

CHAPTER 2
ALTERNATIVES INCLUDING
THE PROPOSED ACTION

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INTRODUCTION

Six general alternatives were evaluated to meet the Southwest Intertie Project (SWIP) needs of providing economical energy to the west and increasing transmission system reliability. These alternatives were:

- energy conservation and load management
- generation
- transmission systems
- transmission technologies
- no action
- the proposed action and alternatives

The first four of these alternatives, discussed in the first nine pages of this chapter, were considered but eliminated because they do not meet the purpose and need for the proposed action. The remaining actions are the no-action alternative and the alternative to construct a transmission line. The no-action alternative, defined as doing nothing to fulfill the purpose and need for the project, is required under the National Environmental Policy Act (NEPA) and implementing Council of Environmental Quality (CEQ) regulation (40 CFR 1500-1508).

The no-action alternative and the proposed action to construct a transmission line are discussed in detail later in this chapter. Transmission lines typically have many alternative routes that can be used to connect into two or more points in the electrical system. Therefore, routing alternatives are identified and compared to determine which route best meets environmental, engineering, and other siting criteria. The following is included in this chapter on the proposed action to build the SWIP:

- (1) a description of the proposed action
- (2) the process used to evaluate the alternative transmission line corridors
- (3) a description of each alternative route
- (4) a comparison of the alternative routes
- (5) the identification of preferred alternative routes

All tables are found at the end of the chapter.

Alternatives Considered But Eliminated

Energy Conservation and Load Management

Energy conservation is the more efficient use of electricity by customers. Conservation incentive programs are designed to reduce energy consumption per customer, providing an increase in energy resources for new loads. Load management refers to power supply system improvements by a utility. Load management programs allow customer demand to be moved away from peak load hours, freeing existing resources to serve additional peakloads. These resources are the first used to meet customer electricity demands before constructing new power plants or transmission lines.

Energy conservation and load management programs (including state-mandated programs in California) have the advantage of reducing energy consumption without any documented adverse environmental impacts. They have also lowered utility forecasts of electric energy sales and system peak demand.

The following examples of conservation and load management programs are typical of utilities within the Western System Coordination Council (WSCC).

Conservation and load management have been an important part of Idaho Power Company's (IPCo's) strategy for many years and would continue to be stressed in IPCo's resource management program. As much as 20 megawatts of conservation has been documented in previous conservation programs and is reflected in IPCo's current loads. IPCo's load forecast predicts saving 82 annual megawatts in the residential sector and 17 annual megawatts in commercial construction by the year 2010.

The residential sector is the largest single customer on IPCo's system, consuming 31 percent of the retail sales. The Good Cents Program provides builder incentives for new electrically-heated homes. IPCo is also participating in the Low Income Weatherization Program and the House Warming Program in conjunction with state and local agencies. These programs target the weatherizing of low-income homes and energy-use education of occupants. In addition, there are numerous other residential programs that IPCo is actively pursuing, including High Performance Showheads and several demonstration programs.

About 22 percent of IPCo's retail sales are to commercial customers. IPCo has installed over 12,000 water-heater jackets and made payments to customers to purchase over 300,000 energy efficient fluorescent lighting tubes. Since 1982 IPCo has been converting street lights from mercury vapor to the more efficient high pressure sodium. The company has offered computer modeling for energy efficiency in new buildings to architects and engineers through the Design Excellence Award Program. Participation in the program has increased dramatically since 1989. In addition, several other conservation and demonstration projects are in operation.

The industrial and irrigation customers of IPCo represent another 48 percent of the retail electrical sales. These customers are offered demonstration and other incentive programs,

including a low-pressure nozzle payment for irrigators. IPCo is also exploring many other efficiency programs, including conversion of hand/wheel lines to center pivot, water management, small pump, and assisting canal companies. One of the most promising programs is reduction in water use for irrigation, which indirectly would result in a reduction of electricity use.

Electrical generation efficiencies are also part of IPCo's program. At IPCo's Jim Bridger plant, other efforts include installation of new technology together with regularly scheduled maintenance which will increase IPCos' share of plant capacity by 33 MW by 1992. In addition, installation of a computer-based Energy Management System to optimize the dispatch of system hydroelectric and thermal resources is expected to produce an increase in system generation of approximately 17 MW when fully implemented in 1993.

The Los Angeles Department of Water and Power (LADWP) also has active conservation programs. LADWP is currently developing active energy conservation/energy efficiency (C/EE) programs as a means of deferring the need for new generation resources. The current Resource Plan contains preliminary planning estimates indicating that the C/EE programs would result in savings of approximately 600 MW by the year 2000. These estimated savings in LADWP's load forecast could reduce energy consumption by 11.4 percent by the year 2000.

The C/EE program consists of a series of pilot programs including:

- Residential Outreach Program
- Residential New Construction Program
- Existing Non-residential Program
- Commercial/Industrial New Construction Program
- Second Refrigerator Turn-in Program

These pilot programs would determine the economic and energy efficiency of:

- utilizing electric heat pumps and solar/electric systems in new residential construction
- commercial and industrial load management
- streetlight conversion
- voltage reductions
- time-of-use metering
- commercial and apartment surveys
- mastermeter conversion
- single residence and multi-family common-space audits
- water heating
- servicing pool-timer setbacks.

Originally, the Residential Outreach Program conservation service provided home energy audits and other services to residential customers. The auditing program was soon extended to include commerce and industry. LADWP is developing a new program to further extend energy audits and other conservation services to as many as 97,000 small commercial, non-government, and apartment customers.

Although conservation would help reduce LADWP's energy needs, the savings from these C/EE programs are insufficient to be an alternative to the project. The proposed project could be considered an oil-and gas-conservation effort. Firm power would be distributed by the transmission line capacity provided by the proposed project, thereby displacing oil and gas or other types of nonrenewable power generation.

The Salt River Project (SRP) in Phoenix, Arizona, has developed a program, referred to as the Balanced Strategy, which refers to efficient power production and customer-oriented energy conservation. The SRP is actively involved in many new types of energy development, including photovoltaic projects, solar-thermal generation, fuel cells, energy storage, and existing power plant efficiencies.

The customer energy programs are targeted toward cutting the energy costs of power users. Conservation programs are expected to meet about 40 percent of the SRP's projected load growth through the year 2000. The power saved would supply about 50,000 homes in the Phoenix area. These programs include:

- Climate Crafted Homes - energy efficient homes coupled with financial enhancement. This program goal is to have over 4,000 homes in the first year.
- Electric Savings Time - an incentive program that allows low residential and commercial customer rates during low-usage periods. This program expects to have 36,500 customers in four years. In two years each participant would be saving 0.9 kilowatts.
- Power Purchase - cash incentives for replacing old heating and cooling equipment with high-efficiency systems. This program has surpassed its goals, saving nearly 5,000 kilowatts by mid-1991.
- Kilowatch - a self-administered audit program in its pilot stage where homeowners are encouraged to audit their energy consumption and are given ideas on how to save energy and money.
- Direct Load Control - an incentive program where air conditioners and swimming pool pumps can be interrupted during peak demands.
- Energy Efficient Landscaping - low water usage trees placed to provide shade to a home can save significant energy and money.
- Thermal Energy Storage - cash incentives for reducing peak energy consumption during the summer cooling period by freezing special solutions on-site during off-peak hours. The program's 20 participants shift over 8,000 kilowatts from peak loading periods to off-peak hours.
- Energy Efficient Lighting - rebates for use of energy efficient lamps, ballasts, reflectors, and skylights. The goal of this program for the first year is a reduction of 3,500 kilowatts during the peak loading period.

- Energy Partnership - financial incentives for industry to shift power use and cut demand.

Though energy conservation and load management can somewhat reduce energy consumption, they affect energy use and system reliability on a local rather than a regional basis. Therefore, energy conservation plans cannot alone be considered an alternative action to meet the stated need for the project. For this reason energy conservation plans were eliminated from further consideration.

Generation

IPCo and LADWP evaluated a number of alternative generation sources available within the WSCC system (refer to page 2-6 for definition), and, like others in the WSCC, are pursuing the development of hydroelectric, thermal, solar, wind, cogeneration, and small power production. Other alternative generation such as solid waste, combustion turbine, fluidized bed, and nuclear fusion were also evaluated. However, as stated in the purpose and need, this alternative would not defer new generation facilities and diversify fuel resources.

In fact, because of high capital costs and environmental regulations, the lead time required to construct new generating facilities is a lengthy and very risky undertaking. New generation would also require additional transmission although not as lengthy as the proposed SWIP. Finally, generation would meet local but not regional needs for northwest and southwest access and transmission reliability, therefore generation was eliminated from further consideration.

The SWIP, by providing capacity for seasonal exchanges, would encourage the efficient use of existing generation sources by taking advantage of seasonal diversity between the Northwest and the Southwest (also refer to page 1-9).

Alternative Transmission Systems

Existing transmission from the Northwest to the southern markets in California and the Desert Southwest consists of two significant pathways. One is the Pacific AC and DC Interties and the other is on the east side of the WSCC region (refer to Figure 1-1), linking the states of Utah and Colorado with Arizona and New Mexico. The need to transfer power across these paths has often exceeded their capacities. Also, transmission access available to utilities who do not own these paths is quite restrictive.

The Pacific AC Intertie consists of two high-voltage AC lines connecting the northern border of Oregon on the Columbia River to central California. The Pacific DC Intertie consists of one DC line connecting the northern border of Oregon to southern California. In the northwest, Bonneville Power Association (BPA) owns about 85 percent of the Pacific AC and DC Intertie capacity and the rest is owned by Portland General Electric (PGE) and PacifiCorp.

In California, all investor owned utilities, Western Area Power Administration (WAPA), LADWP, and some of the other California public utilities share rights to the Intertie.

Since the Pacific Interties began operation, BPA allowed many Northwest utilities to have access. However, in the early 1980's, demand for access often exceeded capacity and hampered the northwest region's, including BPA's, ability to dispose of surplus power. To enhance its own marketing effort, BPA started developing a Long-Term Intertie Access Policy (LTIAP) in 1984 and adopted interim and near-term policies. In May 1988, BPA finally adopted the LTIAP. The LTIAP allows a very small amount of firm intertie access to the northwest utilities. IPCo's share of firm access is 87 MW, and uses an allocation method to limit other northwest utilities non-firm access to the Intertie. Moreover, LTIAP restricts use of a utility's firm access for nonfirm sales or firm contracts which BPA considers advance arrangements to sell nonfirm energy.

The path in the intermountain region, around the east side of the WSCC region consists of a number of low capacity lines. The WSCC is an organization of utilities in the western U.S. that work together to coordinate the region's electrical system (refer to page 1-2 for a description of the WSCC). The total capacity of the path is quite small compared to the Pacific Intertie and is further limited by a number of transmission "bottlenecks" along the path. A transaction from a northwest utility to the southern market must satisfy all the constraints of each transmission bottleneck it encounters. In addition, most transactions require transmission through several utilities' transmission systems, which often makes the transaction uneconomical.

Because of the reasons described above and intervening utilities' transmission policies, most northwest utilities in the past have not been able to gain firm or nonfirm access to the southern market through the eastern path. Conditions imposed by the Federal Energy Regulatory Commission (FERC), in October 1988 on the PacifiCorp and Utah Power and Light Company (UP&L) merger may improve firm access through the merged company system. However, PacifiCorp's recent filing with FERC shows that only 362 MW of transmission capacity is available between the Northwest and the UP&L system. A part of this capacity would be used by transmission-dependent utilities in the State of Utah, and the remainder could be used by PacifiCorp and other utilities.

