	6,000	0	2,500	0	8,500	0
HARDWARE AND INSULATORS(TANGENT)	7	1,350	9 450	920	0 440	2,270	15,890
HARDWARE AND INSULATORS(DEAD END,HEAVY ANGLE)	0	2,025	0	0,720	0	5,745	0
HARDWARE AND INSULATORS(TAP STRUCTURE)	0	2,500	0	1,000	0	9,500	0
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	39	480	18,720	1,150	44,850	1,630	63,570
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	13	280	3,640	250	3,250	530	6,890
TREE TRIMMING	1	1,000	1,000	0	0	1 000	1,000
RELOCATION OF DIST. & COMM. LINES	1	5,000	5,000	0	0	5,000	5,000
RIGHT OF WAY	1	0	0	101,400	101 400	101,400	101,400
	SUBTOTAL						$314 00
CONTINGENCY 10%							$31 000
			TOTAL COST				$345,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE, DOUBLE CIRCUIT

LINK 4 3 DAVIS ROAD TO LOWER SACRAMENTO SUB

LENGTH = 1.37 mi

WIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AN) MATERIAL UNIT	MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	8	4,000	32.000	11.400	91.200	15.400	123.200
STEEL POLE(DEAD END/HEAVY ANGLE 110')	4	6.200	24,800	18.700	74,800	24,900	99.600
TAP STRUCTURE	2	7.000	14.000	14.000	28.000	21.000	42.000
FOUNDATION(TANGENT)	8	1.250	10.000	550	4.400	1,800	14.400
CONCRETE FOUNDATION(DEAD EN))	4	5,000	20.000	2.200	8,800	7,200	28.800
TAP STRUCTURE FOUNDATION	2	6.000	12.000	2,500	5.000	8,500	17.000
HARDWARE AND INSULATORS(TANGENT)	8	1.350	10,800	920	7,360	2.270	18,160
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	4	2.025	8.100	3.720	14.880	5.745	22,980
HARDWARE AND INSULATORS(TAP STRUCTURE)	2	2.500	5.000	7,000	14.000	9.500	19,000
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	45	480	21,600	1,150	51,750	1.630	73,350
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	15	280	4,200	250	3.750	530	7.950
TREE TRIMMING	1	1,000	1,000	0	0	1,000	1,000
RELOCATION OF DIST. & COMM. LINES	1	5,000	5,000	0	0	5,000	5.000
RIGHT OF WAY	1	0	0	116.700	114.700	116.700	116,700
	SUBTOTAL						$589,000
CONTINGENCY 10%							$59,000
			TOTAL COST				$648,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE. DOUBLE CIRCUIT

LINK 2.1 SARCENT-TAP TO R.R.

LENGTH = 2.05 mi

		LABOR		MATERIAL		LABOR AND MATERIAL	
WIT DESCRIPTION	QUANTITY	UNIT	SUBTOTAL	WIT	SUBTOTAL	WIT	SUBTOTAL
STEEL POLE (TANGENT 110')	12	4.000	48.000	11,400	136.800	15,400	184.800
STEEL POLE(DEAD END/HEAVY ANGLE 110')	7	6.200	43.400	18,700	130.900	24,900	174,300
TAP STRUCTURE	1	7,000	7,000	14.000	14.000	21,000	21,000
FOUNDATION(TANGENT)	12	1,250	15,000	550	6,600	1,800	21,600
CONCRETE FOUNDATION(DEAD END)	7	5.000	35.000	2.200	15,400	7,200	50.400
TAP STRUCTURE FOUNDATION	1	6.000	6,000	2.500	2,500	8.500	8,500
HARDWARE AN) INSULATORS(TANGENT)	12	1.350	16.200	920	11,040	2,270	27,240
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	7	2.025	14.175	3.720	26.040	5.745	40.215
HARDWARE AND INSULATORS(TAP STRUCTURE)	1	2.500	2,500	7,000	7,000	9,500	9,500
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	67	480	32,160	1,150	77.050	1,630	109.210
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	22	280	6.160	250	5.500	530	11.660
TREE TRIMMING	1	6.000	6.000	0	0	6.000	6.000
RELOCATION OF DIST. & COMM. LINES	1	15,000	15,000	0	0	15.000	15.000
RIGHT OF WAY	1	0	0	82.000	82.000	82,000	82.000
	SUBTOTAL						$761,000
CONTINGENCY 10%							$76,000
			TOTAL COST				**$837,000**

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE, DOUBLE CIRCUIT

LINK 1.3 TURNER-DAVIS TO SARCENT & LOWER SACRAMENTO

LENGTH = 2.61 mi

UNIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	16	4.000	64,000	11,400	182.400	15.400	246.400
STEEL POLE(DEAD END/HEAVY ANGLE 110')	2	6.200	12.400	16.700	17.400	24,900	49,800
TAP STRUCTURE	0	7.000	0	14.030	0	21,000	0
FOUNDATION(TANGENT)	16	1.250	20,000	550	8,800	1,800	28,800
CONCRETE FOUNDATION(DEAD END)	2	5.000	10.000	2,200	4,400	7,200	14.400
TAP STRUCTURE FOUNDATION	0	6.000	0	2,500	0	8.500	0
HARDWARE AND INSULATORS(TANGENT)	16	1.350	21,600	910	14.720	2,270	36.320
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	2	2.025	4,050	3,720	7.440	5.745	11.490
HARDWARE AND INSULATORS(TAP STRUCTURE)	0	2,500	0	7.000	0	9,500	0
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	85	480	40,800	1,150	97.750	1.630	136.550
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	29	280	8.120	250	7.250	530	15,370
TREE TRIMMING	1	16.000	16.000	0	0	16.000	16.000
RELOCATION OF DIST. & COMM. LINES	1	110.000	110.000	0	0	110.000	110.000
RIGHT OF WAY	1	0	0	637.400	637.400	637.400	637.400

SUBTOTAL	$1,305,000
CONTINGENCY 10%	**$130,000**
TOTAL COST	$1,435,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE. DOUBLE CIRCUIT

LINK 2.1.1 R.R.-SARGENT TO KETTTLEMAN

LENGTH = 1.08 mi

W I T DESCRIPTION	QUANTITY	LABOR W I T	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AN) W I T	MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	7	4,000	28.000	11.400	79,600	15,400	107,800
STEEL POLE(DEAD END/HEAVY ANGLE 110')	0	6.200	0	18.700	0	24.900	0
TAP STRUCTURE	0	7,000	0	14,000	0	21,000	0
FOUNDATION(TANGENT)	7	1.250	8.750	550	3,850	1,800	12.600
CONCRETE FOUNDATION(DEAD END)	0	5.000	0	2.200	0	7,200	0
TAP STRUCTURE FOUNDATION	0	6,000	0	2,500	0	8,500	0
HARDWARE AN3 INSULATORS(TANCENT)	7	1.350	9.430	920	6.440	2,270	15.890
HARDWARE AN3 INSULATORS(DEAD END/HEAVY ANGLE)	0	2.025	0	3.720	0	5.745	0
HARDWARE AND INSULATORS(TAP STRUCTURE)	0	2,500	0	7,000	0	9.500	0
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	35	480	16.800	1.150	40.250	1.630	57.050
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	12	280	3,360	250	3,000	530	6.160
TREE TRIMMING	0	0	0	0	0	0	0
RELOCATION OF DIST. & COMM. LINES	0	0	0	0	0	0	0
RIGHT OF WAY	1	0	0	50.000	50.000	50.000	50,000
SUBTOTAL							$250.000
CONTINGENCY 10%							S25.000
TOTAL COST							$275,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE, DOUBLE CIRCUIT

LINK 2.2 SARCENT-R.R.TO DAVIS

LENGTH = 1.72 mi

UNIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	11	4.000	44.000	11.400	125,400	15.400	169,400
STEEL POLE(DEAD END/HEAVY ANGLE 110')	4	6.200	24.800	18.700	74,800	24,900	99.600
TAP STRUCTURE	0	7.000	0	14.000	0	21,000	0
FOUNDATION(TANGENT)	11	1.250	13.750	550	6,050	1,800	19,800
CONCRETE FOUNDATION(DEAD END)	4	5,000	20,000	2.100	8,800	7.200	28.800
TAP STRUCTURE FOUNDATION	0	6,000	0	2.500	0	8.500	0
HARDWARE AND INSULATORS(TANGENT)	11	1.350	14.850	910	10.120	2,170	24,970
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	4	2.025	8.100	3.720	14.880	5.745	22.980
HARDWARE AND INSULATORS(TAP STRUCTURE)	0	2.500	0	7,000	0	9,500	0
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	56	480	26,880	1,150	64.400	1.610	91.180
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	19	280	5.320	250	4.750	530	10,070
TREE TRIMMING	1	12,000	12,000	0	0	12.000	12.000
RELOCATION OF DIST. & COMM. LINES	0	0	0	0	0	0	0
RIGHT OF WAY	1	0	0	151,000	151,000	151,000	151,000
	SUBTOTAL						$630.000
CONTINGENCY 10%							$63,000
			TOTAL COST				S693.000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
210 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE. DOUBLE CIRCUIT

LINK 2.2.1 DAVIS-SARGENT TO KETTLEMAN
LENGTH = 0.98 mi

UNIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	6	4,000	24,000	11.400	68,400	15.400	92.400
STEEL POLE(DEAD END/HEAVY ANGLE 110')	0	6,200	0	18.700	0	24,900	0
TAP STRUCTURE	0	7,000	0	14,000	0	21,000	0
FOUNDATION(TANGENT)	b	1,250	7,500	550	3.300	1,800	10,800
CONCRETE FOUNDATION(DEAD END)	0	5.000	0	2.200	0	7.200	0
TAP STRUCTURE FOUNDATION	0	6,000	0	2.500	0	8.500	0
HARDWARE AND INSULATORS(TANGENT)	b	1.350	8,100	920	5.520	2,270	13,620
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	0	2.025	0	3,720	0	5.745	0
HARDWARE AND INSULATORS(TAP STRUCTURE)	0	2,500	0	7,000	0	9.500	0
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	32	480	15.160	1.150	36.800	1,630	52.160
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	11	280	1.080	250	2.750	530	5.830
TREE TRIMMING	1	7.000	7.000	0	0	7,000	7,000
RELOCATION OF DIST. & COMM. LINES	0	0	0	0	0	0	0
RIGHT OF WAY	1	0	0	86,800	86.800	86,800	86,800
	SUBTOTAL						$269.000
CONTINGENCY 10%							$27,000
			TOTAL COST				5296.000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
130 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE. DOUBLE CIRCUIT

LINK 2.3 SARGENT-DAVIS TO LOWER SACRAMENTO
LENGTH = 1.5 mi

UNIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	9	4,000	36,000	11,400	102.600	15,400	138,600
STEEL POLE(DEAD END/HEAVY ANGLE 110')	2	6,200	12.400	18.700	37.400	24,900	49.800
TAP STRUCTURE	0	7,000	0	14,000	0	21.000	0
FOUNDATION(TANGENT)	9	1,250	11.250	550	4.950	1,800	16.200
CONCRETE FOUNDATION(DEAD END)	2	5.000	10.000	2.200	4,400	7.200	14.400
TAP STRUCTURE FOUNDATION	0	6,000	0	2.500	0	8,500	0
HARDWARE AND INSULATORS(TANGENT)	9	1.350	12.150	910	8,280	2,270	20,430
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	2	2.025	4,050	3.720	7,440	5.745	11,490
HARDWARE AND INSULATORS(TAP STRUCTURE)	0	2.500	0	7,000	0	9,500	0
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	49	480	23.510	1.150	56,350	1.630	79,870
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	17	280	4,760	250	4.150	530	9.010
TREE TRIMMING	1	4,000	4,000	0	0	4.000	4.000
RELOCATION OF DIST & COMM LINES	1	14.000	14.000	0	0	14.000	14,000
RIGHT OF WAY	1	0	0	104.000	104,800	104.800	104.800
	SUBTOTAL						5403,000
CONTINGENCY 10%							$46,000
			TOTAL COST				$509,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
130 KV TRANSMISSION LINE
SINCLE TUBE STEEL POLE. DOUBLE CIRCUIT

LINK 2.4 LOWER SACRAMENTO-SARGENT TO KETTLEMAN & LOWER SACRAMENT

LENGTH = 1.16 mi

W I T DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL W I T	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	7	4,000	28,000	11,400	79.800	15.400	107.800
STEEL POLE(DEAD END/HEAVY AWLE 110')	4	6.200	24.800	18.700	74.800	24.900	99.600
TAP STRUCTURE	2	7.003	14,000	14.000	28.000	11,000	42,000
FOUNDATION(TANGENT)	7	1.150	8.750	550	3.650	1,800	12.600
CONCRETE FOUNDATION(DEAD END)	4	5 000	20,000	2.200	8,800	7.200	28,800
TAP STRUCTURE FOUNDATION	2	6.000	11,000	2.500	5.000	8.500	17.000
HARDWARE AND INSULATORS(TANGENT)	7	1,350	9.450	920	6.440	1.170	15.890
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	4	2.025	8,100	3,710	14.880	5.745	22,980
HARDWARE AND INSULATORS(TAP STRUCTURE)	2	2,500	5,000	7,000	14,000	9,500	19,000
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	38	480	18,240	1,150	43.700	1.630	61,540
OHGW ASSEMBLY(3/8 E.H.S STEEL)	13	280	3.640	150	3,250	530	6,890
TREE TRIMMING	0	0	0	0	0	0	0
RELOCATION OF DIST & COMM LINES	1	40,000	40.000	0	0	40,000	40,000
RIGHT OF WAY	1	0	0	565,000	565,000	565,000	565,000
		SUBTOTAL					$1,040,000
CONTINGENCY 10%							5104.000
		TOTAL COST					$1,144,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE, DOUBLE CIRCUIT

LINK 3.1 KETTLEMAN-TAP TO R.H.

