

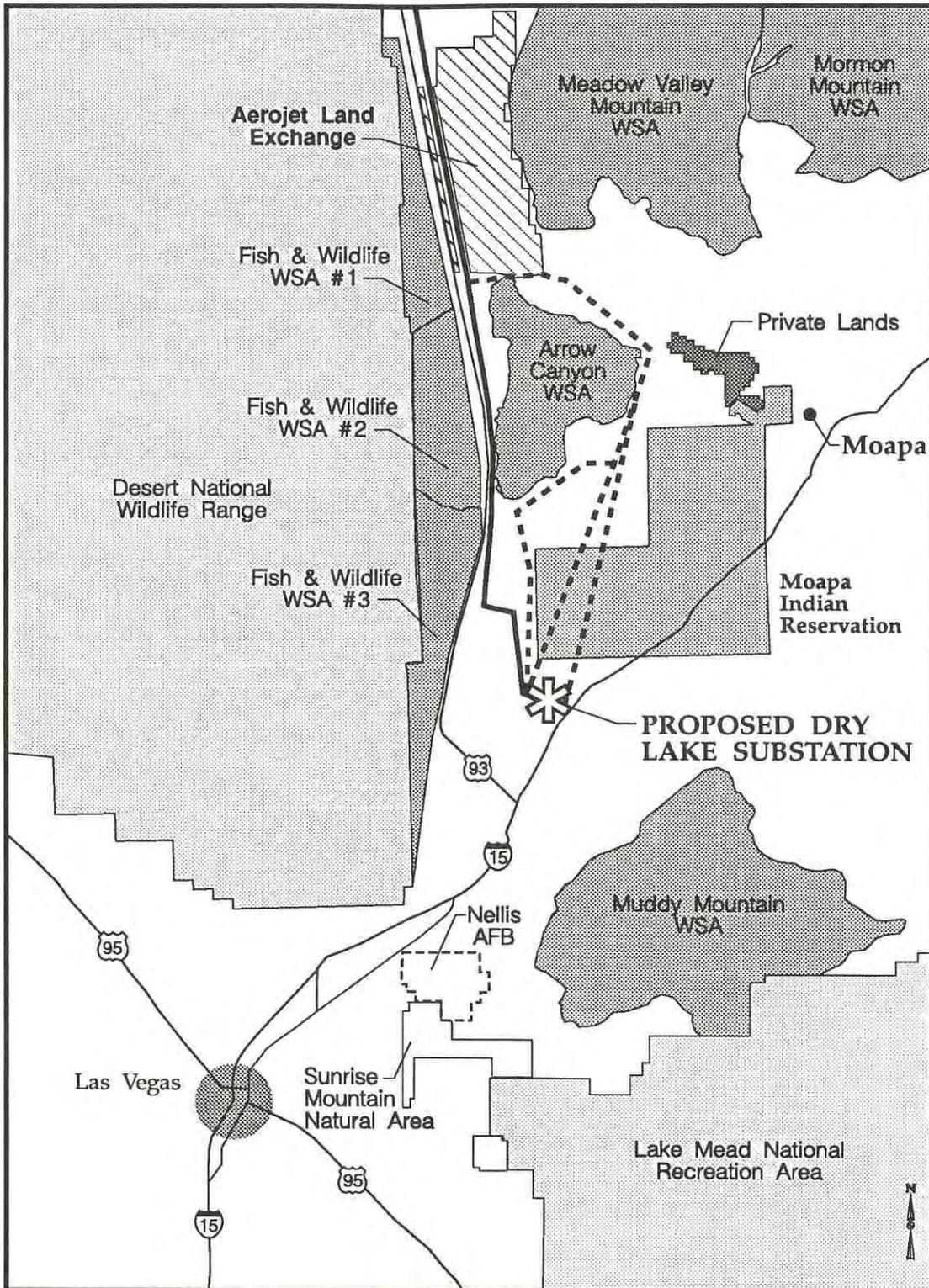
In 1985, the Record of Decision (ROD) for the WPPP stated that the two 500kV transmission lines would be constructed through the Coyote Spring Valley parallel to U.S. Highway 93. In addition, the BLM had previously granted a Right of Way for a second 500kV line from the Intermountain Generating Station. In 1990 this grant was transferred to LADWP for the UNTP. Therefore, the UNTP line would be constructed along the Coyote Spring Valley route (Link 720), and the WPPP lines are approved through the 1985 ROD for this same Coyote Spring Valley route.