A number of new transmission line projects have been discussed in recent years. Of all these proposals, there are only two that are relevant to northwest access to California and the Desert Southwest and are significantly advanced in the planning and permitting processes. These are the Utah-Nevada Transmission Project (UNTP), and the Third AC Intertie Project.

The UNTP is a 500kV transmission line from the existing Intermountain Generating Station, near Delta, Utah, to the McCullough Substation south of Las Vegas. The project is scheduled for completion in 1996. The capacity of the project has not been finalized but is expected to be in the 800 to 1200 MW range.

The UNTP adds new transmission capacity between central Utah and the Las Vegas area. Although the southern terminal of this project provides access to California and the Desert Southwest markets, access to the northern terminal by northwest utilities would remain restricted by less than 300 MW of existing transmission capacity available between the Northwest and the UP&L system.

The Third AC Intertie project is a 500kV project between northern Oregon and the California border. The project would add about 1600 MW of capacity to the Pacific AC Intertie. Like the existing Pacific AC and DC Interties, the project would provide meaningful access only to California, and not the Desert Southwest.

In Oregon, BPA would own and control access to about 85% of the Third AC Intertie capacity. PacifiCorp and PGE would own the remaining capacity. In California all the investor-owned utilities, WAPA, and a number of other utilities would share access on the Intertie.

The Third AC Intertie is presently scheduled for 1993 completion. However, regulatory approvals may delay or substantially change the project. Even if the project is built as it is presently planned, long-term access for northwest utilities (excluding BPA, PGE, and PacifiCorp) to the project is questionable. In December 1988, BPA issued a nonfederal participation in the Third AC Intertie proposal for public comment, but has not yet made a decision to implement it.

In summary, the existing transmission systems do not have adequate capacity to accommodate the transfers of bulk power between the Northwest and Southwest. Because of the insufficient capacity of existing systems, this alternative was not considered acceptable.

Alternative Transmission Technologies

Voltages

The maximum voltage used for major AC transmission lines throughout the western electrical system is 500kV. IPCo chose 500kV for this project because lower voltages would require additional circuits to satisfy the 1200 megawatt rating objective. For example, to achieve this rating for the distance between Midpoint and Dry Lake, three 345kV lines or six 230kV lines would probably be needed.

The use of a higher voltage, such as 765kV, is not practical because voltages higher than 500kV are not used within the western system. In addition, electrical system studies have shown that the electrical benefit of voltages higher than 500kV would not result in higher capacity without significant additional transmission reinforcement. This alternative is not considered acceptable.

Direct Current Transmission

An AC system was selected because it would allow IPCo more flexibility to connect to other systems. IPCo chose not to develop this project as a DC transmission line because the DC terminal installations (e.g., converter stations that convert AC to DC and DC to AC) are more expensive. In addition, there would be considerable difficulty and expense to connect the DC system to intermediate AC buses in the future.

The primary benefit of a DC transmission line system is greater control of power flows. However, this benefit does not justify the considerable increase in project cost (also refer to

page 1-2). The integration of regional resources (existing and future generation or transmission systems) through interconnection is one of the primary reasons for supporting the purpose of this project. A DC line would dictate only two terminals, one at Midpoint Substation and one at Dry Lake Valley northeast of Las Vegas, Nevada, with no intermediate interconnections.

Underground Construction

There has been underground construction of transmission systems in the United States since the late 1920s. Underground construction of transmission lines is commonly used for lower voltage distribution lines in urban areas. However, most high voltage (115kV or above) underground installations have been constructed under constraining circumstances for short distances where overhead lines were not feasible (e.g., in the vicinity of airports, urban centers).

High voltage underground transmission lines have markedly different technological requirements than lower voltage underground distribution lines. Underground high voltage transmission lines require extensive cooling systems to dissipate the heat generated by the transmission of bulk electricity. For this reason, there are currently no underground transmission systems in the U.S. above 230kV longer than approximately 25 miles. Cooling systems are complex and very expensive often employing potentially environmentally hazardous materials (e.g., chloroflourohydrocarbons) as coolant. The extremely high cost of large cooling systems and other special design requirements prohibits the application of underground transmission systems for long distance electric transmission.

In addition, the basic cost of undergrounding a high voltage transmission line would be several times more expensive than the cost of overhead construction. Underground systems would require a pipeline and above-ground ancillary facilities (e.g., oil-pressurizing and pumping stations, cooling stations) to transport cooling oil along the transmission line. Oil-pumping and cooling facilities would be required approximately every 7 to 10 miles along the transmission route and at the originating and terminating substations.

While underground transmission lines are relatively immune to weather conditions, they are vulnerable to washouts, seismic events, cooling system failures, and incidental excavation. Outages for underground lines could last days or weeks while the problem is being located, excavated, and repaired. Typically, failures in overhead lines can be located and repaired in a matter of hours. Long-term outages would be unacceptable for a circuit carrying bulk power. Further, a major cooling system failure could result in coolant spills of environmentally hazardous coolant materials as well as an outage.

During construction, the environmental impacts of an underground transmission line would be similar to those for major pipeline construction. Typical construction would require a continuous trench between terminal points. Potentially greater adverse environmental impacts could be expected because the majority of the right-of-way would be disturbed. Whereas, overhead transmission line construction typically would result only in disturbances at individual tower sites, and at the ancillary facilities, associated with access to the right-of-way.

The principal environmental advantage of undergrounding a transmission line would be the reduction of adverse visual impacts. However, an underground transmission line would still require above-ground ancillary facilities on or adjacent to the right-of-way and would disturb more land area.

In summary, the reduction of adverse visual impacts does not appear to outweigh the costs and potential adverse effects of undergrounding. Because of the technical complications, economic and environmental costs, and accessibility, an underground system was not considered a viable alternative, and was eliminated from further consideration.

New Methods of Transmission

Other methods that might be considered as an alternative for economical bulk-power transmission of electric energy from a generating source to load centers are microwave, laser, and superconductors. Current research and development shows some promising indications that this technology may eventually lead to some viable alternatives to overhead transmission systems. None of these technologies are available for commercial use. Therefore, new methods of transmission were eliminated from further consideration.

Routing Alternatives

This section describes major routing alternatives for the proposed transmission line project that were eliminated from further detailed study during regional scoping and analysis.

From June to December 1988, a regional study was conducted in southern Idaho, northeastern Nevada, and western Utah to determine all reasonable and feasible transmission line routes connecting from Midpoint Substation near Shoshone, Idaho to a new substation site in the Delta, Utah area (also refer to Regional Environmental Study/Scoping Process later in this Chapter and the Objectives, Procedures, and Results Technical Report).

Approximately 3,000 miles of preliminary alternative routes were identified during the regional study. Each of these alternative routes were examined for environmental issues, public acceptability, and engineering constraints. During the scoping process for the SWIP EIS several of these routes were eliminated from further consideration by:

- Environmental constraint analysis based on regional environmental data. The project Steering Committee (also refer to Chapter 5) reviewed environmental data and made recommendations for eliminating routing alternatives. These recommendations were presented to the public in agency review and public scoping meetings during March and April 1989.
- Input from public scoping meetings and public workshops. Public opposition based on acceptability of an alternative or environmental concerns identified by the regional environmental study and by recommendations of the Steering Committee.

In addition, IPCo evaluated the electrical performance of the routes identified in the regional environmental studies. IPCo recommended the routes identified along the Wasatch Front and the extreme eastern edge of the regional study area be eliminated because the route would not meet the project's system requirements of connecting into the Ely, Nevada area and due to the extensive costs associated with the land use conflicts in the Salt Lake City area (refer to SWIP Regional Environmental Study, April 1989).

Because of the length of these alternative corridors, the power expected to flow during normal operating conditions would not justify the line's expense. The extra length of this alternative would cause some of the power expected to flow on this line to use other lines not owned by IPCo. As electricity will always choose the path of least resistance, the length of this alternative would generate much resistance. Under emergency conditions (e.g., when major lines are out of service) the longer route's proportionate share of power typically would be lower than industry guidelines because of resistance.

Figure 2-1 illustrates the potential alternative corridors, including those which were eliminated from further consideration and those that were recommended for detailed evaluation in the DEIS.

ALTERNATIVES STUDIED IN DETAIL

No Action

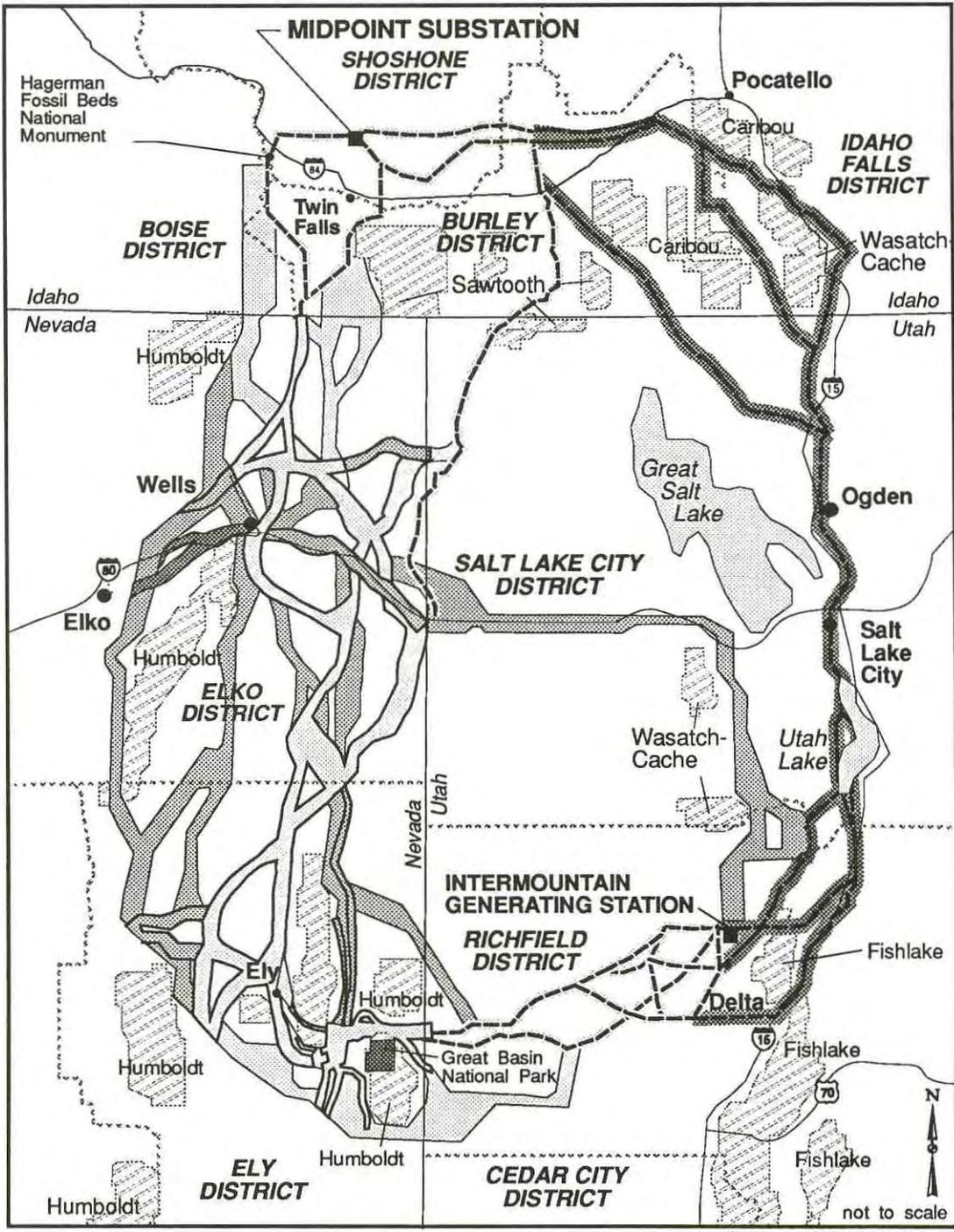
The no-action alternative required for consideration under NEPA regulations has been interpreted in this DEIS/DPA to mean that no new transmission facilities would be constructed by IPCo between the Midpoint Substation and the proposed substation at Dry Lake, nor between a new substation in the Ely area and a new substation near Delta. Under the no-action alternative, the project sponsors would attempt to meet the needs of providing economical energy or anticipated power requirements with existing facilities and fuel sources, along with other measures to compensate for the anticipated shortfall in the supply of electrical power for the region.