LENGTH = 3.3 mi

WIT DESCRIPTION	QUANTITY	LABOR WIT	LABOR SUOTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	19	4,000	76,000	11.400	216.600	15.400	292,600
STEEL POLE(DEAD END/HEAVY ANGLE 110')	9	6.200	55,800	18,700	168,300	24,900	224,100
TAP STRUCTURE	2	7,000	14.000	14,000	28.000	21 000	42,000
FOUNDATION(TANGENT)	19	1.250	23.750	550	10.450	1,800	34.200
CONCRETE FOUNDATION(DEAD END)	9	5.000	45.000	2.200	19.800	7,200	54.800
TAP STRUCTURE FOUNDATION	2	6.000	12.000	2.500	5.000	8.500	17.000
HARDWARE AND INSULATORS(TANGENT)	19	1.350	25.650	920	17.480	2,270	43.130
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	9	2.025	18.225	3.720	33.480	5.745	51.705
HARDWARE AN) INSULATORS(TAP STRUCTURE)	2	2,500	5,000	7,000	14.000	9,500	19,000
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	108	480	51,840	1.150	124,200	1,430	176.040
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	36	280	10,080	250	9,000	530	19.080
TREE TRIMMING	1	1,000	1,000	0	0	1,000	1,000
RELOCATION OF DIST. & COMM. LINES	0	0	0	0	0	0	0
RIGHT OF WAY	1	0	0	106.000	106.000	106.000	106.000
	SUBTOTAL						$1,091,000
CONTINGENCY 10%							$109,000
			TOTAL COST				$1,200,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE. DOUBLE CIRCUIT

LINK 3.2 KETTLEMAN-R.R. TO DAVIS
LENGTH = 1.31 mi

WIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL WIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL WIT	LABOR AND MATERIAL SUBTOTAL
STFEL POLE (TANGENT 110')	8	4.000	32.000	11,400	91,200	15.400	123,100
STEEL POLE(DEAD END/HEAVY ANGLE 110')	2	6.200	12.400	18.700	37,400	24.900	4'1.800
TAP STRKTLRE	0	7,000	0	14,000	0	21,000	0
FOUNDATION(TANGENT)	8	1,250	10.000	550	4,400	1,800	14.400
CONCRETE FOUNDATION(DEAD E M)	2	5,000	10,000	2,200	4,400	3.200	14,400
TAP STRUCTLRE FOUNDATION	0	6.000	0	2.500	0	8,500	0
HARDWARE AND INSULATORS(TANGENT)	8	1.350	10.800	920	7.360	2.270	18,100
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	2	2.025	4.050	3.720	7.440	5,745	11,490
HARDWARE AND INSULATORS(TAP STRUCTURE)	0	2,500	0	7,000	0	9,500	0
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	43	480	20.640	1,150	49.450	1.630	70,090
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	14	280	3.920	250	3,500	530	7.420
TREE TRIMMING	1	1,000	1,000	0	0	1,000	1,000
RELOCATION OF DIST. & COMM. LINES	1	10.000	10.000	0	0	10,000	10.000
RIGHT OF WAY	1	0	0	110.800	110.800	110.800	110.800
			SUBTOTAL				5431,000
CONTINGENCY 10%							$43,000
			TOTAL COST				5474,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINCLE TUBE STEEL POLE. DOUBLE CIRCUIT

LINK 3.3 KETTLEMAN-DAVIS TO LOWER SACRAMENTO SUB

LENGTH = 1.57 mi

W I T DESCRIPTION	QUANTITY	LABOR W I T	LABOR SUBTOTAL	MATERIAL WIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL. W I T	LABOR AND MATERIAL. SUBTOTAL
STEEL POLE (TANGENT 110')	10	4.000	40,000	11,400	114,000	15.400	154.000
STEEL POLE(DEAD END/HEAVY ANGLE 110')	4	6.200	24.800	18.700	74,800	24.900	99.600
TAP STRUCTLRE	2	7.000	14.000	14.000	28.000	21,000	42.000
FOUNDATION(TANGENT)	10	1.250	12.500	550	5.500	1,800	18,000
CONCRETE FOUNDATION(DEAD END)	4	5.000	20.000	2,200	8.800	7.200	28.800
TAP STRUCTURE FOUNDATION	2	6.000	12.000	2,500	5.000	8,500	17.000
HARDWARE AND INSULATORS(TANGENT)	10	1.350	13.500	920	9,200	2.270	22,700
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	4	2.025	8.100	3.720	14.880	5.745	22.980
HARDWARE AND INSULATORS(TAP STRUCTURE)	2	2.500	5,000	7,000	14,000	9.500	19.000
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	51	480	24.480	1.150	58.650	1.630	83.130
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	17	280	4.760	250	4.250	530	9.010
TREE TRIMMINC	1	1,000	1.000	0	0	1,000	1.000
RELOCATION OF DIST. & COMM. LINES	1	5.000	5,000	0	0	5,000	5,000
RICHT OF WAY	1	0	0	95.200	95.200	95,200	95.200
	SUBTOTAL						$617,000
CONTINGENCY 10%							S62.000
	TOTAL COST						$679,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE, DOUBLE CIRCUIT

LINK 5.1 KETTLEMAN-TAP TO RH. ON HARNEY LANL

LENGTH = 4.39 mi

W I T DESCRIPTION	QUANTITY	LABOR W I T	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SMTOTAL
STEEL POLE (TANGENT 110')	14	4.000	96.000	11.400	273.600	15,400	369,600
STEEL POLE(DEAD END/HEAVY ANGLE 110')	11	6.200	68.200	18.700	205,700	14,900	273.900
TAP STRKTLRE	2	7,000	14.000	14.000	28,000	21,000	42.000
FOUNDATION(TANGENT)	14	1.250	30.000	550	13,200	1,800	43,200
CONCRETE FOUNDATION(DEAD EN))	11	5.000	55.000	2.100	24,100	7.200	79,100
TAP STRUCTURE FOUNDATION	2	6.000	12.000	2,500	5,000	8,500	17.000
HARDWARE AN) INSULATORS(TANGENT)	24	1.350	32.400	920	22,080	2,270	54.480
HARDWARE AN) INSULATORS(DEAD END/HEAVY ANGLE)	11	2.025	11.275	3,710	40,920	5.745	63.195
HARDWARE AN) INSULATORS(TAP STRUCTURE)	2	2,500	5,000	7,000	14,000	9,500	19,000
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	143	480	68.640	1,150	164.450	1,630	233.090
OHGW ASSEMBLY(3/8 E H.S. STEEL)	46	280	13.440	250	12.000	530	15.440
TREE TRIMMING	1	1,000	1,000	0	0	1,000	1,000
RELOCATION OF OIST. & COMM LINES	1	5.000	5.000	0	0	5.000	5,000
RIGHT OF WAY	1	0	0	217.000	217,000	117.000	217.000
	SUBTOTAL						$1,443,000
CONTINGENCY 10%							$144,000
	TOTAL COST						$1,587,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE. DOUBLE CIRCUIT

LINK 5.2 HARNEY LANE R.R. TO DAVIS ROAD

LENGTH = 0.89 mi

WIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL WIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL WIT	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	4	4.000	16.000	11,400	45.600	15.400	61,600
STEEL POLE(DEAD END/HEAVY ANGLE 110)	0	6.200	0	18.700	0	24,900	0
TAP STRUCTURE	0	7.000	0	14.000	0	21,000	0
FOUNDATION(TANGENT)	4	1.250	5.000	550	2.200	1,800	7,200
CONCRETE FOUNDATION(DEAD END)	0	5.000	0	2.200	0	7,200	0
TAP STRUCTURE FOUNDATION	0	6.000	0	2,500	0	8.500	0
HARDWARE AND INSULATORS(TANGENT)	4	1.350	5,400	920	3.680	2.270	9.080
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	0	2,025	0	3.720	0	5.745	0
HARDWARE AND INSULATORS(TAP STRUCTURE)	0	2.500	0	7,000	0	9.500	0
CONDUCTOR ASSEMBLY(DRAKE 195 26/7 ACSR)	29	480	13.920	1.150	33.350	1,630	47,270
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	10	280	2.800	250	2,500	530	5.300
TREE TRIMMING	1	1,000	1,000	0	0	1,000	1,000
RELOCATION OF DIST. 6 COMM. LINES	1	5,000	5.000	0	0	5.000	5,000
RIGHT OF WAY	1	0	0	50,900	50,900	50,900	50.900
		SMTOTAL					$187,000
CONTINGENCY 10%							$19,000
		TOTAL COST					$206,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE. DOUBLE CIRCUIT

LINK 5.3 DAVIS ROAD TO LOWER SACRAMENTO ROAD

LENGTH = 1.46 mi

W I T DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL W I T	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	9	4,000	36,000	11.400	102.100	15.400	138,600
STEEL POLE(DEAD END/HEAVY ANGLE 110')	2	6,100	12,400	18.700	37.400	24,900	49,800
TAP STRUCTURE	0	7,000	0	14.000	0	21.000	0
FOUNDATION(TANGENT)	9	1.250	11.250	550	4,950	1,800	16,200
CONCRETE FOUNDATION(DEAD END)	2	5.000	10,000	2,200	4.400	7.200	14.400
TAP STRUCTURE FOUNDATION	0	6,000	0	1,500	0	a.500	0
HARDWARE AND INSULATORS(TANGENT)	9	1,350	12.150	920	8.200	2,270	20.430
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	2	2.025	4.050	3.720	7.440	5,745	11.490
HARDWARE AND INSULATORS(TAP STRUCTURE)	0	2,500	0	7,000	0	9,500	0
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	48	480	23.040	1,150	55,200	1,630	78,240
OHGW ASSEMBLY(3/8 E H.S. STEEL)	16	280	4.480	250	4,000	530	8.480
TREE TRIMMING	1	1,000	1,000	0	0	1,000	1.000
RELOCATION OF DIST. & COMM LINES	1	5.000	5,000	0	0	5,000	5.000
RIGHT OF WAY	1	0	0	92,500	92.500	92,500	92,500
	SUBTOTAL						$436.000
CONTINGENCY 10%							$44,000
			TOTAL COST				$480,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE TUBE STEEL POLE. DOUBLE CIRCUIT

LINK 5.4 LGWER SACRAMENTO ROAD TO SUB SITE

LENGTH = 0.80 mi

UNIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SMTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
STEEL POLE (TANGENT 110')	5	4,000	20.000	11.400	57.000	15.400	77.000
STEEL POLE(DEAD END/HEAVY ANGLE 110')	2	6.100	12.400	18,700	37,400	24.900	49.800
TAP STRUCTURE	2	7,000	14,000	14.000	28,000	21.000	42.000
FOUNDATION(TANGENT)	5	1.250	6.250	550	2.750	1,800	9,000
CONCRETE FOUNDATION(DEAD EN))	2	5.000	10.000	? 200	4.400	7,200	14.400
TAP STRUCTURE FOUNDATION	2	6.000	12.000	2,500	5.000	8,500	17.000
HARDWARE AND INSULATORS(TANGENT)	5	1,350	6,750	920	4.600	2.170	11,350
HARDWARE AND INSULATORS(DEAD END/HEAVY ANGLE)	2	2.025	4.050	3.720	7.440	5,745	11,490
HARDWARE AND INSULATORS(TAP STRUCTURE)	2	2.500	5,000	7,000	14.000	9.500	19.000
CONDUCTOR ASSEMBLY(DRAKE 795 26/7 ACSR)	26	480	12.480	1.150	29,900	1,630	42.380
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	9	280	2,520	250	2,250	530	4.770
TREE TRIMMING	1	1,000	1,000	0	0	1,000	1,000
RELOCATION OF DIST. & COMM LINES	1	5.000	5.000	0	0	5,000	5,000
RIGHT OF WAY	1	0	0	93,100	93.100	93.100	93.100
		SUBTOTAL					5397.000
CONTINGENCY 10%							$40,000
			TOTAL COST				$437.000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 2.1 SARGENT-TAP TO R.R.
LENGTH = 2.05 mi

WIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SWTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIA UNIT	LABOR AND MATERIA SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	16	1.500	14.000	1,320	21.120	2,820	45.120
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	3	9.200	27.600	17,100	51.300	26,300	78,900
WOOD POLE (TANGENT W/OUT OHGW,75')	16	1.300	20.800	930	14.880	1.230	35.680
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT OHGW 75',W/FOUNDATION)	1	8,100	8.100	15,200	15,200	23.300	23,300
HARDWARE AND INSULATORS(TANGENT)	32	600	19.200	1.500	48.000	2,100	67,200
HARDWARE AND INSULATORS(DEADEND/HEAVY ANGLE)	4	1.400	5.600	3.000	12,000	4.400	17.600
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	34	480	16,320	1,085	36.890	1,565	53,210
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	11	280	3.080	250	2.750	530	5.830
RIGHT OF WAY	1	0	0	61.500	61.500	61,500	61.500
	SUBTOTAL						$388,000
CONTINGENCY 10%							39,000
			TOTAL COST .				$427,000
			COST PER MILE				$208,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 2.1.1 R.R.-SARGENT TO KETTLEMAN