Advantages of the no-action alternative would include:

- no adverse environmental impacts from the construction and operation of the SWIP
- eliminating financial costs associated with construction and operation of a 500kV transmission line

However, any monetary savings could be lost through costs to meet the continuing energy needs of the West as outlined in Chapter 1, Purpose and Need.

In an effort to meet forecasted need without new transmission facilities, many western utilities would be forced to continue and likely increase baseload generation from existing oil



Source: Dames & Moore

Legend

BLM District Boundary	Forest Service	Recommended for Elimination	BLM/USFS Corridors
BLM	Environmental	Existing ROW	Corridor Identified In Regional Study
Recommended for Study in EIS			

Regional Study Corridors

Figure 2-1

and gas-fired generation facilities, thereby maintaining oil and gas consumption at or above present levels.

The gas and oil used to generate this power historically has been much more expensive than the sources of fuel (e.g., coal or hydroelectric) available to generation facilities the SWIP. Oil and gas are not only more expensive fuel sources than coal for baseload generation, but the use of oil and gas as primary fuels by utilities is discouraged by federal energy policy, as outlined in the Powerplant and Industrial Fuel Use Act (PIFUA) of 1978.

The northwest-southwest power exchanges to take advantage of seasonal diversity, as outlined in the purpose and need (Chapter 1), would not occur under the no-action alternative. In addition, economy purchases and sales of power would not occur because nonpeak generation would not be available on the system. Overall, the reliability of the western electrical system that would be gained through the action alternatives would not be realized under the no-action alternative.

The intended effect of adding new transmission is to spread out among more lines the concentration of power flows, thereby reducing the largest single hazard required to be recovered by a reserve margin. The no-action alternative would tend to increase the loading on existing lines and likely increase the largest single hazard requiring more local generation to be on-line in reserve for an outage.

Under the no-action alternative there would be no marketplace substation in the Las Vegas area. It would eliminate the benefits of the proposed project to increase competition and economic efficiency in the power market.

Some significant disadvantages or adverse impacts would result from the shortage in electrical supply if the no-action alternative were selected. The northwest and southwest regional utilities would not be able to diversify fuel sources and, accordingly, reduce its oil or hydro dependency. An interruption to the oil supply or a low water year could seriously affect the sponsors' ability to provide electrical power in their service areas. It is possible that locally generated power may increase, which would lead to greater air quality problems in large urban areas.

The disadvantages of the no-action alternative include:

- the loss of potential tax revenues to local tax districts from project construction and Right-of-Way (ROW)
- adverse environmental, socioeconomic, and electric service impacts resulting from compensating actions taken to ensure an adequate, affordable, and reliable energy supply to the West
- potential shortage of electric power that could force increased locally-generated power in urban areas where compliance under the Clean Air Act is an issue
- seasonal exchange of power between the Northwest and Southwest would be limited by the capacity of existing transmission lines

Proposed Action and Alternatives

Description of Proposed Action

The proposed action for the SWIP is to construct a 500kV AC transmission line from the Midpoint Substation in southern Idaho to a new substation in the Ely, Nevada area and then connecting to a new substation northeast of Las Vegas, Nevada. This EIS evaluates the impacts of several alternative routes (Routes A through G), and compares them (refer to page 2-36 and Chapter 4 for additional information).

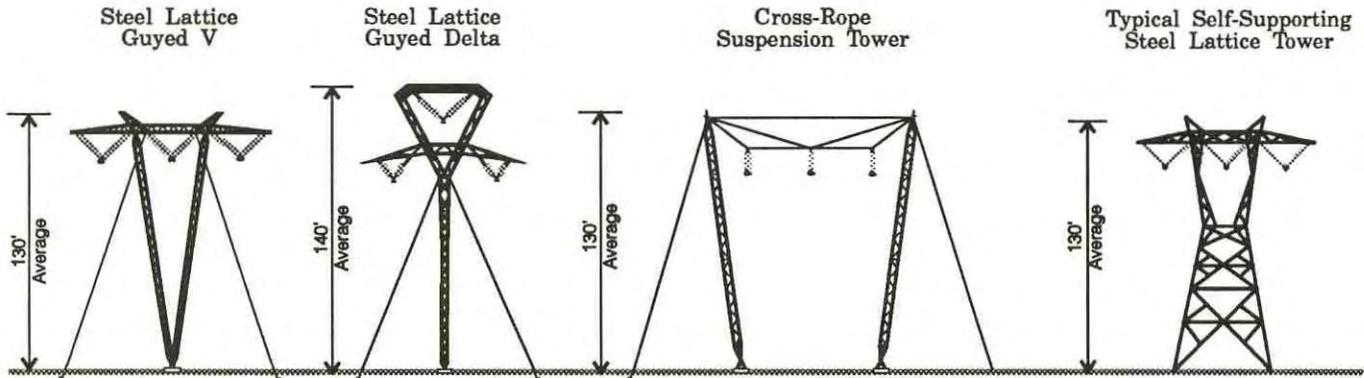
A cross-tie 500kV transmission line is also proposed as part of the SWIP to be constructed from the Intermountain Generating Station near Delta, Utah, to the new substation in the Ely, Nevada area. The cross-tie line would be constructed and operated by the LADWP (refer to page 2-17). This EIS also evaluates the impacts of several alternative routes for the cross-tie (230kV Corridor, Southern, Cutoff, and Direct Routes), and compares them (refer to page 2-46 and Chapter 4 for additional information).

The design, construction, operation, and maintenance of the Southwest Intertie Project 500kV transmission line would meet or exceed the requirements of the National Electrical Safety Code (NESC), U.S. Department of Labor Occupational Safety and Health Standards, and IPCo's requirements for safety and protection of landowners and their property. Table 2-1 contains a list of the basic design characteristics of the proposed transmission facilities.

Transmission Line Design

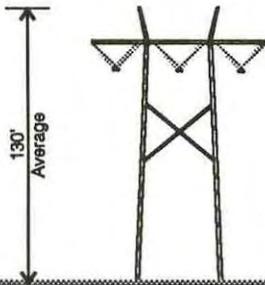
Towers - The proposed 500kV transmission line would be an AC line interconnecting other regional AC facilities. Proposed tower structures for this transmission line are steel-lattice, self-supporting or guyed steel-lattice towers fabricated from unpainted galvanized steel (Figure 2-2). Self-supporting, tubular-steel structures would be used in agricultural lands to mitigate potential conflicts with cultivation (Figure 2-2). These towers would be fabricated from corten steel (dark, rust-like finish). Typical tower-to-tower spans would average 1,200 to 1,500 feet and tower heights would range between 90 and 160 feet, but would average 120 to 130 feet.

Dead-end towers of self-supporting, steel-lattice design would be required periodically to add longitudinal strength along the line (Figure 2-2). Dead-end towers are also used at many turn (angle) locations along the line, at heavily loaded tower locations, and at specific utility crossings (e.g., other transmission lines) for added safety. A three-pole, self-supporting, tubular-steel tower design is an alternative tower type for use as dead-ends (Figure 2-2). The remaining towers would be tangent suspension or angle suspension towers. Angle suspension towers are of the same basic configuration as tangent suspension towers, the difference being in the insulator systems and tower weights.

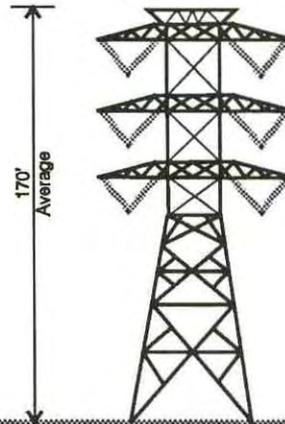


Alternative Tangent Structures

H-Frame Self Supporting Tubular Steel (Agricultural Mitigation)

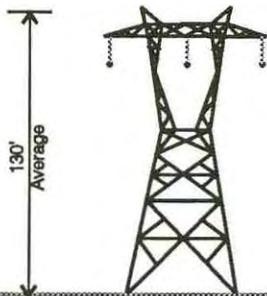


Double Circuit Steel Lattice (Pahranagat Wash Mitigation)

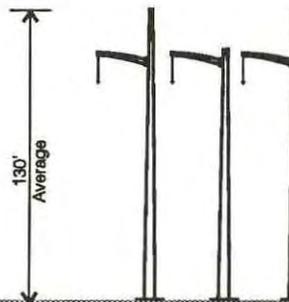


Mitigation Structures

Typical Self-Supporting Steel Lattice Tower (used w/guyed steel lattice tangent towers)



Self Supporting Tubular Steel (used w/H-Frame tangent towers)



Typical Deadend Structures

Source: Dames & Moore/IPCo
Note: Also refer to Table 2-1
Not to scale

Midpoint to Dry Lake Structures

Figure 2-2

Towers along the majority of the route between Midpoint to Dry Lake would be steel-lattice, guyed structures. A typical guyed tower would have four guy cables. Guy cables would be approximately one inch in diameter. Self-supporting, steel-lattice towers or three-pole, self-supporting, tubular-steel towers would be used for dead-end and angles towers.

Self-supporting, steel-lattice towers are proposed for all structures in the Ely to Delta segment (Figure 2-3). The reliability policies of LADWP, a SWIP participant for this segment of the line, precludes use of guyed, steel-lattice structures as proposed for the remainder of the SWIP (Midpoint to Dry Lake). In order to mitigate visual impacts along the crosstie, some of the structures may be an H-frame type. Also refer to the Right-of-Way Acquisition section of this volume.

Tubular-steel, H-frame towers are proposed as mitigation in agricultural lands to minimize impacts to cultivation practices. A guyed tower could interfere with the operation of machinery in the vicinity of the tower as well as with gravity flow and sprinkler irrigation systems. In addition, H-frame towers may be recommended as mitigation to reduce visual contrast where the SWIP would parallel other similar H-frame transmission lines towers (Figure 2-2).

Self-supporting towers would be used in areas of steep terrain where side slopes are greater than the guy slope. This decision was made because guy cables could extend far beyond the edge of the right-of-way. Self-supporting structures would be used to eliminate excessive right-of-way requirements as well as potential construction and operational problems. Reliability of the system would also be strengthened.

Foundations - Self-supporting, steel-lattice towers require four footings, while the steel-lattice, guyed towers require one footing for the tower base and four anchor rods for guy cables. The area disturbed by either of these tower foundations is a small portion of the total area of the tower site.