LENGTH = 1.08 mi

W I T DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIA UNIT	LABOR AND MATERIA SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	0	1,500	0	1,320	0	2,820	0
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	0	9,200	0	17,100	0	26,300	0
WOOD POLE (TANGENT W/OUT OHGW,75')	20	1,300	26,000	930	18,600	2,230	44,600
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT OHGW 75',W/FOUNDATION)	0	8,100	0	15,200	0	23,300	0
HARDWARE AND INSULATORS(TANGENT)	20	600	12,000	1,500	30,000	2,100	42,000
HARDWARE AND INSULATORS(DEADEND/HEAVY ANGLE)	0	1,400	0	3,000	0	4,400	0
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	18	480	8,640	1,085	19,530	1,565	28,170
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	6	280	1,680	250	1,500	530	3,180
RIGHT OF WAY	1	0	0	37,500	37,500	37,500	37,500
SUBTOTAL							$155,000
CONTINGENCY 10%							16,000
TOTAL COST							$171,000
COST PER MILE							S158,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 2.2 SARGENT-R.R. TO DAVIS
LENGTH = 1.72 mi

WIT DESCRIPTION	QUANTITY	LABOR WIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	0	1.500	0	1.320	0	2.820	0
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	0	9,200	0	17,100	0	26,300	0
WOOD POLE (TANGENT W/OUT OHGW,75')	30	1,300	39,000	930	27,900	2.230	66,900
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT aGW 75',W/FOUNDATION)	1	8,100	8,100	15.200	15.200	23.300	23.300
HARD ARE AND INSULATORS(TANGENT)	30	600	18.000	1,500	45.000	2.100	63,000
HARDWARE AND INSULATORS(DEADEND/HEAVY ANGLE)	1	1,400	1.400	3.000	3.000	4.400	4.400
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	28	480	i3.440	1,085	30.380	1.565	43.820
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	10	280	2.800	250	2,500	530	5.300
RIGHT OF WAY	1	0	0	113.250	113,250	113,250	113,250
	SUBTOTAL						$320,000
CONTINGENCY 10%							32,000
			TOTAL COST				$352.000
			COST PER MILE				$205,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 2.2.1 DAVIS-SARCENT TO KETTLEMAN

LENGTH = 0.98 mi

UNIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AN) MATCHIA UNIT	LABOR AN) MATCHIA SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	0	1,500	0	1,320	0	2.820	0
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	0	9.200	0	17.100	0	26,300	0
WOOD POLE (TANGENT W/OUT OHGW,75')	18	1,300	23,400	930	16.740	2,230	40.140
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT OHGW 75',W/FOUNDATION)	0	8,100	0	15.200	0	23.300	0
HARDWARE AN) INSULATORS(TANGENT)	18	600	10,800	1,500	27.000	2.100	37.800
HARDWARE AND INSULATORS(DEADEND/HEAVY ANGLE)	0	1.400	0	3.000	0	4.400	0
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	16	480	7.680	1.085	17.360	1.565	25,040
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	6	280	1.680	250	1.500	530	3,180
RIGHT OF WAY	1	0	0	65.100	65.100	65.100	65.100
SUBTOTAL							$171,000
CONTINGENCY 10%							17,000
TOTAL COST							$188,000
COST PER MILE							$192,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 2.3 SARGENT-DAVIS TO LOWER SACRAMENTO

LENGTH = 1.5 MI

UNIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIA UNIT	LABOR AND MATERIA SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	0	1.500	0	1,320	0	2.820	0
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	0	9,200	0	17.100	0	26,300	0
WOOD POLE (TANGENT W/OUT OHGW,75')	25	1,300	32.500	930	23.250	2.230	55,750
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT OHGW 75',W/FOUNDATION)	1	8,100	8,100	15.200	15.200	23.300	23.300
HARDWARE AND INSULATORS(TANGENT)	25	600	15.000	1,500	37,500	2.100	52.500
HARDWARE AND INSULATORS(DEADEND/HEAVY ANGLE)	1	1,400	1,400	3,000	3.000	4.400	4.400
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	25	480	12.000	1.085	27.125	1,565	39.125
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	8	280	2,240	250	2,000	530	4.240
RIGHT OF WAY	1	0	0	70,600	78.600	78,600	70.600
	SUBTOTAL						$258,000
CONTINGENCY 10%							26,000
			TOTAL COST				$284,000
			COST PER MILE				$189,000

LINE COST ESTIMATE
CITY Of LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 2.4 LOWER SACRAMENTO-SARGENT TO KETTLEMAN & L. SAC

LENGTH = 1.16 mi

UNIT DESCRIPTION	QUANTITY	LABOR WIT	LABOR SUBTOTAL	MATERIAL WIT	MATERIAL SUBTOTAL	LABOR AND MATERIA UNIT	LABOR AND MATERIA SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	19	1.500	28.500	1,320	25.080	2,820	53.580
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	4	9.200	36.800	17.100	68,400	26.300	105.200
WOOD POLE (TANGENT W/OUT OHGW,75')	0	1.300	0	930	0	2,230	0
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT OHGW 75',W/FOUNDATION)	0	8,100	0	15,200	0	23,300	0
HARDWARE AND INSULATORS(TANGENT)	19	600	11,400	1,500	28.500	2.100	39.900
HARDWARE AND INSULATORS(DEADEND/HEAVY ANGLE)	4	1,400	5.600	3.000	12.000	4,400	17.600
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	19	480	9.120	1,085	20.615	1.565	29.735
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	6	280	1,680	250	1,500	530	3.180,
RIGHT OF WAY	1	0	0	423.800	423.800	423,800	423,800
	SUBTOTAL						J673,000
CONTINGENCY 10%							67,000
			TOTAL COST				5740,000
			COST PER MILE				$638,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 3.1 KETTLEMAN-TAP TO R.R.

LENGTH = 3.3 mi

		LABOR		MATERIAL		LABOR AND MATERIAL	
WIT DESCRIPTION	QUANTITY	UNIT	SUBTOTAL	UNIT	SUBTOTAL	WIT	SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	19	1,500	28.500	1.320	25.080	2.820	53,580
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	4	9,200	36.800	17.100	68.400	26.300	105.200
WOOD POLE (TANGENT W/OUT OHGW,75')	37	1,300	48.100	930	34,410	2,230	82.510
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT OHGW 75',W/FOUNDATION)	2	8,100	16.200	15,200	30.400	23,300	46,600
HARDWARE AND INSULATORS(TANGENT)	56	600	33.600	1.500	84.000	2.100	117.600
HARDWARE AND INSULATORS(DEADEND/HEAVY ANGLE)	6	1.400	8,400	3,000	18,000	4,400	26,400
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	54	4eo	25,920	1,085	58.590	1.565	84.510
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	18	280	5.040	250	4.500	530	9.540
RIGHT OF WAY	7	0	0	79,500	79,500	79.500	79,500
	SUBTOTAL						5605.000
CONTINGENCY 10%							61,000
	TOTAL COST						$666,000
	COST PER MILE						$202,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 3.2 KETTLEMAN-R.R. TO DAVIS
LENGTH = 1.31 mi

WIT DESCRIPTION	QUANTITY	LABOR WIT	LABOR SUBTOTAL	HATERIAL UNIT	HATERIAL SUBTOTAL	LABOR AN) MATERIA UNIT	LABOR AN) MATERIA SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	0	1.500	0	1.320	0	2.820	0
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	0	9.200	0	17.100	0	26.300	0
WOOD POLE (TANGENT W/OUT OHGW,75')	22	1,300	28.600	930	20.460	2,230	49.060
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT OHGW 75',W/FOUNDATION)	1	8.100	8,100	15,200	15,200	23,300	23.300
HARDWARE AND INSULATORS(TANGENT)	21	600	13.200	1,500	33.000	2.100	46.200
HARDWARE AND INSULATORS(DEADEND/HEAVY ANGLE)	1	1,400	1.400	3,000	3.000	4.400	4.400
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	22	480	10.560	1,085	23,870	1.565	34,430
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	7	280	1,960	250	'1.750	530	3.710
R I M OF WAY	1	0	0	83,100	83.100	83.100	83.100
	SMTOTAL						S244.000
CONTINGENCY 10%							24.000
			TOTAL COST				$268,000
			COST PER MILE				$205,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 3.3 KETTLEMAN-DAVIS TO LOWER SACRAMENTO SUB

LENGTH = 1.57 mi

UNIT DESCRIPTION	QUANTITY	LABOR WIT	LABOR SMTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL WIT	LABOR AND MATERIAL SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	13	1,500	19.500	1.310	17.160	2.820	16.560
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	4	9.100	36.800	17.100	68,400	26,100	105 ?.0
WOOD POLE (TANGENT W/OUT OHGW,75')	14	1.300	18.200	910	13,020	2.230	31,2?6
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT OHGW 75',W/FOUNDATION)	0	8.100	0	15.200	0	13.300	0
HARDWARE AND INSULATORS(TANGENT)	27	600	16.200	1,500	40,500	2.100	56,700
HARDWARE AND INSULATORS(DEADEND/HEAVY ANGLE)	4	1,400	5,600	1.000	12,000	4,400	17.600
CONDUCTOR ASSEMBLY(ARBUTUS 793 AAC)	26	480	12.480	1.085	18.210	1.565	40,690
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	9	280	2.510	250	2.150	530	4.770
RIGHT OF WAY	1	0	0	71.400	71,400	71.400	71,400

SUBTOTAL	$364.000
CONTINGENCY 10%	16,000
TOTAL COST	$400,000
COST PER MILE	$255.000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 4.1 KETTLEMAN-TAP TO R.R.
LENGTH = 3.71 mi

WIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AN) MATEKIA UNIT	SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	19	1,500	28.500	1.320	25.080	2.820	53,580
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	4	9.200	36.800	17.100	68.400	26.300	105,200
WOOD POLE (TANGENT W/OUT OHGW,75')	41	1,300	53,300	930	38.130	2.230	91,430
STEEL POLE(DEADEND/HEAVY ANCLE W/OUT OHGW 75',W/FOUNDATION)	3	8,100	24.300	15.200	45.600	23,300	69,900
HARDWARE AN) INSULATORS(TANGENT)	60	600	36.000	1,500	90.000	2,100	126.000
HARDWARE AN) INSULATORS(DEADEND/HEAVY ANCLE)	7	1.400	9,800	3,000	21,000	4,400	30.800
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	61	480	29.250	1.085	66.185	1.565	95.465
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	20	280	5.600	250	5,000	530	10.600
RIGHT OF WAY	1	0	0	142.800	142.800	142.800	142.800
SUBTOTAL							$726,000
CONTINGENCY 10%							73.000
TOTAL COST							5799,000
COST PER MILE							$215.000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 4.2 R.R. TO DAVIS ROAD
LENGTH = 1.19 mi

WIT DESCRIPTION	WANTITY	LABOR WIT	LABOR SUBTOTAL	MATLR IAL WIT	MATLR IAL SUBTOTAL	LABOR AND MATERIA UNIT	LABOR AND MATERIA SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90'	0	1,500	0	1,320	0	2.820	0
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	0	9,200	0	17.100	0	26,300	0
WOOD POLE (TANGENT W/OUT OHGW,75')	20	1,300	26.000	930	18.600	2.230	44.600
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT OHGW 75',W/FOUNDATION)	0	8,100	0	15,200	0	23.300	0
HARDWARE AND INSULATORS(TANGENT)	20	600	12,000	1,500	30.000	2,100	42.000
HARDWARE W/ INSULATORS(DEADEND/HEAVY ANGLE)	0	1.400	0	3,000	0	4.400	0
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	20	480	9,600	1,085	21.700	1,565	31.300
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	7	280	1,960	250	1.750	530	3.710
RIGHT OF WAY	1	0	0	76.100	76.100	76.100	76.100
	SUBTOTAL						$198,000
CONTINCEKY 10%							20,000
				TOTAL COST			$218.000
				COST PER MILE			$183,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 4.3 DAVIS ROAD TO LOWER SACRAMENTO SUB

LENGTH = 1.37 mi

W I T DESCRIPTION	QUANTITY	LABOR W I T	LABOR SUBTOTAL	MATERIAL W I T	MATERIAL SUBTOTAL	LABOR AND MATERIA W I T	LABOR AND MATERIA SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	16	1.500	24,000	1,320	21,120	2.820	45,120
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	3	9,200	27,600	17.100	51,300	26,300	78.900
WOOD POLE (TANGENT W/OUT OHGW,75')	8	1,300	10.400	930	7.440	2,230	17,840
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT OHGW 75',W/FOUNDATION)	0	8,100	0	15.200	0	13.300	0
HARDWARE AND INSULATORS(TANGENT)	24	600	14.400	1,500	36.000	2,100	50.400
HARDWARE AND INSULATORS(DEADEND/HEAVY AXLE)	3	1.400	4,200	3.000	9,000	4,400	13.200
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	22	480	10.560	1.085	13.070	1,565	34.430
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	8	280	2.240	250	2.000	530	4,240
RIGHT OF WAY	1	0	0	87.600	07.600	87,600	87,600
	SUBTOTAL						$332,000
CONTINGENCY 10%							33,000
			TOTAL COST				5365.000
			COST PER MILE				$266,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 5.1 KETTLEMAN-TAP TO R.K. ON HARNEY LANE

LENGTH = 4.39 mi

UNIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SUBTOTAL	MATERIAL UNIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	19	1.500	28,500	1.320	25.080	2.820	53,580
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	4	9.200	36,800	17.100	68,400	26.300	105.200
WOOD POLE (TANGENT W/OUT OHGW,75')	57	1,300	74.100	930	53.010	2.230	127.110
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT OHGW 75',W/FOUNDATION)	2	8,100	16.200	15.200	30,400	23.300	46.600
HARDWARE AND INSULATORS(TANGENT)	76	600	45.600	1.500	114,000	2,100	159,600
HARDWARE AND INSULATORS(DEADEND/HEAVY ANGLE)	6	1,400	8,400	3.000	18.000	4,400	26,400
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	72	480	34.560	1.085	78.120	1.565	112.680
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	24	280	6.710	250	6,000	530	12,720
RIGHT OF WAY	1	0	0	162.800	162.800	162,800	162,800
SUBTOTAL							$807,000
CONTINGENCY 10%							81,000
TOTAL COST							$888,000
COST PER MILE							$202,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSICN LINE
SINGLE CIRCUIT