Some foundations and guy anchors would consist of pre-cast concrete footings approximately 4 feet in diameter and 6 feet deep. Due to site specific characteristics, some foundations and guy anchors (e.g., rock anchors) would require cast-in-place footings. Steel H-frame structures would have cast-in-place concrete footings 6 to 10 feet in diameter and 20 to 30 feet deep. Self-supporting lattice towers would have cast-in-place concrete footings 3 to 4 feet in diameter and 12 to 24 feet deep.

Conductors - The conductor would consist of three phases, with a two or three-conductor bundle for each phase. The configuration of the conductor bundle would be determined during the engineering design of the project. Spacing between subconductors in a bundle would be approximately 18 inches.

Aluminum-trapezoidal or aluminum-stranded conductors with a steel stranded reinforced core (ACSR) would be used. The aluminum carries the majority of the electrical current and the steel provides tensile strength to support the aluminum strands.

Minimum conductor height above the ground is 31 feet, based on National Electric Safety Code (NESC) and IPCo's own standards. Greater clearances may be required in areas

accessible to vehicles. Minimum conductor clearance would dictate the exact height of each tower based on topography and safety clearance requirements. Minimum conductor clearances in some instances may be greater based on specific NESC requirements.

Insulators and Associated Hardware - Three assemblies of insulators in the form of a "V" or an "I" would be used to position and support each of the conductor bundles relative to the tower while maintaining electrical design clearances between the conductors and the tower (refer to Figures 2-2 and 2-3). Each "I" string would consist of 26 to 30 insulators, while each leg of "V" strings would consist of 26 to 30 insulators. Insulator assemblies would be between 14 and 20 feet long.

Overhead Ground Wires (Shield Wires) - To protect conductors from direct lightning strikes, two overhead ground wires, 3/8 to 1/2 inch in diameter, would be installed on the top of the towers. Electrical current from lightning strikes would be transferred through the groundwires and structures into the ground. Ground wire having fiber optic capability may be installed rather than traditional groundwire in order to facilitate project communication needs or potentially to serve the needs of commercial communication companies.

Terminals and Communications

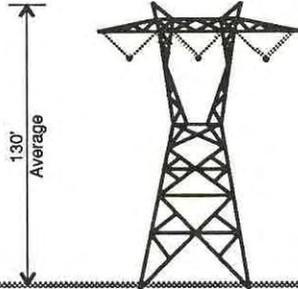
The transmission line originates at the Midpoint Substation in Idaho. New terminals, or substations, are proposed in the vicinity of Ely, Nevada, and northeast of Las Vegas, Nevada. A third terminal may also be needed north of Wells, Nevada for an interconnection with Sierra Pacific Power (SPP). In the past, Sierra (SPP) has expressed an interest in a connection in this location. A substation is also proposed on the crosstie route in the vicinity of Delta, Utah. Substations provide the point interconnection with other transmission lines of the same or different voltages. These terminals would also operate as switching stations where power flows can be controlled. Control of power flows and other operations at substations are generally directed remotely through a microwave communications system. This section describes the types of facilities that are proposed as part of the SWIP.

Substation and Series Compensation Stations

Three new substations would be required in Nevada, one north of Wells, one in the vicinity of Ely, and one northeast of Las Vegas. One new substation would also be required on the crosstie route in the vicinity of Delta, Utah. The land requirements for each substation site would be approximately 80 acres depending on layout of associated electrical equipment, and potential allowance for setbacks from or relocation of existing electric and gas transmission lines.

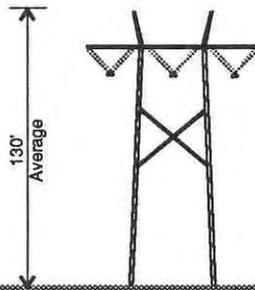
The electrical towers and rack structures would be similar in appearance and height to those at the existing substation site at Midpoint Substation in Idaho. The maximum height of structures in a substation would be approximately 125 feet. The electrical equipment yards would be open and would include transformers, circuit breakers, disconnect switches,

Typical Self Supporting
Steel Lattice Structure
Tangent Structure



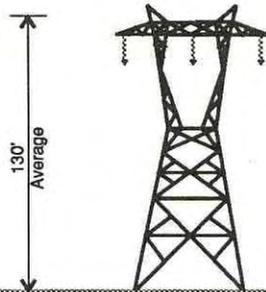
Tangent Structures

H-Frame Self Supporting Tubular Steel
(Visual Mitigation)



Mitigation Structure

Typical Self-Supporting
Steel Lattice Tower
Deadend Structure



Deadend Structure

Source: Dames & Moore/IPCo
Note: Also refer to Table 2-1
Not to scale

Ely to Delta Structures

Figure 2-3

lightning/surge arresters, reactors, capacitors, bus (conductor) structures, and microwave towers (refer to Table 2-2). The equipment yard control house (a structure approximately 50 feet wide by 100 feet long by 10 feet high and constructed of painted concrete block) and the internal access roads would be similar to what is now existing on the Midpoint site. The proposed facilities would be enclosed by chain-link fencing for security (also refer to Figure E-1 in Appendix E).

A series compensation station would be located northeast of Wells, Nevada, at a point approximately halfway between Midpoint Substation in Idaho and a proposed substation in the vicinity of Ely, Nevada. This facility would require 15 to 20 acres and consists of electrical towers, high-voltage series capacitor banks, switching equipment, bus conductor, and microwave. Series compensation is used in transmission system design to economically increase the capacity of a transmission line. Series compensation provides voltage support to the system that varies with line loadings. As the line loadings increase, so does the voltage support from the series compensation. This action improves the electrical characteristics of the transmission line thereby increasing the line capacity. In addition, a series compensation station may also be required halfway between the substation site near Ely, Nevada, and the proposed substation at Dry Lake (also refer to Figure E-1 in Appendix E). The series compensation station near Wells may be expanded to accommodate switching equipment (substation) if Sierra Pacific Power constructs a transmission interconnection from north central or northwest Nevada.

Site preparation work for substation or series compensation station facilities would involve the following.

- Cut-and-fill grading, placement, and compaction of structural fill would serve as a foundation for substation facilities. Sites would be graded to maintain current drainage patterns.
- A new construction entrance and construction fencing would be provided.
- Approximately 20-foot-wide gravel base road would be required. The yards would be covered with aggregate. A gravel parking area, approximately 100 feet by 100 feet, would be required. Where possible, native vegetation would be re-established.

Communications Facilities

The need for reliable, secure communication circuits for protective and control relaying for the SWIP line would require the construction of a microwave communications system between Hansen Butte, Idaho, and the proposed Dry Lake substation site in Nevada. In addition to protective relaying circuits, the microwave system would be used for voice communications, telemetering, and supervisory control and data acquisition (SCADA).

The communication system for the portion of the transmission line between Ely, Nevada, and Delta, Utah, would use existing microwave facilities, currently used to control the existing 230kV system. The existing facilities would require some modifications (e.g., new

equipment) at each site. However, these modifications are not expected to require any ground disturbing activities.

Ideally, sites chosen for microwave installations are proposed to be 35 to 40 miles apart, have line-of-sight between adjacent sites, have commercial power, and be accessible by road. Where feasible, developed communication sites would be used. In areas where no existing facilities are present and there is no existing access to a viable site, solar powered facilities would be placed and maintained by helicopter. These communications facilities would be unmanned and would operate automatically. The building would be locked and secured, with entry restricted to appropriate utility personnel.

The proposed microwave facilities would require a small site, approximately one-quarter acre in size. Each site would require clearing, and minor grading. Structures on each site would include a 10 feet by 12 feet building made of wood or concrete panels that would be painted an earth tone color to reduce visual contrast. In addition a triangular steel lattice tower ranging between 20 feet and 100 feet in height would be required. Figure F-1 in Appendix F illustrates a typical microwave facility.

These facilities are unmanned and operate by automatically responding to incoming signals. Communication signals are relayed using parabolic (bowl shaped) dishes mounted on the tower which capture signals from other microwave sites and relay them to other sites along the system. The signals are short wave length, high frequency radio beams that maintain good reliability under adverse conditions.

Where there are existing facilities, often only an additional parabolic dish would be needed. For undeveloped sites, the specific type of facility would be determined by the availability of access and proximity to a power supply. If the site is remote and no roads are present, a solar powered facility would be proposed (refer to Figure F-2 in Appendix F). Construction of remote sites would be completed using a helicopter. Where access is near an existing road and/or power supply, a standard facility would be constructed. Most sites would generally be accessible by gravel roads and could be patrolled periodically by IPCo representatives.

Maintenance of the communication facilities would consist of testing, repair, and replacement of electronic equipment located within the building at the communication site. Inspection and maintenance of the building, communication tower, and other physical equipment would occur periodically.

At the end of the proposed project life and if the facilities were no longer required for other existing or proposed projects, the microwave sites would be abandoned (also refer the discussion of site reclamation and abandonment on pages 2-23 and 2-24). Subsequently, the equipment would be dismantled and removed from the sites. Refer to Appendix F for additional information and the Map Volume for the mapped locations of the alternative communication sites.

It is possible that a fiber optic groundwire may be installed (on the towers in place of the shield wire) to facilitate communication needs for the transmission line, or capacity may be sold to commercial communication companies. If fiber access is allowed to commercial companies, they would be responsible for obtaining the necessary permits and right-of-way

needed for regeneration stations at intervals along the transmission line (also refer to Right-of-Way Acquisition).

Right-of-Way Acquisition

In general, new land rights would be required for the transmission line facilities, such as the transmission line corridor, substation/switching stations, series compensation stations, microwave facilities, and access roads (e.g., right-of-way grant, easements, and fee simple). IPCo would request a right-of-way grant from the BLM and a special use permit from the FS for transmission line facilities located on federal lands. Additional right-of-way may be required in isolated areas where the proposed transmission line turns sharply.

Rights-of-way for transmission line facilities on nonfederal lands would be obtained in perpetual easements. If necessary, private lands for substations would be purchased in fee simple. Every effort would be made to purchase all the land rights on private lands through reasonable negotiations with the present owners.

Land rights would be obtained in the name of IPCo. IPCo plans to construct the transmission segments from Midpoint Substation to the proposed substation at Dry Lake in southern Nevada. IPCo has entered into an agreement with LADWP to convey the portion of a right-of-way grant for the segment from the Ely area to Delta. This is referred to as the "Delta Grant" in the agreement. The agreement further states that IPCo would conduct the necessary environmental permitting for the Delta Grant and then assign it to LADWP for construction, operation, and maintenance.

If a route is selected that crosses the Moapa River Indian Reservation (Links 760 and 770), negotiations with the Tribal Council of the Moapa Band of the Paiute for a perpetual easement would be initiated.

If a fiber optic groundwire is installed and access is sold to a commercial company, they would be responsible for all permitting activities and obtaining right-of-way for the regeneration stations that would be needed at intervals along the transmission line right-of-way (also refer to Communication Facilities).

Right-of-Way Separation

Where the SWIP would parallel the proposed Utah-Nevada Transmission Project (UNTP) south of the Delamar Valley, the right-of-ways of the SWIP and UNTP would need sufficient separation to meet reliability and outage criteria of the WSCC (also refer to page 1-2). Without adequate separation, the criteria considers the simultaneous outage of the SWIP and UNTP to be a credible event, or an event that has a significant likelihood of occurring. The simultaneous loss of the SWIP and UNTP under heavy transfer conditions could precipitate a major electrical system disturbance resulting in a cascading failure of the western power

system. Building and operating the system in this manner would be inconsistent with the WSCC Reliability Criteria.