LINK 5.2 HARNEY LANE R.R. TO DAVIS ROAD

LENGTH = 0.89 mi

UNIT DESCRIPTION	QUANTITY	LABOR WIT	LABOR SUBTOTAL	MATERIAL WIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL WIT	LABOR AND MATERIAL SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	0	1,500	0	1.320	0	2.820	0
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	0	9,200	0	17.100	0	26.300	0
WOOD POLE (TANGENT W/OUT OHGW,75')	14	1.300	18.200	930	13.020	2.230	31.210
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT OHGW 75',W/FOUNDATION)	0	8,100	0	15.200	0	23,300	0
HARDWARE AM) INSULATORS(TANGENT)	14	600	8,400	1,500	21.000	2,100	29,400
HARDWARE AND INSULATORS(DEADEND/HEAVY ANGLE)	0	1.400	0	3.000	0	4,400	0
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	15	480	7.200	1,085	16.275	1.565	23.475
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	5	280	1.400	250	1.250	530	2.650
RIGHT OF WAY	1	0	0	38.200	38,200	38,200	38,200

SMTOTAL	$125.000
CONTINGENCY 10%	12,000
TOTAL COST	$137,000
COST PER MILE	$154,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 5.3 DAVIS ROAD TO LOWER SACRAMENTO ROAD

LENGTH = 1.46 mi

WIT DESCRIPTION	WANTITY	LABOR WIT	LABOR SMTOTAL	MATERIAL WIT	MATERIAL SUBTOTAL	LABOR AN) MATERIA WIT	LABOR AN) MATERIA SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	3	1,500	4.500	1,320	1.960	2,820	8,460
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	1	9.200	9.200	17.100	17,100	26.300	26.300
WOOD POLE (TANGENT W/OUT OHGW,75')	23	1.300	29,900	910	21,390	2.230	51.290
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT OHGW 75',W/FOUNDATION)	0	8,100	0	15,200	0	21,300	0
HARDWARE AND INSULATORS(TANGENT)	26	600	15.600	1,500	19.000	2,100	54.600
HARDWARE AND INSULATORS(DEADEND/HEAVY ANGLE)	1	1.400	1.400	3,000	1.000	4,400	4.400
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	24	480	11,520	1.085	26.040	1,565	37.560
OHGW ASSEMBLY(3/8 E.H.S STEEL)	8	280	2.240	250	2.000	530	4,240
RIGHT OF WAY	1	0	0	69.400	69.400	69,400	69.400
	SUBTOTAL						f256.000
CONTINGENCY 10%							26.000
			TOTAL COST				1282.000
			COST PER MILE				$191,000

LINE COST ESTIMATE
CITY OF LODI
DIRECT INTERCONNECTION PROJECT
230 KV TRANSMISSION LINE
SINGLE CIRCUIT

LINK 5.4 LOWER SACRAMENTO ROAD TO SUB SITE
LENGTH = *0.80* mi

UNIT DESCRIPTION	QUANTITY	LABOR UNIT	LABOR SMTOTAL	MATERIAL WIT	MATERIAL SUBTOTAL	LABOR AND MATERIAL UNIT	LABOR AND MATERIAL SUBTOTAL
WOOD POLE (TANGENT W/OHGW,90')	15	1.500	*22,500*	1,320	19,800	2.820	42,300
STEEL POLE(DEADEND/HEAVY ANGLE W/OHGW 85',W/FOUNDATION)	3	9.100	*17.600*	17.100	51,300	26.300	78,900
WOOD POLE (TANGENT W/OUT OHGW,75')	0	1,300	0	930	3	2.230	0
STEEL POLE(DEADEND/HEAVY ANGLE W/OUT OHGW 75',W/FOUNDATION)	0	8,100	0	15.200	0	23.300	0
HARDWARE AND INSULATORS(TANGENT)	15	600	9.000	1,500	22.500	2,100	31,500
HARDWARE AND INSULATORS(DEADEND/HEAVY ANGLE)	3	1,400	4,100	3.000	9,000	4.400	13.200
CONDUCTOR ASSEMBLY(ARBUTUS 795 AAC)	13	480	6.240	1.085	14.105	1.565	20.345
OHGW ASSEMBLY(3/8 E.H.S. STEEL)	4	280	1.120	250	1,000	530	2,120
RIGHT OF WAY	1	0	*0*	69.900	69.900	69.900	69,900
SUBTOTAL							$258.000
CONTINGENCY 10%							26.000
TOTAL COST							$284.000
COST PER MILE							$355.000

APPENDIX D

ROUTE & SITE EVALUATION CRITERIA DEFINITIONS

APPENDIX D
ROUTE AND SITE EVALUATION CRITERIA

This appendix discusses each *of* the criteria the routing team developed to evaluate aiternative points of interconnection, transmission line routes and substation sites. These criteria were used *for* identifying general land use, engineering and environmental conditions that pose constraints to routing a transmission line and siting substations. Weight assignments for these criteria, commensurate with the degree of conflict and/or cost, are also reviewed. This appendix is divided into three sections with three main categories each: a section each for interconnection points, transmission line, and substation with each section addressing land use, engineering and environmental considerations.

1.0 TRANSMISSION LINE EVALUATION CRITERIA

1.1 Land Use Considerations

Number of buildings requiring removal or relocation. Pursuant to the California Relocation Act, this addresses the greatest direct impact of a transmission line, particularly from an economic factor, and therefore was assigned a weight of 5. As presently envisioned with a fifty foot right of way, the preferred alignment would not require buildings to be relocated.

Mites of line of existing distribution/communication of other utilities. Special engineering allowances have to be made when a distribution line is paralleled. If the transmission line is to be built alongside the existing distribution line, then additional right of way is required to provide adequate clearances. If the new line is built where the distribution is located, then the distribution line must be relocated in one of three ways: on the new structures (underbuild), below the new structures (underground), or on the other side of the road. Because these options require special land use, engineering considerations, and additional cost this factor was given a weight of 4.

Miles of line requiring special restoration efforts. Within environmentally hardened urban areas, transmission line construction activities may require restoration of storm drains, curbs, sidewalks, parking lots, and decorative landscaping. A weight Of 3 was assigned for each mile affected.

Miles crossing agricultural land on a diagonal. Transmission lines impose special constraints upon agricultural practices, especially when routed at an angle to practical patterns. Such alignment creates undue hardship upon operators of farming machinery. This criterion is considered a severe constraint and has been weighted a 5.

Miles along field edge. While this proximity to agricultural operations imposes some problems to the operator, a field edge location is less restrictive than open field or diagonal rerouting. Therefore, this criteria is weighted a 2. This criterion excludes frontage for houses, barns, and commercial developments. For evaluation purposes these land uses were considered to each withdraw 200 feet from the link distance to arrive at total linear feet of field edge.

Acres in conflict with land use planning goals. This criterion, given a weight of 5, is consistent with the Williamson Act and the San Joaquin County planning goal to protect agricultural land from incompatible uses. Relative to that goal, transmission line poles would directly withdraw land from productive uses by approximately 80 square feet per pole, or a cumulative total of 5,660 square feet (0.13 acres) along the preferred route.

1.2 Engineering Considerations

To ensure that the route ultimately selected for construction is feasible for transmission line construction and maintenance, a number of factors relating to design and construction were considered. Listed below are five engineering considerations **used** in the evaluation of the routes.

Miles of Line. No other single factor contributes more to the cost of the transmission line than its length. Therefore, this criterion received a weight of 5.

Miles requiring new construction and maintenance access. Difficult or poor access requires special construction techniques and/or extended construction time. When these areas also require road building to aid in construction access and maintenance activities, reseeding or revegetstion is often required. A weight of 5 was assigned to this factor.

Miles of urban development. The constraints of urbanization necessitate special, and generally costly, design, construction, and rehabilitation measures. Links representative of this criteria are excessively costly relative to other less constrained alternatives. Therefore, this criterion weighted a 5.

Miles along poorly drained, floodplain, wetland areas. Special structure foundation designs with higher associated costs may be required for these areas; therefore, a weight of 3 was assigned.

Number of angles greater than 60 degrees. Large angles have a higher cost because they require special structure design. A weight of **4** was assigned to each occurrence of this factor. For the routing of the alternatives, the angles of structures was estimated, final determination of angle degree will occur during design.

Miles requiring tindergrounding (U.G.) of railroad communication lines. When transmission lines of the higher voltages are constructed in close proximity to a communications line, interference can occur on the communications line. One method of mitigating the problem is to underground the communication line. However, to do so, increases the construction costs by approximately 880,000 per mile of communication line. For this reason, a weighting socre of 3 was assigned.

1.3 Environmental Considerations

The five environmental considerations discussed below were selected to determine the degree of environmental conflict posed by the transmission line route location.

Number of cultural resource conflict areas. Sites of archaeological and historic interest and significance are to be avoided. A weight of 5 was assigned each time the line would pass over or adjacent to a cultural resource. While not an apparent issue, this criterion was retained to demonstrate its consideration.

Miles of tine through sensitive wildlife habitat. Areas such as stream crossings, ponds, wetlands, abandoned fields, or pasture with native vegetation provide habitat for a variety of plant and wildlife species including threatened or endangered species. These areas are assigned a weight of 5 for each miie of occurrence. While not an apparent issue, this criterion was retained to demonstrate its consideration.

Miles of prominent visuai intrusion. The low topographic relief of the San Joaquin Valley does not allow transmission lines to be screened by natural features. Native and domestic vegetation is of low heights and density so as to provide intermittent screening of structure bases only. Therefore, the contrast of the vertical structures and aerial horizontal lines of the conductors will be evident to the foreground and middle ground views in the project vicinity. When the transmission line route passes within 1/4 miles of a residence it was considered to be a dominant and adverse visual element. However, the City of Lodi is committed to avoiding structure placement in front of any residential or commercial dwelling. The desires of the local landowners and residents will be considered when making those placement decisions. This condition was assigned a weight of 4 for each mile of occurrence.

Miles requiring tree trimming and/or removal. Orchards and various species of shade and ornamental trees are a valuable resource in an area otherwise devoid of trees; taller trees also provide a screening effect for the transmission line structures. Therefore, protection of trees is an important project consideration and removal or tree trimming is weighted a 5.

Mites of residentiai development **exposed** to electrical and maqnetic fields.

While the present research on biological effects of electric and magnetic fields is inclusive, the criteria represents consideration of this issue. Because the field effects of the proposed line would be below any established standard, either at the right of way edge, or within the right of way, the criterion *is* weighted a 2.

2.0 SUBSTATION SITING EVALUATION CRITERIA

2.1 Land Use Consideration

Number *of* buildings requiring removal or relocation. Pursuant to the California Relocation Act, this is the greatest direct impact of a substation in this category and was assigned a weight *of* 5.

Number of private land parcels affected by acquisition. The right of way process becomes increasingly involved as the number of parcels of land and potential landowners affected by a substation site increases. A weight of 2 was assigned t this factor to account for additional negotiation and settlement procedures that may be required.

Offsite construction impacts. The proximity of other land uses and the potential for their destruction during construction is a measure of a site's overall ability to accommodate development. This criterion is weighted a 2.

Long term effects on adjacent land uses. This criterion considers the effect of a substation on present and future land uses, and the perceived limitation on potential development. Included in this criteria is a consideration of electric and magnetic fields emanating from the substation. The criteria is weighted a 2 to account for possible cumulative long term effects.

Siting on cultivated cropland. Siting of a substation on cultivated cropland can potentially take 3 acres out *of* production. Such action would be inconsistent with the Williamson Act and San Joaquin County's planning goals. The location of a substation in the corner of a field may pose an obstacle to maneuvering farm equipment and reduces the flexibility in cropping patterns. For these reasons, a weight of 5 was assigned to this factor.

2.2 Engineering Considerations

The following lists three engineering considerations that were used in the evaluation of the substation sites.

Difficulty of site preparation. Weighted a 2, this criterion is a measure of a site's physical characteristics, such as slope, drainage, accessibility, soil bearing capacity, etc., and the degree of difficulty they may impose on substation construction.

Acquisition cost. A parcel's size and shape will dictate to some degree the arrangement of substation faciiities, and the ability to logically expand the substation to accommodate future needs. An appraisal conducted by a local firm in February 1988 confirms acquisition costs. The possible commercial value of a corner lot at a major intersection encouraged inflated acquisition costs. This criterion is weighted a 4.

Routing of 60kV line. The configuration of the 60kV line out of the substation would necessitate additional structures, angles, and special design considerations, therefore this criterion was weighted a 4.

2.3 Environmental Considerations

The four environmental considerations discussed below were selected to determine the degree of environmental conflict posed by substation siting.

Number of cultural resource conflict areas. Sites of archaeological and historic interest and significance are to be avoided. Thus, a weight *of* 5 was assigned each time a substation would be sited within 400 meters. Whiie not an apparent issue, this criterion is retained to demonstrate its consideration.

Area of sensitive wildlife habitat. Areas such as ponds, wetiands, abandoned fields, or pasture with native vegetation provide habitat for a variety of plant and wildlife species. Sites in these areas are assigned a

weight of 5 for each site located thereon. While not an apparent issue, this criterion is retained to demonstrate its consideration.

Visually prominent from a major highway. To mitigate the visual impact of a substation to travelers of major highways, masonry walls and plantings would be used, therefore this criterion was assigned a weight of 3.

Visually prominent from a residential area When the substation is located within 1/8 of a mile of a residence, it was considered to be a dominant and adverse visual element even though the substation would be screened by a masonry wail and plantings. This condition was assigned a weight of 3 for each occurrence.