Therefore, the projects must (1) reduce capacity (which has the effect of rendering one project economically impractical), (2) provide measures to avert system breakup (considered technically and economically impractical), or (3) construct the projects so a simultaneous outage is not credible (use adequate circuit separation). While the latter course is preferable to the project participants, the specific amount of separation required to achieve this determination has not been defined in the criteria. However, based on the terrain and environmental considerations in the area of parallel right-of-way, it is believed that 2,000 feet would be adequate. Double circuit towers or a separation of less than 1000' would exist in isolated areas along the route due to terrain or land use conflicts. It is believed that by using a higher safety factor on the tower design in these physically constrained areas, the reliability would be sufficient to maintain the requested capacity rating. Also refer to Corridor Studies (page 2-28) and Capacity and Reliability (page 1-8).

The SWIP and UNTP would converge near Robber's Roost Hills (Link 675), and would travel parallel for approximately 140 miles (Links 690, 700, and 720) into Coyote Spring Valley in southern Nevada, where the UNTP would continue south and the SWIP would cross through the southern end of the Arrow Canyon Range into the Dry Lake Valley. Separation of 2,000 feet is needed for this entire distance except where it is not physically possible to maintain this separation.

In the Pahranaagat Wash area, the SWIP and UNTP lines may need to be closer for two miles or more. Because the Delamar Mountains and Evergreen Wilderness Study Areas (WSAs) are within about 1/2 mile of each other and other linear features are present (e.g., U.S. Highway 93 and the Lincoln County Coop 69kV line), the SWIP and UNTP lines would be constructed on double circuit towers, each with an open circuit. The SWIP line is proposed to be on the west side and the UNTP on the east. The plan is for the two future WPPP lines to be placed on the open circuits of the SWIP and UNTP lines through this area. The proposed configuration of the planned lines through this area is shown schematically in the cross-sections included in the Map Volume. To help compensate for this lack of separation and to meet the WSCC criteria outlined above, the structures within this area would need to be engineered to a higher standard to better withstand potential physical disturbances (e.g., earthquakes, etc.). Also refer to Cumulative Effects section in Chapter 4.

If the Delamar and Evergreen WSAs are not designated as Wilderness by Congress by the time all of the lines are constructed, the involved utilities may pursue amending the right-of-way grants to allow all of the lines to be placed on separate circuits.

In the approximately 140 miles where the SWIP and UNTP lines can be separated by 2000 feet, the SWIP and UNTP lines would form the outside edges of the utility corridor that would include the two planned 500kV WPPP transmission lines. The cross-sections in the Map Volume schematically show the relationship of the four planned 500kV transmission facilities. Also refer to the Cumulative Effects section in Chapter 4.

In areas where the SWIP would parallel lower voltage overhead lines, a minimum separation of 200 feet, centerline to centerline, would be required. With this separation, if either the SWIP or the lower voltage line failed, neither would fall into the other.

Construction

Construction of a transmission line follows the sequence of surveying the centerline, access road identification and construction, right-of-way and tower sites clearing (including construction yards and batch plants), installing foundations, assembling and erecting the towers, clearing, pulling, tensioning, and splicing sites, installing ground wires and conductors, installing counterpoise/ground rods, and cleanup and site reclamation. Various phases of construction would occur at different locations throughout the construction process. This would require several contractors operating at the same time in different locations.

Surveying Activities - Before construction surveying begins, it would be necessary to obtain either a survey permit on federal and state lands, or rights-of-entry for private lands. Construction survey work would consist of locating the centerline, tower center hubs, right-of-way boundaries, and tower access roads. All of these activities would begin approximately two years prior to the start of construction. Cultural resources and threatened and endangered species intensive surveys can begin once the survey of the centerline and access roads is completed and clearly marked.

Access Road Construction - The construction, operation, and maintenance of the proposed transmission line would require that heavy vehicles access tower sites along the right-of-way. If new access roads are required, they would be constructed to support the weight of these vehicles. Where necessary, temporary roads would be typically 14 feet wide bladed roads, but would typically have no improved ditch drainage systems. Material and topsoil from the temporary roads would be bladed to one or both sides to facilitate rehabilitation. Following construction, bladed material can be respread across the disturbed road section. Seeds and roots contained within the respread topsoil layer normally provide a natural source for new growth. Some permanent roads may be constructed where necessary for operation or maintenance, or where the landowner or land managing agency requires. Road standards would be addressed specifically in the Construction, Operation, and Maintenance Plan during the engineering phase of this project.

Culverts or other drainage structures would be installed as necessary across drainages, but the roads would usually follow the natural grade. This type of temporary road would facilitate rehabilitation. Existing paved and unpaved highways and roads would be used where possible.

Roads along existing utility corridors would be used where possible to minimize new access road construction. Where existing roads can be used, only spur roads to the tower sites may be required. New access roads and spur roads may be constructed into the right-of-way where existing roads do not exist.

The approximate area of ground disturbance associated with the typical construction activities was estimated for five types or levels of access. These access levels describe the assumptions for the degree of disturbance expected to occur with each access level (refer to page 2-35, Routing Alternatives Evaluation Process). Further, the access levels consider areas of as much as five acres per mile that may be temporarily disturbed (e.g., grasses crushed) by tower construction sites, pulling, tensioning, and splicing sites, batch plants, and marshalling yards.

Wherever possible, roads would be built at right angles to streams and washes. Culverts would be installed where necessary. In addition, road construction would include dust-control and erosion control measures in sensitive areas. All existing roads would be left in a condition equal to or better than their condition prior to the construction of the transmission line.

All roads would be constructed in accordance with IPCo requirements for transmission line access roads (also refer to description above). In the event of a conflict between IPCo requirements and the requirements of the BLM and FS, the states of Idaho, Utah, Nevada, or other agencies, the governing agency requirements would take precedence. Private landowners along the proposed roads would be consulted before construction begins.

Tower Site Clearing - At each tower site, leveled areas (pads) would be needed to facilitate the safe operation of equipment, such as construction cranes. The leveled area required for the location and safe operation of large cranes would be approximately 30 by 40 feet. At each tower site, a work area of approximately 200 feet square would be required for the location of tower footings, assembly of the tower, and the necessary crane maneuvers. The work area would be cleared of vegetation only to the extent necessary. After line construction, all pads not needed for normal transmission line maintenance would be graded to blend as near as possible with the natural contours, and revegetated where required.

Clearing Right-of-Way - The clearing of some natural vegetation may be required. However, selective clearing would be performed only when necessary to provide for surveying, electrical safety clearances, line reliability, and maintenance. Topping or removal of mature vegetation, under or near the conductors, would be done to provide adequate electrical clearance as required by NESC standards (refer to Table 2-1).

Trees that could fall onto the lines or affect lines during wind-induced line swing would be removed. Normal clearing procedures are to top or remove large trees and not disturb smaller trees. Where there is a direct conflict between trees and clearance standards, the removal of trees would be jointly reviewed and agreed upon between IPCo (or LADWP for the crosstie) and the owners or managers of the property. Rights-of-way would not be chemically treated unless necessary to comply with requirements of a permitting agency.

Foundation Installation - Excavations for foundations would be made with power drilling equipment. Where the soil permits, a vehicle-mounted power auger or backhoe would be used. In rocky areas, the foundation holes may be excavated by drilling and blasting, or special rock anchors may be installed. Where required, conventional or plastic explosives would be used. Safeguards (e.g., blasting mats) would be employed when adjacent areas need to be protected.

In extremely sandy areas, soil stabilization by water or a gelling agent may be used prior to excavation. After excavations are completed, pre-cast or cast-in-place footings would be installed. Steel grillage foundations may be specified in mountainous areas.

The pre-cast footing would be lowered into the excavated foundation hole, positioned, and backfilled. The cast-in-place footing would be installed by placing reinforcing steel and a tower stub into the foundation hole, positioning the stub, and encasing it in concrete. Spoil material would be used for fill where suitable. The foundation excavation and installation would require access to the site by a power auger or drill, a crane, material trucks, and ready-mix trucks.

Construction Yards and Batch Plants - Temporary construction yards would be located near each end of the transmission line right-of-way, and approximately every 20 to 30 miles along the route. These would be located in previously disturbed sites or in areas of minimal vegetative cover where possible. All sites would be determined through discussions with land owners or the land management agencies.

Concrete for use in constructing foundations would be dispensed from a portable concrete batch plant located at approximately 20 to 30 mile intervals. A rubber-tired flatbed truck and tractor would be used to relocate each plant along the right-of-way. Commercial ready-mix concrete may be used when access to tower construction sites is economically feasible.

The construction yards and batch plants would serve as field offices, reporting locations for workers, parking space for vehicles and equipment, sites for material storage, and stations for equipment maintenance. Facilities would be fenced and their gates locked. Security guards would be stationed where needed.

Tower Assembly and Erection - Bundles of steel members and associated hardware would be shipped to each tower site by truck. Steel members would be assembled into subsections of convenient size and weight. The assembled subsections would be hoisted into place by a large crane and then fastened together to form a complete tower. Figure 2-4 illustrates typical construction activities.

Conductor Installation - After the towers are erected, insulators, hardware, and stringing sheaves would be delivered to each tower site. The towers would be rigged with insulator strings and stringing sheaves at each ground wire and conductor position.

For public protection during wire installation, guard structures would be erected over highways, railroads, power-lines, structures, and other obstacles. Guard structures would consist of H-frame poles placed on either side of an obstacle. These structures would prevent ground wire, conductor, or equipment from falling on an obstacle. Equipment for erecting guard structures would include augers, line trucks, pole trailers, and cranes. Guard structures may not be required for small roads. On such cases other safety measures such as barriers, flagmen, or other traffic control would be used.

Pilot lines would be pulled (strung) from tower to tower by a helicopter and threaded through the stringing sheaves at each tower. Following pilot lines, a larger diameter, stronger line would be attached to conductors to pull them onto towers. This is called the

pulling line. This process would be repeated until the ground wire or conductor is pulled through all sheaves.

Ground wire and conductors would be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end of a conductor segment as shown on Figure 2-5. Sites for tensioning equipment and pulling equipment would be approximately two miles apart. If a fiber optic groundwire is installed rather than conventional groundwire, the construction methods would be the same. The appearance of a fiber optic groundwire is the same as conventional groundwire.

The tensioning site would be an area approximately 200 feet by 200 feet. Tensioners, line trucks, wire trailers, and tractors needed for stringing and anchoring the ground wire or conductor would be located at this site. The tensioner in concert with the puller would maintain tension on the ground wire or conductor while they are fastened to the towers.

The pulling site would require approximately half the area of the tension site. A puller, line trucks, and tractors needed for pulling and temporarily anchoring the counterpoise/ground wire and conductor would be located at this site.

Ground Rod Installation - Part of standard construction practices prior to wire installation would involve measuring the resistance of tower footings. If the resistance to remote earth for each transmission tower is greater than 10 ohms, counterpoise (grounds) would be installed to lower the resistance to 10 ohms or less. Counterpoise would consist of a bare copper clad or galvanized steel cable buried a minimum of 12 inches deep, extending from one or more tower legs for approximately 200 feet.