3.0 SWITCHING STATION/INTERCONNECTION POINT EVALUATION CRITERIA

3.1 Land Use Consideration

Number of Buildings requiring removal or relocation. Pursuant to the California Relocation Act, this is the greatest direct impact of an interconnection point in this category and therefore was assigned a weight of 5.

Number of private land owners affected by acquisition. The right of way process becomes increasingly involved as the number of potential landowners affected by an interconnection point increases. A weight of 2 was assigned to this factor to account for additional negotiation and settlement proceduresthat may be required.

Offsite construction impacts. The proximity of other land uses and the potentiai for their destruction during construction is a measure of an switching station site's overall ability to accommodate the facility. This criterion is weighted a 2.

Siting on cultivated cropland. Siting of a switching station facility on cultivated cropiand can potentially take agricultural land out of production. The location of the switching station facility in the middle of a field may pose an obstacle to maneuvering farm equipment and reduces

the flexibility in cropping patterns. For these reasons, a weight of 5 was assigned to this factor.

3.2 Engineering Considerations

The fotlowing lists three engineering considerations that were used in the evaluation of the switching station/interconnection point sites.

Difficulty of site preparation. Weighted a 2, this criterion is a measure of a site's physical characteristics and the degree of difficulty they may impose on the switching station construction and configuration.

Acquisition cost A parcel's size and shape will dictate to some degree the placement of the facility. A constraining shape may necessitate a more costly design, or require the first structure of the line to be located in close proximity to the switching station. This criterion is weighted a 4.

3.3 Environmental Considerations

The four environmental considerations discussed below were selected to determine the degree of environmental conflict posed by the switching station/interconnection point siting.

Number of cultural resource conflict areas. Sites of archaeological and historic interest and significance are to be avoided. Thus, a weight of 5 was assigned each time the facility would be sited within 400 meters. While not an apparent issue, this criterion is retained to demonstrate its consideration.

Area of sensitive wildlife habitat. Areas such as ponds, wetlands, abandoned fields, or pasture with native vegetation provide habitat for a variety of plant and wildlife species. Sites in these areas are assigned a weight of 5 for each site located thereon. While not an apparent issue, this criterion is retained to demonstrate its consideration.

Visually Prominent from a major highway. When the switching station

facility/interconnection point would be visually prominent to travelers of major highways, it was measured and multiplied by a weight of 3.

Visually prominent from residential area. When the switching station/ interconnection point was located within 1/8 of a mile of a residence, it was considered to be a dominant and adverse visual element. This condition was assigned a weight of 3 for each occurrence.

4.0 Route, Substation Site and Switching Station/Interconnection Point Ranking

The total scores within each of the three major criteria categories were used to determine rankings. The route, site, and point with the lowest total score received a ranking of 1.

5.0 The ?referred Route

The combination of route, substation site, and switching station/interconnection point with the lowest score represents the preferred route according to the evaluation criteria.

Route 3 is the preferred route with a total score of 103.25. Shown In Appendix D, Table **4,** Route 3 offers the optimum balance between design/ construction costs, land use and environmental concerns.

This route displays the best overall compatibility with the analysis criteria. Section 5.0 compares the preferred route and alternatives and describes the positive and negative aspects of each.

APPENDIX E

ROUTE & SITE EVALUATION WORKSHEETS

TABLE 1: CITY OF LODI-DIRECT INTERCONNECTION PROJECT
ROUTE EVALUATION WORKSHEET
APRIL, 1988

ANALYZED CRITERIA

	LINK	1.1		1.1.1		1.2		1.2.1		1.3		2.1		2.1.1		2.2		2.2.1		2.3		2.4	
	MILES	1.04		1.17		2.2		1.1		2.61		2.05		1.08		1.72		0.98		1.5		1.16	
LAND USE CONSIDERATIONS	WT.	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT
NUMBER OF BUILDINGS REQUIRING REMOVAL/RELOCATION	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MILES OF LINE OF EXISTING DISTRIBUTION/COMMUNICATION	4	1.8	7.2	1.17	4.68	2.2	8.8	1.1	4.4	2.61	10.44	1.66	6.64	1.08	4.32	1.72	6.88	0.98	3.92	1.5	6	1.16	4.64
MILES REQUIRING SPECIAL RESTORATION EFFORTS	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.16	3.48
MILES CROSSING AGRICULTURAL LAND IN A DIAGONAL	5	0	0	1.17	5.85	0	0	0	0	0	0	0.5	2.5	0.98	4.9	0	0	0	0	0	0	0	0
MILES ALONG FIELD EDGE	2	1	2	0	0	1.6	3.2	1	2	0.8	1.6	2	4	0	0	1.1	2.2	0	0	1.1	2.2	0	0
ACRES IN CONFLICT WITH LAND USE PLANNING GOALS	5	0.021	0.105	0.024	0.12	0.045	0.225	0.022	0.11	0.053	0.265	0.042	0.21	0.022	0.11	0.035	0.175	0.02	0.1	0.03	0.15	0.01	0.05
LAND USE TOTAL			9.305		10.65		12.22		6.51		12.30		13.35		9.33		9.255		4.02		8.35		8.17
ENGINEERING CONSIDERATIONS		NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT
MILES OF LINE	5	1.04	5.2	1.17	5.85	2.2	11	1.1	5.5	2.61	13.05	2.05	10.25	1.08	5.4	1.72	8.6	0.98	4.9	1.5	7.5	1.16	5.8
MILES REQUIRING NEW CONSTRUCTION/MTC. ACCESS	5	0	0	0	0	0	0	0	0	0	0	0.8	4	0	0	0	0	0	0	0	0	0	0
MILES OF URBAN DEVELOPMENT	5	0	0	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0	0	0	1	5
MILES ALONG POORLY DRAINED FLOODPLAIN/WETLAND AREAS	3	1.04	3.12	0	0	0	0	0	0	0	0	2.05	6.15	0	0	0	0	0	0	0	0	0	0
NUMBER OF ANGLES GREATER THAN 60 DEGREES	4	0	0	1	4	0	0	1	4	1	4	2	8	1	4	0	0	1	4	0	0	1	4
MILES REQUIRING U.G. OF RR COMMUNICATIONS LINE	3	0	0	1.17	3.51	0	0	0	0	0	0	0	0	1.08	3.24	0	0	0	0	0	0	0	0
ENGINEERING TOTAL			8.32		13.36		11		9.5		22.05		28.4		12.64		8.6		8.9		7.5		14.8
ENVIRONMENTAL CONSIDERATIONS		NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT
NUMBER OF CULTURAL RESOURCE CONFLICT AREAS	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MILES THROUGH SENSITIVE WILDLIFE HABITAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MILES OF PROMINENT VISUAL INTRUSION (< 1/4-MI.)	4	1.04	4.16	0.53	2.12	2.2	8.8	0.79	3.16	2.61	10.44	1.21	4.84	0.57	2.28	1.72	6.88	0.98	3.92	1.5	6	1.16	4.64
MILES REQUIRING TREE TRIMMING/REMOVAL	5	0.2	1	0	0	0.9	4.5	0.1	0.5	1.2	6	0.5	2.5	0	0	0.9	4.5	0.5	2.5	0.3	1.5	0	0
MILES OF RESIDENTIAL DEVEL. EXPOSED TO ELEC. & MAG.FIELDS	2	0.08	0.16	0	0	0.5	1	0.08	0.16	1.7	3.4	0.3	0.6	0	0	0.6	1.2	0	0	0.4	0.8	0	0
ENVIRONMENTAL TOTAL			5.32		2.12		14.3		3.82		19.84		7.94		2.28		12.58		6.42		8.3		4.64
GRAND TOTAL			22.94		26.12		37.52		19.83		54.19		49.69		24.25		30.43		19.34		24.15		27.61
	LINK	1.1		1.1.1		1.2		1.2.1		1.3		2.1		2.1.1		2.2		2.2.1		2.3		2.4	

[illegible]		3.2		3.3		3.4		4.1		4.2		4.3		5.1		5.2		5.3		5.4	
3.3		1.31		1.57		0.66		3.71		1.19		1.37 *		4.39		0.89		1.46		0.8	
NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	3	15	2	10	0	0
0.[illegible]	[illegible]	0	0	0	0	0.66	2.64	0	0	0	0	0	0	0	0	0.89	3.56	1.46	5.84	0.8	2
0	0	0	0	0	0	0.66	1.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.5	[illegible]	0	0	0	0	0	0	0.8	4	1.19	5.95	1.37	6.85	0.83	4.15	0	0	0	0	0	0
2.4	[illegible]	1.2	2.4	1.5	3	0.4	0.8	2.91	5.82	0	0	0	0	3.33	6.66	0.89	1.78	1.46	2.92	0.45	0.9
0.[illegible]	0.3[illegible]	0.027	0.135	0.032	0.16	0.013	0.065	0.075	0.375	0.024	0.12	0.02	0.14	0.089	0.445	0.018	0.09	0.03	0.15	0.015	0.08
	10.[illegible]		2.535		3.16		5.485		10.195		6.07		6.99		16.25		20.43		18.71		4.16
NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT
3.3	16.5	1.31	6.55	1.57	7.85	0.66	3.3	3.71	18.55	1.19	5.95	1.37	6.85	4.39	21.95	0.89	4.45	1.46	7.3	0.8	4
0.6	3	0	0	0	0	0	0	0.5	4	1.19	5.95	1.37	6.55	1.74	8.7	0	0	0	0	0	0
0	0	0	0	0	0	0.7	3.5	0	0	0	0	0	0	0	0	0	0	0	0	0.53	2.65
1.8	5.4	0	0	0	0	0	0	2.65	7.95	0	0	0	0	2.65	7.95	0	0	0	0	0	0
1	4	0	0	0	0	1	4	2	8	0	0	0	0	2	8	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.06	3.18	0	0	0	0	0	0
	28.9		6.55		7.85		10.8		8.5		11.9		13.7		49.78		4.45		7.3		5.65
NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT	NUM	TOT		TOT	NUM	TOT	NM	TOT	NM	TOT	NUM	TOT	NM	TOT
0	0	0	0	0	0	0	0	0	[illegible]		0	0	0	0	0	0	0	0	0	0	0
[illegible]	0	0	0	0	0	0	0	0	0		0	0	0	[illegible]	0	0	0	0	0	0	0
[illegible]	13.[illegible]	1.31	5.24	1.57	6.28	0.66	2.64	2.65	10.6		0	0	[illegible]	3	13.2	0.1[illegible]	0.76	0.8	3.2	0.63	2.52
[illegible]	0.1[illegible]	0.01	0.05	0.02	0.1	0.01	0.05	0	0		0	0.61	[illegible]	0	0	0.33	1.[illegible]5	0.55	2.75	0.2[illegible]	1.25
0.[illegible]	0.6	0.1	0.2	0.08	0.16	0.2	0.4	0	0		0	0	0	0	0	0.1[illegible]	0.39	0.8	1.6	0.63	1.26
	13.[illegible]		5.49		6.54		3.09		[illegible]		0		3.0[illegible]		13.2		2.29		7.55		5.03
	30.[illegible]		[illegible]		[illegible]		19.37		[illegible]9.2[illegible]		[illegible]		[illegible]		79.[illegible]3		27.27		[illegible]		[illegible]
[illegible]		3.2		3.3		3.4		4.1		4.2		4.3		5.1		5.2		5.3		5.4	

Table 1 (continued)

TABLE 2: CITY OF LODI-DIRECT INTERCONNECTION PROJECT
INTERCONNECTION PROJECT EVALUATION WORKSHEET
APRIL, 1988

ANALYSIS CRITERIA		INTCNT #:	IC-1		IC-2	
		WT.	NUM	TOT	NUM	TOT
LAND USE CONSIDERATIONS						
NUMBER OF BUILDINGS REQ. REMOVAL/RELOCATION		3	0	0	0	0
NUMBER OF PVT. LAND OWNERS AFFECTED BY ACQ.		2	1	2	1	2
OFFSITE CONSTRUCTION IMPACTS		2	2	4	1	2
SITING ON AGRICULTURAL LAND		5	1	5	1	5
	LAND USE TOTAL			11		9
ENGINEERING CONSIDERATIONS			NUM	TOT	NUM	TOT
DIFFICULTY OF SITE PREPARATION/DESIGN		2	1	2	1	2
ACQUISITION COST		4	1	4	1	4
	ENGINEERING TOTAL			6		6
ENVIRONMENTAL CONSIDERATIONS			NUM	TOT	NUM	TOT
CULTURAL RESOURCE CONFLICT AREAS		5	0	0	0	0
SENSITIVE WILDLIFE HABITAT		5	0	0	0	0
VISUALLY PROMINENT FROM MAJOR HIGHWAY		3	1	3	1	3
VISUALLY PROMINENT FROM RESIDENTIAL AREA		3	1	3	0	0
				6		3
				23		18
		INTCNT #:	IC-1		IC-2	

TABLE 3: CITY OF LODI-DIRECT INTERCONNECTION PROJECT
SUBSTATION EVALUATION WORKSHEET
APRIL, 1988

ANALYSIS CRITERIA	SUB SITE	SS-1		SS-2		SS-3	
	WT.	NUM	TOT	NUM	TOT	NUM	TOT
LAND USE CONSIDERATIONS							
NUMBER OF BUILDINGS REQ. REMOVAL/RELOCATION	5	0	0	1	5	1	5
NUMBER OF PVT. LAND OWNERS AFFECTED BY ACQ.	2	1	2	2	4	1	2
OFFSITE CONSTRUCTION IMPACTS	2	0	0	0	0	1	2
LONG TERM AFFECTS ON ADJACENT LAND USES	2	1	2	1	2	1	2
SITING ON CULTIVATED CROPLAND	5	1	5	0	0	1	5
LAND USE TOTAL			9		11		16
ENGINEERING CONSIDERATIONS		NUM	TOT	NUM	TOT	NUM	TOT
DIFFICULTY OF SITE PREPARATION	2	1	2	5	10	2	4
ACQUISITION COST	4	1	4	5	20	2	8
ROUTING OF 60KV LINE	4	3	12	2	8	2	8
ENGINEERING TOTAL			18		38		20
ENVIRONMENTAL CONSIDERATIONS		NUM	TOT	NUM	TOT	NUM	TOT
CULTURAL RESOURCE CONFLICT AREAS	5	0	0	0	0	0	0
SENSITIVE WILDLIFE HABITAT	5	0	0	0	0	0	0
VISUALLY PROMINENT FROM MAJOR HIGHWAY							
VISUALLY PROMINENT FROM RESIDENTIAL AREA	3	0	0	0	0	2	6
ENVIRONMENTAL TOTAL			6		6		9
GRAND TOTAL			33		55		45
	SUB SITE	SS-1		SS-2		SS-3	

TABLE 4: LODI DIRECT INTERCONNECTION PROJECT
ALTERNATE ROUTE TOTALS AND RANKING
APRIL 1988

SCORE	ROUTE	DISTANCE (MILES)	ACRES REQUIRED	INTERCONNECTION POINT AND LINK COMBINATION
165.26	1	7.01	7.042	IC-1, 1.1, 1.2, 1.3, 2.4
149.88	2	6.43	7.031	IC-2, 2.1, 2.2, 2.3, 2.4
103.25	3	6.18	7.025	IC-2, 3.1, 3.2, 3.3
119.05	4	6.27	7.027	IC-2, 4.1, 4.2, 4.3
174.02	5	7.54	7.053	IC-2, 5.1, 5.2, 5.3, 5.4
128.44	1A	6.17	7.025	IC-1, 1.1, 1.1.1, 2.1.1, 3.2, 3.3
154.26	1B	6.59	7.033	IC-1, 1.1, 1.1.1, 2.2, 2.3, 2.4
140.18	1C	6.89	7.040	IC-1, 1.1, 1.2, 1.2.1, 2.2.1, 3.3
155.05'	1D	7.00	7.042	IC-1, 1.1, 1.2, 1.2.1, 2.3, 2.4
124.06	2A	6.01	7.022	IC-2, 2.1, 2.1.1, 3.2, 3.3
135.01	2B	6.32	7.028	IC-2, 2.1, 2.2, 2.2.1, 3.3

Ail routes terminate at the preferred substation site, SS #1, south of southwest corner of Kettleman Lane and Lower Sacramento Road.

APPENDIX F

CARPENTER LETTER

STATE OF NEW YORK
DEPARTMENT OF HEALTH **OFFICE OF PUBLIC HEALTH**

CORNING TOWER • THE GOVERNOR NELSON A. ROCKEFELLER EMPIRE STATE PLAZA • ALBANY N Y 12201

DAVID AXELROD, M.D
Commissioner

LINDA A. RANDOLPH, M D., M.P.H.
Director, OPH

HERBERT W. DICKERMAN, M.D., Ph.D.
Acting Center Director

<date>

<name>
<address>

Dear <first>:

Thank you for taking the time to write me regarding the New York State Powerlines Project. I know that the project findings, particularly those of Dr. David Savitz linking electromagnetic fields to childhood cancers, have caused widespread public concern.

Since we all live in a world where we depend upon electricity, we ate all exposed to electromagnetic fields every day. I wish I could say that the scientific community knows the full story on the dangers posed by electromagnetic fields; however, far more research must be conducted on this subject before we will know for sure what risk, if any, humans face from power lines, electric appliances and other sources of electromagnetic radiation both in the home and on-the-job. I will do my best, however, to answer the questions you have posed and to try to allay some of your fears. I want to emphasize at the outset that Dr. Savitz has said repeatedly that he is concerned but not panicked by his findings and that he would not make a decision to sell his home based on his results.

Before I describe the Savitz study, let me say that the power lines project included a total of 16 research projects. One study in the project, conducted in Seattle using the same methods used by Dr. Savitz, found no association between electromagnetic fields and adult cancer. In other studies, researchers found no effects of electric or magnetic fields on reproduction, growth or development in isolated cells. Researchers also could find no evidence that power lines cause genetic or chromosomal damage in cells.

Several studies in the project considered various effects of electromagnetic fields on the nervous system of rats and monkeys. One of the studies on monkeys revealed some small effects on brain chemistry. Other studies on animal behavior indicate magnetic fields may affect body rhythms, may alter a rat's response to pain and the ability of rats to learn tasks. Obviously, these results suggest several new avenues for further research.

Dr. Savitz' findings are of greater concern, however. His epidemiological study involved all cases of childhood cancer diagnosed between 1978 and 1983 in the Denver, Colorado, area. A control group of children was selected through random telephone dialing. Dr. Savitz then used two different methods to estimate the electric and magnetic fields in the home of each child in the study. First, he assigned a coding to each residence, depending on the proximity of the home to ordinary overhead power lines, as well as to transformers and substations. The second method involved direct measurements of the electric and magnetic fields in each house; one set of measurements was made with all the lights and appliances turned on, another was made with all the lights and appliances turned cff. (The purpose of taking measurements under these two different ccnditions was to estimate the contribution to the fields solely from the external power lines.)

After collecting all the data, Dr. Savitz turned to sophisticated computer programs to see whether there was a correlation between the level of an electromagnetic field in a child's home, as measured by his two different methods, and the incidence of cancer among the children in this study. He found that children living in homes closest to high-current power lines (ordinary distribution lines) had a 1.7 times higher incidence of cancer than children who did not live by the lines. Children living near the power lines had 2.1 times the incidence of leukemia.

When he correlated cancer incidence with the actual measurements of electric and magnetic fields in homes (measurements made using his second method), Dr. Savitz found a small increase in the incidence of cancer in homes with strong magnetic fields. Because he had measured the fields first with lights and appliances turned on, and then turned off, he was able to determine that the measurements associated with the cancer were a result of the power lines feeding the houses. while the lights, appliances or wiring in the home also generate fields, their use is not constant. These results suggest that total exposure (averaged over days to years) is the important factor.

Increasing the risk of cancer, of course, doesn't mean that a person is certain to develop the disease. Health experts estimate that the incidence of cancer among children in the U.S. today is about one in 10,000 per year. If the incidence of cancer is raised by 2.1, as suggested by the Savitz study, then the likelihood of getting childhood cancer is two in 10,000 per year. While this is only a small increase, it is obviously one that we want to reduce.

Dr. Savitz' findings confirmed research done by other scientists several years before. Moreover, a few other studies have linked electromagnetic fields and cancer. Nonetheless, the jury is still out on this matter. Savitz' study by no means proves a cause-and-effect relationship between electromagnetic fields and cancer. Nor does it give us any information on how magnetic fields may generate cancer. What the study does do is significantly strengthen the hypothesis that electromagnetic fields cause cancer. Far more research must be done before we have any conclusive proof.

As the scientific advisory panel of the Powerlines Project recommended in its final report, additional research is needed to explore the possible association between cancer, particularly leukemia, and magnetic fields. Unfortunately, it will be several years before this type of research produces any results.

The panel's first recommendation that a major research effort be immediately undertaken to explore methods of delivering power to homes in such a way as to reduce magnetic field exposures. Possible solutions might be tc ***bury*** power lines ok run current-carrying lines in pairs (by Fairing the lines in opposite directions, the electromagnetic fields would cancel each other out.) Changing in how grounding is done may also help.

In the meanwhile, there is very little that the average homeowner can do *to* guard against the possible dangers posed by electromagnetic fields. While newspaper and television reports focused almost exclusively on the dangers posed by overhead power lines, our studies have implications for all sources of electric current commonly found both inside and outside the home. Wherever electricity flows through a wire, a magnetic field is generated. The toaster sitting on your counter, and the electric blanket covering your bed generate electromagnetic fields. The real question, of course, is what strength **and** duration of an electromagnetic field represents a cause for concern?

Unfortunately, we don't have answers, only indications, from the Savitz research. Based on his findings, there is reason to believe that magnetic fields in or around the home due *to* external sources in excess of 2.5 milligauss (mG) may, and I emphasize may, indicate a heightened risk; fields between 1.5 mG and 2.5 mG may be termed a moderate risk, and fields below 1.5 mG, a low risk. (A gauss, named after a 19th century physicist, is a measure of the intensity of a magnetic field.) In most of our homes during the daytime the fields will measure higher than these values due to use of appliances.

These numbers, however, should in no way be regarded as standards or regulations, only guidelines. And a real problem exists right now in that there are virtually no commercial companies available to measure the magnetic field in or around your home.

Many people have written to ask at what distance away from overhead power lines a person can live safely, that is, without increasing their: risk of contracting cancer. Again, it is impossible to answer that question, because the magnitude of a magnetic field depends on the level of electric current passing through the line at any given time. The current fluctuates continually in power lines.

Others have written to ask whether a person faces a greater threat because his or her home is situated near a transformer, a substation, *or* a high-voltage power lines. The assumption is that if ordinary low-voltage power lines passing through neighborhoods pose a risk, then high-voltage

lines and transformers must pose an even greater risk. Indeed, there is a substantial level of current passing through transformers, substations and high-voltage lines, and fairly strong electromagnetic fields are associated with these currents. However, there can be as much current passing through low-voltage lines from time to tine as there is passing through higher-voltage devices. As much as we would like to be able to provide more definitive advice as to the risks posed by these devices, we would be irresponsible to do so without more information, information we just don't have at this time.

I want to conclude by stressing that people snould not be unduly alarmed be the information contained in our report. It may help to realize that children are commonly exposed to a number of other environmental contaminants which pose a far greater risk than does electromagnetic radiation. We suggest, for instance, that children who live in homes where parents smoke face far more risk of contracting cancer from the cigarette smoke than they do from the effects of electromagnetism. The risk of use of automobiles on highways is also greater than that of cancer from magnetic fields. Clearly we (our society) should do all we can to reduce all of these risks, but at the same time it is not appropriate to try to live without electricity.

Again, I thank you for your interest in the Powerlines Project.

Sincerely,

David O. Carpenter, M.D.
Executive Secretsry
Powerlines Project

Enclosure

APPENDIX G

AGENCIES CONSULTED

STATE OF CALIFORNIA—OFFICE OF THE GOVERNOR GEORGE DEUKMEJIAN, Governor

OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET
SACRAMENTO, CA 95814

DATE: October 15, 1937

TO: Reviewing Agencies

RE: The City of Lodi's Community Development Department's NOP for Direct interconnection Project/Double Circuit 230kV Transmission Line SCH# 87101311

Attached for your comment is the City of Lodi Community Development Department's Notice of Preparation of a draft Environmental Impact Report (EIR) for Direct Interconnection Project/Double Circuit 230kV Transmission Line.

Responsible agencies must transmit their concerns and comments on the scope and content of the EIR, focusing on specific information related to their own *statutory* responsibility, within 30 days of receipt of this notice. We encourage commenting agencies to respond to *this* notice and express their concerns early in the environmental review process.

Please direct your comments to:

David Morimoto
The City of Lodi
Community Development Department
221 West Pine Street
Lodi, CA 95240

with a copy to the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the review process, call Norma Wood at 916/445-0613.

Sincerely,

David C. Nunenkamp
Chief
Office of Permit Assistance

Attachments

cc: David Morimoto

RECEIVED
OCT 16 1987
COMMUNITY DEVELOPMENT DEPARTMENT

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, Governor

PUBLIC UTILITIES COMMISSION
505 'JAN NESS AVENUE
SAN FRANCISCO. CA 94102

October 22, 1987 File No.:

'David Morito
City of Lodi Community Development Department
221 West Pine Street
Lodi, CA 95240

SUBJECT: Comments on Notice of Preparation and Initial Study
City of Lodi Direct Interconnection Project

Gentlemen:

This comment letter responds to your Notice of Preparation received October 19, 1987. We recommend that such documents be provided to the State Clearinghouse, 1400 Tenth Street, Room 121 Sacramento, CA 95814, for distribution to all concerned state agencies.

1. The City of Lodi is a member of the Transmission Agency of Northern California, the lead agency for the California-Oregon Transmission project (COTP). The present project appears to be at least in part a response to the proposed construction of the COTP. As such, it properly should be considered as a part of the environmental document for that project and the financial effects of the proposed construction should be provided to and incorporated in the calculations for the COTP.

2. The alternative involving upgrading of PG&E lines would require a Certificate of Public Convenience and Necessity Erom this Commission, since it would involve the equivalent of constructing a new double circuit 230 kV line. Accordingly, the CPUC will be a responsible agency for the preparation of your EIR on the proposed construction.

3. Your document should provide careful consideration of the relative environmental impacts of the various alternatives.

4. Since it is Likely chat upgrading the existing lines in their right-of-way will prove environmentally preferable to developing a new right-of-way, a careful discussion of the relative costs of construction, operation, and naintenance of the project and its alternatives should be provided to allow for justification of the selection of an alternative other than the environmentally most favored. This discussion should include consideration of the economics of participation in the CGT?, prices of power anticipated, and alternative power sources.

5. The proposed right-of-way and the alternatives cross a major railroad right-of-way. Construction at this crossing must comply with this Commission's General Order 95.

6. The Initial Study states that there are no adverse perceivable effects from the magnetic fields of 230 kV transmission lines. This conclusion may no longer be correct. The Environmental Impact Report should take account of the studies and reviews performed by the New York State Power Lines Project. In particular, review the Panel's Final Report on Biological Effects of Power Line Fields. This report can be obtained from Dr. D. O. Carpenter, State of New York, Department of Health, Albany, N.Y. 12201.