Cleanup - Construction sites, material storage yards, and access roads would be kept in an orderly condition throughout the construction period. Refuse and trash would be removed from the sites and disposed of in an approved manner. Oils and fuels would not be dumped along the line. Oils or chemicals would be hauled to a disposal facility authorized to accept such materials. No open burning of construction trash would occur without agency approval.

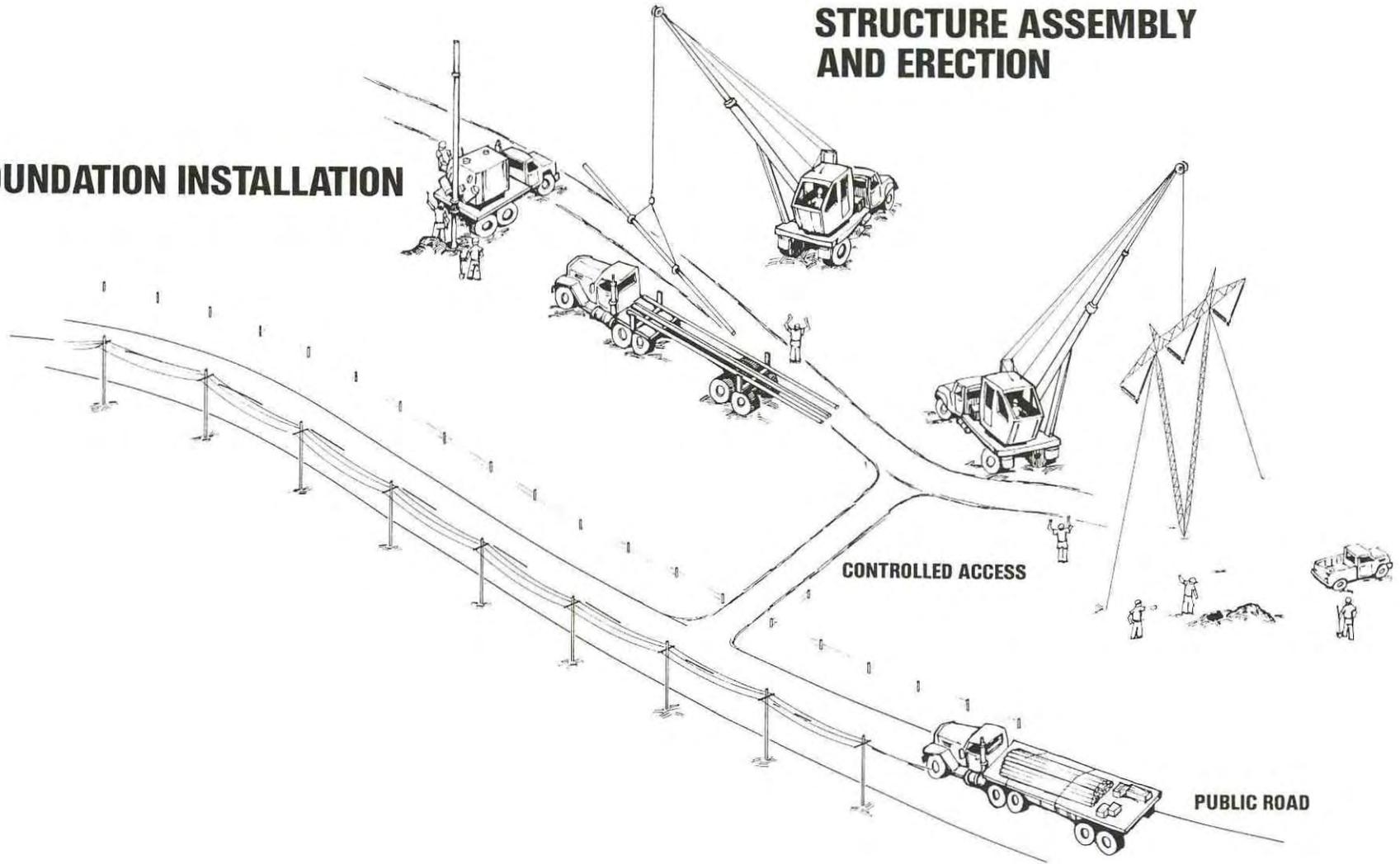
Hazardous Materials Within Corridor - Petroleum products such as gasoline, diesel fuel, helicopter fuel, crankcase oil, lubricants, and cleaning solvents would be present within the transmission line corridor during construction. These products would be used to fuel, lubricate, and clean vehicles and equipment. These products would be containerized by fuel trucks or by approved containers. When not in use, hazardous materials would be properly stored to prevent drainage or accidents.

Hazardous materials would not be drained onto the ground or into streams or drainage areas. Totally enclosed containment shall be provided for all trash. All construction waste including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials would be removed to a disposal facility authorized to accept such materials.

All construction, operation, and maintenance activities would comply with all applicable federal, state, and local laws and regulations regarding the use of hazardous substances.

FOUNDATION INSTALLATION

**STRUCTURE ASSEMBLY
AND ERECTION**



Typical Construction Activities

Figure 2-4

OVERHEAD GROUND-WIRE-STRINGING

TRUCK MOUNTED DRUM PAYOUT AND TENSIONER

CONDUCTOR STRINGING

TRUCK MOUNTED THREE REELS OF CONDUCTOR

TENSIONER

OVERHEAD GROUND-WIRE

SPUR ROAD

CONTROLLED ACCESS

PUBLIC ROAD

LIGHT CABLE PULLER

OVERLAND CONSTRUCTION ACCESS

THREE DRUM PULLER

THIS DIAGRAM DEPICTS GENERIC OR TYPICAL WIRE-HANDLING PHASES. OVERHEAD GROUND WIRE AND CONDUCTOR STRINGING ARE HANDLED IN TWO SEPARATE PHASES. OVERHEAD GROUND-WIRE-STRINGING PRECEDES CONDUCTOR STRINGING PHASES.

Basic Wire Handling Equipment

Figure 2-5

The construction or maintenance crew foreman would insure that all applicable laws are obeyed. In addition, an on-site inspector would be present during construction to make sure that all hazardous materials are used and stored properly. A health and safety plan would be developed as part of the Construction, Operation, and Maintenance Plan during the engineering and preconstruction phase of the project.

Site Reclamation - The right-of-way would be restored as required by the property owner or land management agency. All practical means would be made to restore the land to its original contour and to restore natural drainage patterns along the right-of-way. Because revegetation would be difficult in many areas of the project where precipitation is minimal, it would be important to minimize disturbance during the construction. All practical means would be made to increase the chances of vegetation reestablishment in disturbed areas.

The total construction period would be approximately two years. The Construction, Operation, and Maintenance Plan that would be prepared during the engineering and preconstruction phase of the project would address site reclamation of disturbed areas.

Fire Protection - All applicable fire laws and regulations would be observed during the construction period. All personnel would be advised of their responsibilities under the applicable fire laws and regulations, including taking practical measures to report and suppress fires.

Operation, Maintenance, and Abandonment

Operational Characteristics - The nominal voltage for the SWIP transmission line would be 500kV AC. There may be minor variations of up to five percent above the nominal level depending upon load flow.

Permitted Uses - After the transmission line has been energized, land uses that are compatible with safety regulations would be permitted in and adjacent to the right-of-way. Existing land uses such as agriculture and grazing are generally permitted within the right-of-way. Incompatible land uses within the right-of-way include construction and maintenance of inhabited dwellings, and any use requiring changes in surface elevation that would affect electrical clearances of existing or planned facilities.

Land uses that comply with local regulations would be permitted adjacent to the right-of-way. Compatible uses of the right-of-way on public lands would have to be approved by the appropriate agency. Permission to use the right-of-way on private lands would have to be obtained from the utility owning the transmission line.

Safety - Safety is a primary concern in the design of this 500kV transmission line. An AC transmission line would be protected with power circuit breakers and related line relay protection equipment. If conductor failure occurs, power would be automatically removed from the line. Lightning protection would be provided by overhead ground wires along the line. Electrical equipment and fencing at the substation would be grounded. All fences, metal gates, pipelines, etc. that cross or are within the transmission line right-of-way would

be grounded to prevent electrical shock. If applicable, grounding outside of the right-of-way may also occur.

Maintenance - The 500kV transmission line would be inspected on a regular basis by both ground and air patrols. Maintenance would be performed as needed. When access is required for nonemergency maintenance and repairs, IPCo would adhere to the same precautions that were taken during the original construction.

Emergency maintenance would involve prompt movement of repair crews to repair or replace any damaged equipment. Crews would be instructed to protect crops, plants, wildlife, and other resources of significance. Restoration procedures following completion of repair work would be similar to those prescribed for normal construction. The comfort and safety of local residents would be provided for by limiting noise, dust, and the danger caused by maintenance vehicle traffic. Details would be provided in the Construction, Operation, and Maintenance (COM) Plan prior to line construction.

Abandonment - At the end of the useful life of the proposed project, if the facility were no longer required, the transmission line would be abandoned. Subsequently, conductors, insulators and hardware would be dismantled and removed from the right-of-way. Tower structures would be removed and foundations broken off below ground surface.

If the line and associated right-of-way are abandoned at some future date, the right-of-way would be available for the same uses that existed prior to construction of the project.

Following abandonment and removal of the transmission line from the right-of-way, any areas disturbed to dismantle the line would be restored and rehabilitated as near as possible to their original condition.

Construction Work Force and Schedule

The total work force required to complete the phases of construction described above would be 100 to 150 people. The initial work force would consist of about 65 people. This force would be added to at approximately two-week intervals until it reaches a maximum of 120 workers. Table 2-3 lists the personnel and equipment that would be needed for the construction work force.

From past experience, it is estimated that about 50 percent of this work force would be hired locally. Those who are not local people normally take up temporary housing in nearby communities and commute to and from the job site on a daily basis. Many have their own trailers and park them where connection facilities are available, others occupy rental houses and apartments.

The target date for commercial operation of the project is late 1997. Right-of-way procurement would begin in 1993, and construction is scheduled to commence in early 1995. The project may be built in phases or sections if the market or financial conditions warrant.

Regional Environmental Study/Scoping Process

In 1988 IPCo proposed to construct a transmission interconnection from their 500kV Midpoint Substation near Shoshone, Idaho to a new substation site in the Delta, Utah area. In the Delta area, IPCo could potentially interconnect with and obtain transmission capacity on the UNTP, a proposed 500kV transmission line from Delta to the a new substation site located approximately 13 miles southwest of Boulder City, Nevada. The UNTP is owned by a consortium of utilities including LADWP, NPC, Utah Associated Municipal Power Systems (UAMPS), and Deseret Generation and Transmission Cooperative. The new substation site would be a major interconnection point, or "marketplace" substation, for the Southwest.

A regional environmental study to identify routing alternatives was completed for the SWIP in late 1988. Because it was determined in 1989 that transmission capacity for the SWIP would not be available on the UNTP, the project description was revised to include a connection from the Ely, Nevada area to a new substation site to be located northeast of Las Vegas, Nevada (also refer to page 2-31). The purpose and need for the proposed Ely, Nevada to Delta, Utah segment was revised as well (refer to right-of-way acquisition on page 2-17). The following section describes how the alternatives compared in the EIS were identified and finalized.

Identification Of Alternatives

Through the 1988 regional environmental studies, approximately 2,000 miles of routing alternatives were identified as being reasonable and feasible between Midpoint and Delta. The regional environmental study of southern Idaho, northeastern Nevada, and western Utah was completed as part of the scoping process (also refer to Chapter 5 and the Objectives, Procedures, and Results Technical Report). Environmental analysis completed during the regional studies and the scoping process for the SWIP EIS determined which alternative routes were reasonable and feasible to construct and operate. These alternatives were then evaluated in detail to facilitate comparing alternatives in this document.