Please call George Hersh of this office at (415) 557-1375 if you have further questions.

Sincerely yours,

RUSSELL W. COPELAND, Chief
Service and Safety Branch

flnm:#181etgh.lod
ref:lodicome.gh/gh/disk

cc: State Clearinghouse

COUNTY OF SAN JOAQUIN
DEPARTMENT OF PUBLIC WORKS
PO BOX 1810 - 1810 E. HAZELTON AVENUE
STOCKTON CALIFORNIA 95201
(209) 468-3000

HENRY M. HIRATA
DIRECTOR

EUGENE DELUCCHI
CHIEF DEPUTY DIRECTOR

THOMAS R. FLINN
DEPUTY DIRECTOR

MANUEL LOPEZ
DEPUTY DIRECTOR

October 29, 1987

Mr. Gavid Morimoto
City of Lodi
Community Development Department
221 W. Pine Street
Lodi, CA 95240

SUBJECT: NOTICE OF PREPARATION - CITY OF LODI DIRECT INTERCONNECTION PROJECT

Dear Mr. Morimoto:

This Department submits the following comments in response to the scope and content of the environmental review of the above named project:

1. The undergrounding of the transmission line should be considered as an alternative.

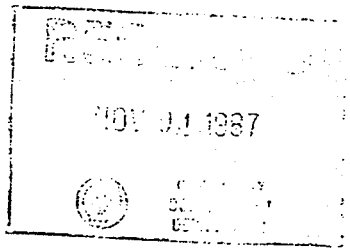
2. Transmission line poles within County right of way require prior approval of this Department. An Encroachment Permit will be required if County right of way is affected. In addition, a Franchise Agreement may be required if County rights of way are utilized.

Thank you for the opportunity to comment on this project. Your questions, if any, should be directed to me at (209) 458-3000.

Very truly yours,

R. L. PALMQUIST
Environmental Coordinator

RLP:cr
D 7J294RPC1



STATE OF CALIFORNIA—THE RESOURCES AGENCY GEORGE DEUKMEJIAN Governor

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814

November 2, 1987

Mr. David Morimoto
City of **Lodi**
Community Development Department
221 Pine Street
Lodi, **CA** 95240

Re: Comments on the **Initial** Study **for** the **City** of **Lodi's** Direct Interconnection Project

Dear Mr. Morimoto:

The California Energy Commission (CEC) staff appreciates the opportunity to review and comment on the Notice of Preparation and Initial Study for the City of Lodi's Direct Interconnection Project. The following comments are provided for your consideration in preparing the project's Draft Environmental Impact Report (DEIR).

In the visual impact discussion, the Initial Study indicates that the project area has a number of existing transmission lines and radio towers. It is unclear, however, whether these existing facilities will dominate foreground views (0 to 0.5 miles) from roads and residences located near the proposed transmission line alignment. The DEIR should further evaluate the location, number, and sensitivity of viewpoints (residences, roads, etc.) near the proposed project.

The Initial Study states that a number of protected species are located within the general area of the project; one: the giant garter snake, is located within one mile of the project area (page 11). To ensure that the project will not directly or indirectly impact protected species, a biological survey of the preferred route is necessary. Without such a survey, the Initial Study cannot support the conclusion that no protected species will be displaced. The DEIR should discuss the survey's methodology, results and identify suitable mitigation measures, or alternative routes, if necessary. Avoidance is the preferred mitigation measure.

The Initial Study indicates that the project may impact small wetland areas (page 13). Even if these wetlands lack unique habitat value, the loss of these resources will contribute to a continual loss of wetland areas in the Central Valley. These wetland areas should be included in the biological survey discussed in the preceding paragraph and the results similarly

addressed in the DEIR. Unless wetland impacts are avoided or mitigated, the project may contribute to a significant cumulative impact.

The Initial Study's land use discussion makes no mention of the project effects on agricultural operations (page 13). As noted on page 8 of the checklist, the project may affect current patterns of crop dusting. Other agricultural operations may be affected by the project as well, and need to be evaluated further in the DEIR.

If you have questions or if we can provide additional information on these comments, please call Sharron Taylor at (916) 324-3231.

Sincerely,

ROBERT L. THERKELSEN, Chief
Siting and Environmental Division

RLT:JO'H:ST

STATE OF CALIFORNIA—BUSINESS TRANSPORTATION AND HOUSING AGENCY GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF TRANSPORTATION
P.O. Box 2048 (1976 E. CHARTER WAY)
STOCKTON, CA
TDD (209) 948-7853
(209) 948-7906

November 2, 1987

10-SJ-12-15.15
City of Lodi
Direct Interconnection
Project
Notice of Preparation
of an EIR

Mr. David Morimoto
City of Lodi
Community Development Department
221 West Pine Street
Lodi, CA 95240

Dear Mr. Morimoto:

Caltrans has reviewed the Notice of Preparation of an EIR for the Direct Interconnection Project and offers the following comments:

As noted on Page 5, an encroachment permit from Caltrans will be required for work planned on State highway right of way. Use of the Kettleman Road Route 12 alternative will involve more highway encroachment and may make it necessary to contact Caltrans early in the process to avoid unnecessary delay. It is probable that the 30 to 40 feet from Centerline of the highway, referred to'en Page 22, will not be acceptable under the latest Caltrans right of way protection policy. Normally, when permits are issned for structures along State arterial highways, a minimum set back of 50 feet is required. The location of the preferred alternate along Route 12 is in an area with the potential for future development. This would require that the highway be upgraded to five lanes and a minimum of 100 feet of right of way be provided. This would not allow for power line towers within the highway right of way. Any relocation of the towers will be at owner's expense. The location of substation structures will also need to be set back a minimum of 50 feet from the highway center line.

Additional widening of Route 12 has not been programmed in the State Transportation Improvement Program (STIP). However, the Route Concept, or long range plan for Route 12 on that segment calls for a minimum of **four** lanes and 100 feet of right of

way. The Regional Tansportation Plan (RTP) prepared by the San Joaquin County Council of Governments supports this concept.

Caltrans appreciates the opportunity to comment on the Notice of Preparation and looks forward to reviewing the Draft EIR. Any questions regarding these comments may be directed to Al Johnson at Caltrans, telephone (209) 948-7838.

Very truly yours,

Dana Cowell

DANA COWELL
Chief, Transportation
Planning Branch

cc:PVerdoorn/SJCCOG
LGrewal/SJCAPCD

STATE OF CALIFORNIA – BUSINESS, TRANSPORTATION & HOUSING AGENCY GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF TRANSPORTATION
DIVISION OF AERONAUTICS
1130 K STREET - 4th FLOOR
MAIL: PO. SOX912873
SACRAMENTO, CA 94273-0001
(916) 322-3090
TDD (916)323-7665

rec'd. 12/11/87

December 4, 1987

Mr. Frank Rowland
Power Engineers
P.O.Box 1066
Hailey, Idaho 83333

Dear Mr. Rowland:

NOP for the City of Lodi Power Interconnection
Project; SCH# 87101311

The California Department of Transportation, Division of Aeronautics, has reviewed the above-referenced document pursuant to CEQA and we offer the following comments for your consideration.

The project which consists of a proposal to interconnect the City of Lodi with the WESTERN transmission lines via a 230kV transmission line along Kettleman Lane. A substation is proposed in the vicinity of Kettleman Lane and the South Main Canal. The preferred alternative will place transmission lines approximately 1 and 1/2 miles to the north of Kingdon Airpark. This location plus the proposed tower heights of between 90'-110' should result in no impact to aircraft operations at the airport.

Thank you for the opportunity to review and comment on this proposal.

Sincerely,

JACK D. HEIMERLY, Chief
Division of Aeronautics

Sandy Hesnard
Envir. Neural Planner

cc: City of Lodi, Community Developement Dept.
Kingdon Airpark

STATE OF CALIFORNIA—THE RESOURCES AGENCY

GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF FISH AND GAME
REGION 2
1701 NIMBUS ROAD, SUITE A
RANCHO CORDOVA, CALIFORNIA 95670
(916) 355-7023

DEC 14 1987

Mr. Frank Rowland
Land Services Manager
Power Engineers Incorporated
1020 Airport Way
P.O. Box 1066
Hailey, ID 83333

Dear Mr. Rowland:

The Department of Fish and Game (Department) has reviewed the September, 1987 Initial Study for the City of Lodi's Direct Interconnection Project and finds that the project will not impact any rare, threatened, or endangered plants or animals.

The Initial Study identifies (page 13) that the proposed transmission line will cross small drainage ditches containing wetlands in the western-most project area. We recommend the transmission line be designed so the structures either avoid these ditches or the wetlands loss be replaced using the mitigation concept, an acre for acre and value for value basis.

If the project either avoids or mitigates the project's potential impact upon the wetlands, we would concur with the findings for a mitigated Negative Declaration under CEQA Guidelines.

If the Department can be of further assistance, please contact Patricia Perkins, Wildlife Management Supervisor, telephone (916) 355-7010.

Sincerely,

James D. Messersmith
Regional Manager

Federal Emergency Management Agency
Region IX Building 105
Presidio of San Francisco, California 94129

18 DEC 1987

Mr. David Morimoto
City of Lodi
Community Development Department
221 West Pine Street
Lodi, California 95240

Subject: City of Lodi Direct Interconnection Project

Dear Mr. Morimoto:

This is in response to your request for FEMA's input regarding the subject project.

Our review indicates that no project lands ***are*** within an identified 100 year floodplain.

FEMA regulations only apply to development occurring within designated 100 year floodplains, therefore, the proposed project ***is*** not **subject** to the requirements of the National Flood Insurance Program (NFIP).

If you have any questions, please call Mary Bandiera at (415) 323-7180.

Sincerely,

for Robert L. Vickers
Regional Director

CENTRAL CALIFORNIA
INFORMATION CENTER

(209) 667-3307/3127

Department of Anthropology
California State University
Turlock, California 95380

ALPINE
CALAVERAS
MARIPOSA
MERCED
SAN JOAQUIN
STANISLAUS
TUOLUMNE

1-4-88

Ms. Mary Ann Mix
Senior Environmental Specialist
Power Engineers Inc.
P.O. Box 1966
Haley, Idaho 83333

RE: File #0767L
City of Lodi 230KV Transmission Line

Dear Ms. Mix:

We have conducted a records search as per your request for the above-referenced project area located on the Lodi North, Lodi South, New Hope and Terminous 7.5 minute USGS quadrangle maps in San Joaquin County. According to our files there are no recorded cultural resources located directly within the routes as indicated on the map you transmitted. For your information, the exact routes as indicated on your map have not been subject to previous cultural resource survey. There are two cultural resources located within a one-mile radius of the northern periphery of the project (CA-SJO-0035 and 0036, occupation/burial sites) and there is one cultural resource (CA-SJO-0074, occupation/burial) located ca. 1500 feet north of Route 3, between Ray and Free Roads.

This communication is advisory only and does not constitute a negative declaration of impact upon cultural resources. The law requires that if cultural resources are discovered as a result of project-related activities, all work is to cease and the lead agency and a qualified archaeologist are to *be* consulted regarding evaluation of the find.

Thank you for contacting this office regarding cultural resource preservation in San Joaquin County. Please fill out and return the attached Agreement of Confidentiality Form. Our billing is attached.

Sincerely,

E. A. Greathouse, M.A.

L. Kyle Napton, Coordinator E. A. Greathouse, Assistant

POWER Engineers Incorporated

January 11,1988

Central California Information Center
Dept. of Anthropology
Cal ifornia State College
Turlock, CA 95380

Attention: Elizabeth Greathouse

Subject: $1163-01.24; City of Lodi 230kV Transmission ine
Cultural Resources Survey

Dear Ms. Greathouse:

Thank you for your prompt response to my recent **request** for information on the above referenced project. However, one reference needs to be clarified. Your letter states cultural resource (CA-SJO-0074) is located approximately 1,500 feet north of Route 3, between Ray and Free Roads. Upon consulting the San Joaquin County Map, it appears the referenced route'should be Route 12, Kettleman Lane. Should this reference be an erruneous assumption on my part, please advise and forward the Township, Range, and Section for Route **3.**

Per your request, please find enclosed the Agreement of Confidentiality

Sincerely,

POWER Engineers, Incorporated

Mary Ann Mix
Senior Environmental Specialist

:mf
enc. as noted
cc: file

1-14-88

Thank you for transmitting the Confidentiality Form. You are indeed correct, the referenced route should read "12", not **3,** as stated.

E. A. Greathouse, Assistant Coordinator
Central California Information Center

CENTRAL CALIFORNIA
INFORMATION CENTER

(209) 667-3307/3127

Department of Anthropology
California State University
Turlock, California 95380

ALPINE
CALAVERAS
MARIPOSA
MERCED
SAN JOAQUIN
STANISLAUS
TUOLUMNE

State of California
The Resources Agency
Department of Parks and
Recreation

AGREEMENT OF CONFIDENTIALITY File #: 0767L

I, the undersigned have been granted access to the cultural resource site record data at the Central California Information Center at Califcrnia State University, Stanislaus for the purpose of:

____ Scientific Research _XX_ Project Planning Review Other (specify: _____)

Site Record(s) consulted: CA-SJO-0035 & 0036; CA-SJO-0074
Site Record(s) copied: Same
USGS Quads consulted: Lodi North, Lodi South, New Hope, Terminous
county(ies): San Joaquin

Title of Project or Research: City of Lodi 230kV Transmission Line
Contact person/agency for which work conducted: City of Lodi Electric Utility Dept., Henry Rice - Director
Address: 221 West Pine St., Call Box 3006, Lodi, CA 95241-1910
Phone: (209)333-6762

I fully understand the confidential nature of the information contained in these records, and I agree to respect that confidentiality.