The regional study was begun in June 1988 and completed in December of the same year. The purpose of the study was to determine, as mandated by NEPA (1969) and the implementing CEQ regulations (1978), all reasonable and feasible transmission line routing alternatives connecting from Midpoint Substation to the Delta, Utah area (also refer to the Objectives, Procedures, and Results Technical Report and later in this chapter for more on the Alternatives Evaluation Process). The study area encompassed about 80,000 square miles in the three states. Satellite imagery enhanced the data collected from agencies throughout the study area. The major resource areas evaluated included:

Natural environment

- threatened and endangered plant and animal species
- wildlife habitat and use areas
- plant habitat

- soils and geology
- surface hydrology

Human environment

- existing, planned, and designated land uses
- parks, recreation, and preservation uses
- scenic and aesthetic resources

Cultural environment

- archaeology
- prehistory
- ethnohistory
- history

A sensitivity analysis was completed, and opportunities and constraints were determined to identify potential alternative routes for the SWIP. Sensitivity is the measure of the probable adverse response of each resource to direct and indirect impacts associated with the construction, operation, maintenance, and abandonment of the proposed transmission line. Criteria used in this determination included:

- **Resource Value:** A measure of rarity, high intrinsic value or worth, singularity or diversity of a resource within the study area or region.
- **Protective Status:** A measure of the formal concern expressed for a resource either through legal protection or by designation of special status.
- **Present or Future Uses:** A measure of the level of conflict based on policies of land management agencies and/or use.
- **Hazards:** A measure of the degree to which a resource represents a significant hazard to construction and/or operation of the proposed project.

These resources were then mapped according to their respective sensitivity level as follows:

- **Exclusion Area:** Areas determined to be unsuitable because of unique, highly valued, complex or legally protected resources, significant potential conflict with current or planned use, and areas posing substantial hazards to construction and operation of the line. For purposes of selection of corridors, exclusion areas were avoided.
- **Avoidance Area:** Areas of potentially high environmental impact because of important, valued resources, resources assigned special status, some conflict with current or planned use, and areas posing some hazard to construction and operation of the facility. In corridor selection these areas were avoided where possible or conflict with these areas was minimized if avoidance was difficult or impossible.
- **Low to Moderate Sensitivity:** Areas where the resource conflicts that have been identified through the regional environmental study process are minimal, or present little hazard to construction or operation of the facility.

After completing the sensitivity analysis for each resource, a composite sensitivity map was prepared through an overlay process of all the resource sensitivity maps. This composite was used to identify constraints and locational opportunities resulting from combinations of the three levels of environmental sensitivity for the five major resource areas: visual, land use, biology, earth, and cultural. Alternative corridor locations were then plotted taking into account the composite sensitivity, the locations of existing transportation and utility corridors, topographic constraints, and utilizing public lands. The corridor width varied somewhat to reflect the locations of constraining environmental features, yet allow sufficient margin for planning within each corridor. Corridors describe linear paths where:

- features or areas of exclusion were avoided (e.g. residences, airstrips, wells, and other sensitive land use features)
- crossing of features or areas of avoidance was minimized
- locations through steep or rugged topography were minimized
- proximity to existing roads that could be utilized for access was maximized
- locations parallel to existing transmission or existing utility corridors were maximized
- routing on private lands was minimized in favor of public lands

Several members of BLM, a FS representative, engineers from IPCo and LADWP, as well as project management from the consulting firm, Dames & Moore, were present during and participated in the identification of alternative corridors. Based upon the environmental data available for the regional studies, the selection participants determined that all reasonable alternatives had been identified. The resulting alternatives were presented to the SWIP Steering Committee for review (also refer to Chapter 5). The Steering Committee did not identify any additional alternatives.

About 3,000 miles of alternatives were initially identified in the regional study (refer to Figure 2-1). Through a joint effort involving IPCo, LADWP, BLM, FS, Bureau of Reclamation, NPS, and Dames & Moore, the initial alternatives identified in the regional study were reviewed through numerous field and aerial surveys. The objective of the field review was to refine the broad "corridors" of the alternatives, and to delineate assumed centerlines based on environmental and engineering input, and to further the familiarity of the study team with the environmental, physiographic, and engineering characteristics of the study corridors. These assumed centerlines formed the basis for the study area for each alternative route that was later studied in detail in the EIS. The field review and delineation of the assumed centerlines was completed in the period of April 1989 to July 1989. Following scoping, about 2,000 miles of these alternatives were identified as being reasonable and feasible for detailed study based on the regional environmental issues, public acceptability, and engineering constraints. The results of the route evaluation are documented in the SWIP project files and in the Southwest Intertie Project Regional Environmental Study report (Dames & Moore, April 1989).

Following completion of the regional studies, IPCo determined that an interconnection point would be needed in the Ely, Nevada area to best use projected regional resources (e.g., future WPPP in the Ely, Nevada area). Refer to page 2-31 for more information regarding the project expansion of the SWIP from Ely south to the Las Vegas area.

Develop Scope/Preparation Plan

A Scope/Preparation Plan was developed for the environmental documentation process (refer to Preparation Plan for the Southwest Intertie Project Environmental Studies - Phase II, Dames & Moore, July 1989). This plan considered the following:

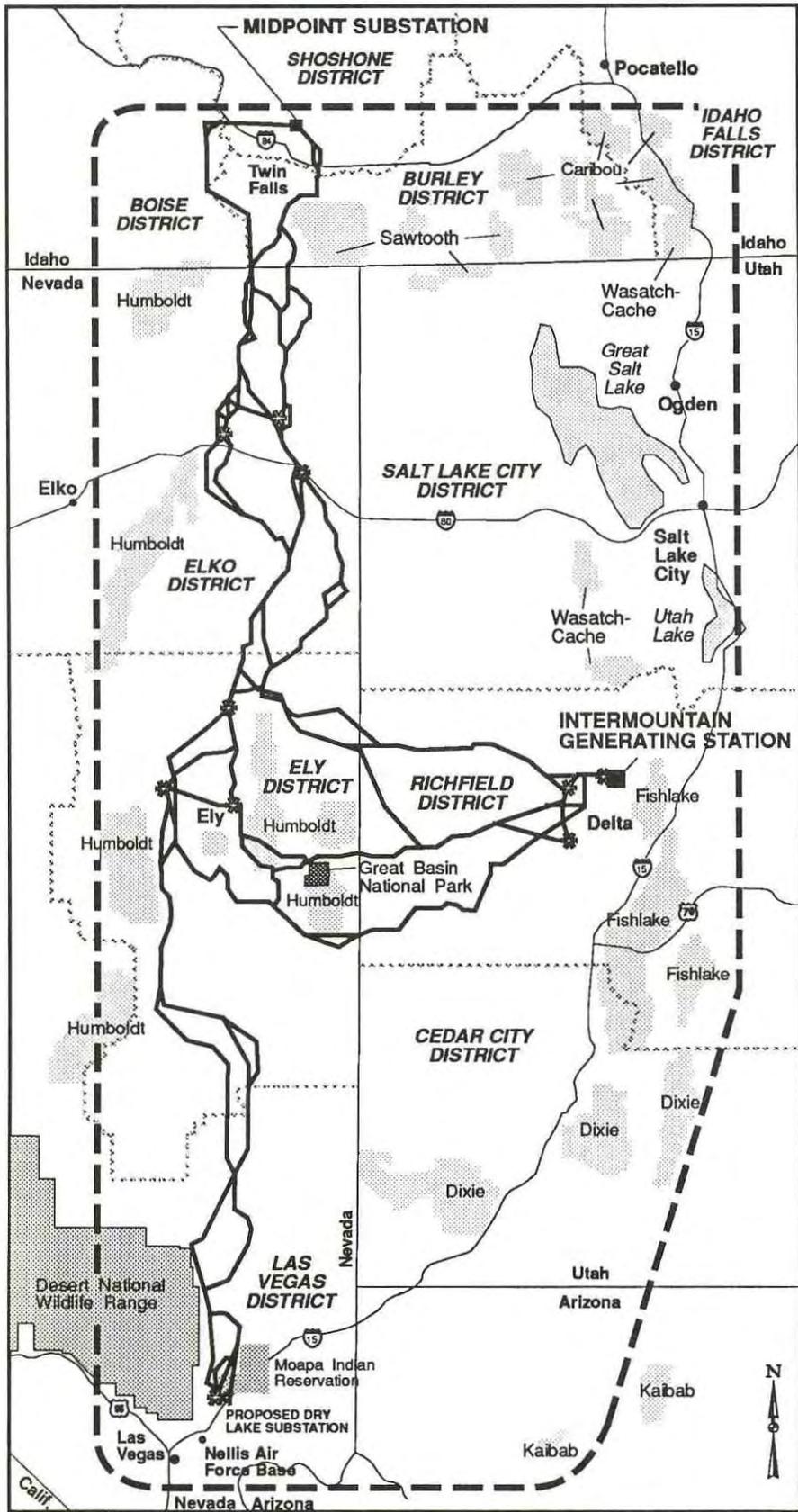
- previous environmental studies, reports, and EISs
- Draft and Final Humboldt National Forest Land and Resource Management Plan
- the Management Framework Plans (MFPs) of the Burley District and Shoshone in Idaho
- the Resource Management Plans (RMPs) of the BLM resource areas in the Boise and Shoshone Districts in Idaho, the Elko and Ely Districts in Nevada, and Richfield District in Utah
- issues and alternatives resulting from the regional environmental siting studies
- input from the agency contacts and public scoping meetings
- federal environmental reporting and compliance requirements as mandated by NEPA (1969) and the CEQ regulations (1978)

In addition when the project was extended to Dry Lake in May 1991, the MFPs of the Las Vegas District in Nevada were considered.

Corridor Studies

Following completion of the regional studies, scoping meetings, and agency input and review, approximately 2,000 miles of alternative corridors were initially studied in detail (refer to Figure 2-6). The study areas established along the assumed centerline of each alternative ranged in widths from two to six miles depending upon the needs of and concerns for each resource study (discussion in Chapter 4). Detailed environmental data were compiled on maps at a scale of 1:100,000 within these "study corridors".

Following the identification of final alternative routes, the environment was inventoried for nine resource categories to establish current environmental conditions. This baseline was



LEGEND

-  ALTERNATIVE CORRIDORS
-  BLM District Boundaries
-  Forest Service Boundaries
-  Alternative Substation Siting Area

Source: Dames & Moore

Note: Not to scale

Southwest Intertie Project Alternative Corridors

Figure 2-6

then used to determine where and to what extent impacts from the project may occur. The nine inventoried resource categories were organized as follows:

Natural Environment

- Air and Meteorology: air quality, climate
- Earth Resources: geology, hydrology, springs inventory, water quality, soils, and paleontology
- Biological Resources: terrestrial vegetation, rare, threatened or endangered plant, wildlife, and aquatic species, floodplains, wetlands, and associated vegetation, sensitive plant and wildlife habitat

Human Environment

- Land Use: land jurisdiction, existing and future uses, park, recreation, preservation areas, range lands and improvements
- Visual Resources: scenic resources, visual sensitivity, BLM visual resource management (VRM) classes, FS visual quality objectives (VQO) classes
- Socioeconomics: demography, economy, employment, tax jurisdictions, community resources, and grazing effects

Cultural Environment

- Prehistory: known and expected/probable prehistoric resources including lithic scatters, antelope traps, dwelling sites, etc.
- History: historic sites, trails, structures
- Ethnology: Native American religious and ritual sites, and hunting and gathering sites

These data provided the baseline for identifying potential impacts and appropriate mitigation measures, both generic and specific. Further, these data form the basis for the comparison of routing alternatives. Specific mitigation measures, recommended on a case-by-case basis, determined the residual, or unavoidable adverse, impacts to the environment along each alternative corridor. Detailed results of the inventory, impact assessment, and mitigation planning are provided in the technical report.

The assessment of environmental impacts is based upon an assumed reference centerline for the proposed transmission line. Impacts identified in this document were assessed assuming maximum movement of one-quarter mile from the assumed centerline for the final engineered right-of-way.

The corridor studies were initiated in the summer of 1989. The collection of detailed environmental data for the resource areas is previously described. The inventory of resource data involved contacts with federal, state, and local agency resource specialists and land managers. The data, collected, mapped, and field verified by Dames & Moore resource investigators, were reviewed by agency resource specialists. In addition to the environmental resources, electrical and magnetic field (EMF) effects have been analyzed for the SWIP.

The planning process used for the SWIP applied advanced computer technology in the form of a geographic information system (GIS) to map, analyze, and manage the voluminous data collected for the inventory. The data collected by resource investigators were supplemented by "remotely sensed" data from another advanced technology, multi-spectral satellite data. GIS was also used during the impact assessment and mitigation planning process. The system applied a variety of models developed by resource investigators to evaluate and assess the potential impacts the proposed project.

These data provided the baseline for identifying impacts, appropriate mitigation measures, and comparing the routing alternatives. Detailed results of the inventory, impact assessment, and mitigation planning are provided in the supplemental resource technical reports (Volumes II, III, and IV of the supporting technical reports).

Several adjustments, modifications, and additions to the assumed study centerlines were made during the corridor studies. In July 1989, the Burley District of the BLM in Idaho requested that alternative centerlines be evaluated on both sides of the existing midpoint to Valmy 345kV line from just south of Cottonwood Creek in southern Idaho to the Idaho-Nevada border. In addition, discussions with the superintendent of the Fossil Beds National Monument near Hagerman, Idaho, in June 1989 resulted in the addition of Link 62 to potentially reduce visual impacts to the monument. Links 61 and 64 were also adjusted slightly to avoid potential conflicts with the boundary of this national monument. (Links are route segments that connect to others to form the network of routing alternatives being considered).

During June 1989, the superintendent of the Great Basin National Park requested that alternatives be developed to avoid visual impacts to Great Basin National Park. In response, alternatives that would cross through military operating areas (MOAs) of the Utah Training and Testing Range (UTTR) of Hill Air Force Base (Links 262, 263, 264, 266, 267, and 268) were included. In August 1989 the superintendent also requested that an additional alternative be developed that would cross the Restricted R-6405 Area of the UTTR. In response, the Links 61, 63, and 64 (Direct Route) were developed and included in the alternatives studied in detail. Both of these added alternative routes would avoid visual impacts to Great Basin National Park.

In July 1989, the Elko District of the BLM requested the addition of several alternatives to Links:

- Link 71 between Jackpot and Contact, Nevada to potentially reduce visual impacts to U.S. Highway 93 (shown as Link 70 on maps)
- Links 711, 713, 714, and 715 to provide an alternative crossing of U.S. Highway 93 near Contact, Nevada
- Link 83 along Shoshone Creek just south of the Idaho-Nevada state line to provide another alternative route into the Trout Creek area
- Link 211 crossing Interstate 80 northwest of Oasis, Nevada to potentially reduce visual impacts
- Link 224 near Ferguson Mountain to potentially reduce visual impacts to U.S. Highway 93A
- Link 1612 to provide an alternative that could connect with the proposed Thousand Springs Power Project (Thousand Springs has been canceled)
- Links 161, 163, 164, 165, 166, 167, and 168 north of Wells, Nevada, to potentially reduce visual impacts to U.S. Highway 93

The Ely District in Nevada also made several requests for additions or revisions to the assumed alternative centerlines. In mid 1989 the District requested that Link 293 be added because of concerns about wildlife watering holes in the Antone Pass area on Link 280. An alternative route consisting of Links 362 and 363 into the Robinson Summit substation siting area from the north was desirable to BLM.

In early 1990, IPCo determined that the UNTP would not be able to provide the transmission capacity for the SWIP to reach the new substation near Boulder City, Nevada. IPCo decided that the SWIP would have to be extended south from the Ely area in order to meet the purpose and need for the SWIP project to interconnect in the Las Vegas area. In June 1990 the SWIP studies were expanded to include routes from the Ely, Nevada, area to a new substation site northeast of Las Vegas in the Dry Lake Valley.

To accommodate this expansion, the BLM determined that the SWIP route should follow the preferred route approved in the 1985 Record of Decision for the White Pine Power Project (WPPP), and that the studies for the WPPP should be updated to the same level of detail as the SWIP studies from Midpoint to Ely and Ely to Delta. No regional studies were completed between Ely and Dry Lake to determine other alternative routes. If the SWIP is approved in a Record of Decision, the WPPP Record of Decision would be amended so that the SWIP and the two lines proposed for WPPP would be consolidated in the same corridor. If one of the alternative routes avoiding Link 720 (Coyote Spring Valley) is selected, the SWIP Record of Decision would not amend the WPPP Record of Decision to consolidate the corridors in this area. The decision to construct the WPPP transmission system through Coyote Spring Valley would remain.

The lead federal agency for the SWIP, the BLM, recommended that one portion of the UNTP be retained in the SWIP EIS/PA process, although technically not a part of the SWIP. This

approximately 150 mile transmission line segment would extend east from the vicinity of Ely, Nevada, to near Delta, Utah. The right-of-way for this segment would be granted to IPCo and then assigned to LADWP for construction and operation of this portion of the line and a new substation at the Intermountain Generating Station near Delta, Utah. The action was recommended because of the amount of work completed on the route already, and the likelihood it would be repropoed by LADWP as the only part of UNTP not having an existing record of decision or right-of-way grant.

Prior to being added to the SWIP, the additional alternatives described below were evaluated for environmental and engineering feasibility during overflights. Further, BLM requested that the assumed centerlines for these alternatives be located such that the resulting utility corridor would accommodate the two future WPPP transmission lines. Assumed centerlines for the additional alternatives were determined jointly by the SWIP project management, BLM, and IPCo engineers requests.

Scoping was reopened for the project expansion to determine the issues and concerns for the SWIP between Ely and the Las Vegas area (also refer to Chapter 5). During the scoping period, contacts were made with the Nellis Air Force Base (AFB) to inform the military of the proposed project. The air space manager for Nellis Air Force Base expressed concerns about the route passing through areas designated as MOAs. The Air Force conducts low-altitude aircraft operations in these areas to train combat pilots. Subsequent meetings with representatives from Nellis AFB in August 1990 helped identify several additional alternatives (Links 672, 673, 674, and 675) that should be evaluated. In addition, the Caliente Resource Area of the BLM also suggested the need to evaluate Link 675 because it would parallel an existing 69kV power line in a utility corridor designated in the Caliente Resource Area Management Framework Plan of the Las Vegas District of BLM.

In September 1990, the Ely District requested that Link 363 be added as an alternative to avoid known ferruginous hawk nests along Link 361. Similarly, because of additional concerns for visual impacts and impacts to sage grouse leks and nesting areas in the vicinity of Jackpot and Contact, Nevada, two additional alternatives (Links 714 and 715) were requested in January 1991 by the Elko District of the BLM.

In September 1990 BLM requested that the SWIP studies evaluate the engineering and environmental feasibility of routing the SWIP roughly parallel to Nevada State Highway 7 toward the community of Moapa, Nevada, through a pass at the northern tip of the Arrow Canyon Range (Link 730). The proposed alternative would then enter a major utility corridor through the Moapa Indian Reservation parallel to Interstate 15 to reach the Dry Lake area.

BLM made this request because of concerns for desert tortoise in the Coyote Spring Valley. This concern was of particular concern because of the ongoing Section 10 (of the Endangered Species Act) consultation being conducted for private lands slated for development in Clark County. Under the Habitat Conservation Plan (HCP) being prepared, a desert tortoise conservation area was being proposed on public lands in Coyote Spring Valley. Because they were cooperating on ongoing planning work for desert tortoise, the BLM requested that other routing alternatives be considered for the planned transmission lines through this area. BLM was also concerned about visual impacts to travelers of U.S. Highway 93.

The BLM initiated a Resource Management Plan (RMP) process for the Stateline Resource Area in January 1990. The draft plan and EIS are planned to be released for public review in mid 1992. Utility corridors are among the many issues addressed by the plan. The BLM has coordinated the SWIP EIS and RMP EIS processes, to the extent possible, in determining the locations of both transmission lines and utility corridors.

Reliability concerns if the SWIP were constructed in the major utility corridor across reservation lands would be similar to those discussed on page 2-17 (e.g., paralleling the UNTP). Other major regional transmission lines, as well as several smaller transmission lines, are already sited in this corridor (also refer to Reliability on page 1-8).

A feasibility report was prepared and completed in February 1991. The purpose of this study was to evaluate the feasibility of constructing future lines through the Moapa area because of the concern for further visual impacts and disturbance to desert tortoise habitat in Coyote Spring Valley (Figure 2-7). Several potential routes were evaluated to identify the environmental and technical/economic issues.

In June of 1991, based on the results of the feasibility report, BLM determined that several of the routes should be studied in detail for the EIS. The route that would roughly parallel Nevada State Highway 7 from the north end of the Arrow Canyon Range to a point near the community of Moapa and then southwest toward the Dry Lake Valley in the designated utility corridor was eliminated from further consideration because of many environmental, technical, and cost issues. Near the Reid-Gardner Generating Station the route would either have to cross the coal storage area on the east side of the generation station or the wetland areas on the west side of the generating station. The line could not be routed far enough east to avoid the coal storage area because of the major regional transmission lines (IPP-Adelanto 500kV DC transmission line and the Navajo-McCullough 500kV transmission line) located in this area, and the SWIP cannot feasibly cross these lines. Environmentally the route would likely result in many miles of visual impacts along Highway 7 and the residential concentrations in the Moapa and Glendale areas. Additionally, BLM determined that this route would not meet their planning criteria for locating utilities within corridors.

Another route, which crossed Aerojet lands outside of the designated utility corridor northwest of the Moapa River Indian Reservation, was eliminated from further consideration. The study determined that a utility corridor had already been established through the Aerojet lands by Congress in the Nevada-Florida Land Exchange Authorization Act of 1988 (PL 100-275). The legislation states under 102 Stat.55(b,1) that "Activities to construct, operate, and maintain electric transmission lines within the corridor shall be given priority over all other conflicting activities."

Several of the alternative route segments were determined to be reasonable and feasible and were studied in detail for the EIS (Figure 2-7). Two of the route segments would cross the Moapa Indian Reservation lands. During the fall of 1991 consultation with the Tribal Council determined that these routes could be considered through the EIS process. These were evaluated during November and December of 1991 (Links 730, 740, 750, 760, 780, and 790). A public information meeting was held in the Tribal Office of the Moapa Band of the Paiute on December 17, 1991. Also refer to discussion of Subroute Set 23 in Appendix D.