I will attempt to ensure that specific site locations are not distributed in public documents or made available to unauthorized individuals within my institution or agency. I also understand that prior written consent of the Information Center Coordinator or tne State Historic Preservation Officer is required for any exceptions to the above stipulations.

Furthermore, I agree to forward to-the appropriate Information Center, no later than 30 days after completion of field reconnaissance or investigation, any preliminary reports and complete site records for any sites that are identified or dealt with. I also agree to forward all subsequent reports on these sites, which are pertinent to cultural resource management.

1 understand that failure to comply with any aspect of this agreement is grounds for denial of subsequent access to the cultural resource site data.

Signature of Researcher — 11 January 1988 (Date)

Mary Ann Mix, Sr. Env. Spec., POWER Engineers, Inc. — (208)788-3456 (Phone Number)

Printed Name

L. Kyle Napton, Coordinator E. A. Greathouse, Assistant

United States Department of the Interior

FISH AND WILDLIFE SERVICE

SACRAMENTO ENDANGERED SPECIES OFFICE
2800 Cottage Way, Room E-1823
Sacramento, California 95825-1846

JAN 11 1988

In Reply Refer To:
EL/1-1-88-SP-149

Ms. Nancy Weintraub
Environmental Manager
Department of Energy
Western Area Power Administration
Sacramento Area Office
1825 Bell Street
Sacramento, California 95825

Subject: Request for Species List for the Proposed Western Area Power Administration Transmission and Substation Project for the City of Lodi

Dear Ms. Weintraub:

As requested by letter from your agency dated December 11, 1987, you will find attached a list of endangered and threatened species (Attachment A) that may be present in the area of the subject project. To the best of our knowledge no proposed species occur within the area. The list is intended to fulfill the requirement of the Fish and Wildlife Service to provide a list of species under Section 7(c) of the Endangered Species Act, as amended. Please see Attachment B for your requirements.

Also for your assistance, we have included a list of candidate species. These species are presently being reviewed by our Service for consideration to propose and list as endangered or threatened. Candidate species have no protection under the Endangered Species Act and are included for your consideration as it is possible the candidates could become formal proposals and be listed during the construction period.

upon completion of the Biological Assessment (see Attachment B), should you determine that a listed species is likely to be affected (adversely or beneficially), then your agency should request formal Section 7 consultation through our office at the letterhead address. If there are both listed and candidate species (if included in the assessment) that may be affected and if requested, we will informally consult on the

candidate species during the formal consultation. However, should the assessment reveal that only candidate species may be affected, then you should consider informal consultation with our office at the letterhead address.

One of the benefits of informal consultation to the consulting agency is to provide the necessary planning alternatives should a candidate species become listed before completion of a project. Informal consultation may also be utilized prior to a written request for formal consultation to exchange information and resolve conflicts with respect to listed species.

If the Biological Assessment is not initiated within 90 days of receipt of this letter, you should informally verify the accuracy of the list with our office.

Should you have any additional questions regarding this list or your responsibilities under the Act, please contact Dave Harlow at (916) 978-4866 or (FTS) 460-4866. Thank you for your interest in endangered species, and we await your assessment.

Sincerely,

Gail C. Kobetich

Gail C. Kobetich
Field Supervisor

Attachments

cc: Chief, Endangered Species, Portland, Oregon (FWE-SE; Attn: Ralph Swanson)
Field Supervisor, Ecological Services, Sacramento, CA (ES-S)

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED WESTERN AREA POWER ADMINISTRATION TRANSMISSION AND SUBSTATION PROJECT **FOR THE** CITY OF **LODI**
(Case No. 1-1-88-SP-149)

Listed Species

Invertebrates

Valley elderserry longhorn beetle, Desmocerus californicus dimorpnus (T)

Proposed Species

None

Candidate Species

Birds

Tricolored blackbird, Agelaius tricolor *(2)*

Herps/mammals

Giant garter snake, Thamnophis couchi gigas *(2)*

California tiger salamander, Ambystoma tigrinum californiense *(2)*

(E)--Endangered (T)--Threatened (CH)--Critical Habitat

(1)--Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered **or** threatened.

(2)--Category *2:* Taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

ATTACHMENT B

FEDERAL AGENCIES' RESPONSIBILITIES UNDER SECTIONS 7(A) and (C) OF THE **ENDANGERED** SPECIES ACT

SECTION 7(a) Consultation/Conference

Requires: **1)** Feaeral agencies to utilize their authorities to carry out programs to conserve endangered and tnreatened species; *2)* Consultation with PWS when a Feaeral action may arfect a listed endangered or threatened species to insure that any action authorizea, funaed or carried out by a Federal agency **is** not likely to jeopardize the continue existence of listed species or result in tne destruction or adverse modification ot critical habitat. The process is initiated by the Federal agency after determining the action may affect a listed species; and **3)** Conference with FWS wnen a Federal action **is** Likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical nabitat.

SECTION 7(c) Biological Assessment--Major Construction Activity 1/

Requires Federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities. The BA analyzes tne effects of the action on listed and proposed species. The process begins with a Feaeral agency requesting from EWS a **list** of proposed and listed threatened and endangered species. The **BA** should be completed within 180 days after its initiation (or within such a time period as is inutually agreeable). If tne BA is not initiated within 90 days or receipt of the list, the accuracy of the species list should be inrormaily verified with our Service. No irreversible commitment of resources is to ***be*** made during tne **BA process** wnicn would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, administrative actions may proceea; however, no construction may begin.

We recommend the following for inclusion in tile BA: an onsite inspection of tne area affected by the proposal wnich may include a detailed survey of the area to determine if tne species or suitable habitat are present; a review literature and scientific data to determine species' distribution, habitat needs, ana otner biological requirements; interviews witn experts, including those

1/ A consrruction project (or otner undertaking having similar **physical** impacts) which is a major Federal action significantly affecting the quality of tne numan environment as referred to in NEPA (42 U.S.C. 4332(2)C).

within FWS, State conservation departments, universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of the direct and indirect (including interrelated and interdependent effects) and cumulative effects of the proposal on the species and its habitat (See 50 CFR §402.02, definition of effects of the action); an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

JONES S STOKES ASSOCIATES, INC / 1725 - 23rd STREET, SUITE 100 /SACRAMENTO, CA 95816 916/444-5638
FAX 916/444-0308

March 3, 1988

Mr. Frank L. Rowland
Land Services Manager
Power Engineers, Inc.
P. O. Bos 1066
Hailey, ID 83333

SUBJECT: 1163-01, Biological Assessment for the Lodi Direct Interconnection Project

Dear Mr. Rowland:

Enclosed. is the Biological Assessment report, pursuant to Section 7(c) of the Endangered Species Act, for the subject project. The report describes the study methods and findings.

Our field survey found no suitable habitat for the valley elderberry longhorn beetle in the study area. Therefore, the proposed project will have no impacts on this threatened species.

Please call if you have any questions or require additional information.

Sincerely,

Jordan Lang

Jordan Lang
Project Manager

Enclosure

JL/jb

BIOLOGICAL ASSESSMENT

FOR THE

VALLEY ELDERBERRY LONGHORN BEETLE

ON THE

LODI DIRECT INTERCONNECTION PROJECT

OF THE

WESTERN AREA POWER ADMINISTRATION

Background and Study Objectives

The U. S. Fish and Wildlife Service (USFWS) indicated that the valley elderberry longhorn beetle (Desmocerus californicus dimorphus), a threatened species designated under the Endangered Species Act (ESA), might be present in the study area of the Lodi Direct Interconnection Project (see G. Kobetich letter to N. Weintraub, dated January 11, 1388, for USFWS Case No. 1-1-88-SP-149). No other species listed or proposed for listing under the ESA were indicated as potentially occurring in the study area.

This Biological Assessment *has* been prepared pursuant to Section 7(c) of the ESA. This assessment has the following objectives:

1) To determine if suitable habitat for the beetle was present in the study area;

2) To determine if the beetle was present in any suitable habitat found: and

3) To determine any possible impacts on the beetle from the proposed project or alternatives.

Studv Methods

On March 1, 1988 a Jones & Stokes Associates resource ecologist conducted a field survey of the areas shown on the attached figure. The ecologist has extensive experience with beetle life history and habitat requirements and has conducted previous beetle surveys under contract to USFWS.

The beetle is a live wood pith borer that exclusively uses elderberry (Sambucus ssp.) shrubs as its host plant. Because the beetle bores only in elderberry, the first step in an assessxent of potential beetle habitat is to search for the presence or absence of elderberry plants. During the field

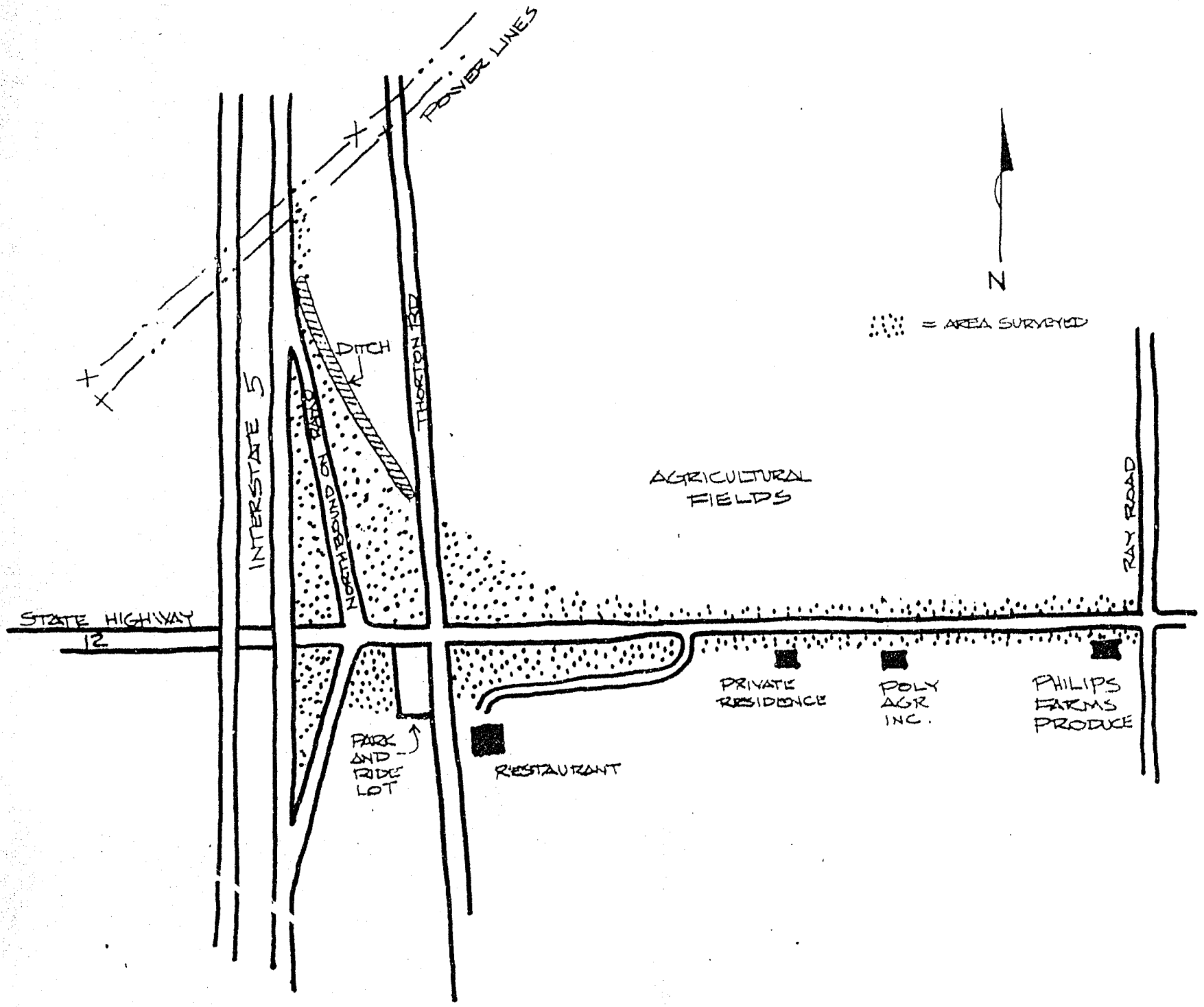
investigation both the north and south sides of State Highway 12 between Ray Road and Interstate 5 were searched for the presence of elderberry plants. The areas on both sides of the northbound Interstate 5 on-ramp were also searched (see the attached Cla-ure).

Survey Results

No elderberry plants were found growing in the study area. Several trees had recently been cut down and removed by crews of the California Department of Transportation in the freeway interchange area. The removed trees were mainly **wiiiows** (Salix ssp.) with a few cottonwoods (Populus fremontii). Most of the survey area is occupied by nonwoody herbaceous plants with scattered **willows,** cottonwoods, mule fat (Baccharis viminea), and escaped ornamental poplars (probably Populus nigra). There was no evidence that any of the plants removed had been elderberry.

Conclusion

No suitable habitat for the beetle is present in the study area. Therefore, the beetle cannot be present and no impacts on the species are possible.


POWER LINES
N
= AREA SURVEYED
DITCH
INTERSTATE 5
OVERCROSSING
THORTON RD
AGRICULTURAL
FIELDS
RAY ROAD
STATE HIGHWAY
12
PRIVATE
RESIDENCE
POLY
AGR
INC.
PHILIPS
FARMS
PRODUCE
PARK
AND
RIDE
LOT
RESTAURANT

APPENDIX H

PROJECT AREA MAP