Following the impact assessment and mitigation planning process, the Coyote Spring Valley route was determined to be environmentally preferred. This route would avoid significant impacts to cultural sites and visual impacts to high sensitivity recreation viewpoints. All of the routing alternatives evaluated on the east side of the Arrow Canyon Range and on or near the Moapa River Indian Reservation, would result in high visual impacts to recreationists on the east side of the Arrow Canyon WSA and to a proposed interpretative trail in the area. In addition, these routes would result in direct impacts to several important ethnohistoric and historic sites located in Arrow Canyon along Link 730. Desert tortoise impacts on routes both east and west of the Arrow Canyon Range are considered to be mitigable. Also refer to Appendix D for additional information.

Routing Alternatives Evaluation Process

A GIS was used to assist in the preparation of the required environmental impact statement/plan amendment (EIS/PA). The GIS was originally used to evaluate environmental issues and help identify alternative transmission line corridors in Phase I of the SWIP (refer to the SWIP Regional Environmental Report, April 1989). GIS processing was performed using Dames & Moore's Geographic Information Management System (GIMS). The following summarizes the sequence of GIS applications:

- digitizing of resource inventory data as collected and recorded on maps by resource principal investigators
- producing baseline resource inventory maps and data reports
- conversion of mapped resource data to a digital database format
- developing pre-assessment models to establish the level of potential ground disturbance associated with construction activities, the potential increase in public access into remote areas, and degree of visible change in the landscape
- developing of impact assessment models to evaluate how the construction and operation of the proposed project would effect resource values and features
- producing of impact maps (to scale) that graphically illustrate the locations and magnitudes of potential resource impacts



Source: Dames & Moore

Note: Not to Scale

Moapa Feasibility Study

Figure 2-7

- developing and producing tabular impact data reports that describe the location and magnitude of potential impacts along the assumed centerline of alternative transmission line routes
- developing and applying analysis for siting and selecting substation facility locations using engineering and environmental criteria

Substations, series compensation stations, and microwave communication facilities sites were also evaluated during the environmental studies (refer to Chapters 3 and 4, and appendices). Siting areas for substation and series compensation station facilities were inventoried by the same methods and for the same resource categories as the alternative routes.

Alternative sites were selected for substations and series compensation stations based on a set of environmental and engineering criteria. The GIS facilitated the selection of sites with opportunities and constraints mapping. The resource inventory for the siting areas was input into GIS, and the impact assessment used models adapted from those used for the corridor analysis. Refer to Appendix E at the end of this document for additional discussion of the siting and assessment process.

Alternative microwave facilities sites were identified by IPCo representatives for the Midpoint to Dry Lake portion of the SWIP. The resource inventory and impact assessment for these sites were conducted manually without the assistance of the GIS. (Refer to Appendix F at the end of this document for a detailed discussion of the microwave facilities study). No additional microwave facilities would be required on the Ely to Delta portion of the SWIP. Existing communication facilities would be used (also refer to page 2-15).

The proposed project's purpose and need statement (refer to Chapter 1), public issues, and agency concerns guided identification and evaluation of alternatives. An environmental study process was developed and implemented to ensure a systematic framework for identifying, assessing, and comparing alternative routes for the proposed transmission line. Initial routing alternatives were identified through the Regional Environmental Study (refer to page 2-23).

The necessary information for each of the alternative routes was collected to predict the potential impacts of the project to the environment. The project team determined the impacts that could be caused by the construction, operation, and maintenance of the transmission line.

The access road requirements determine the amount of potential disturbance (e.g., constructing new roads, constructing spur roads to tower locations from existing roads, or upgrading existing roads). Vegetation removal was a major consideration during field review and identification of alternative routes. The following access levels are preliminary estimates of disturbed area for main and spur road construction, tower sites, and marshalling yards:

1. Agricultural areas, no new access roads needed.

2. No new access roads needed, use existing roads, build spur roads into tower sites. Less than 0.75 mile of new access road per mile of transmission line. Disturbed area is about 1.5 acres per mile for access roads and about 1.0 acre per mile for tower sites and marshalling yards.
3. New access roads in flat to gently rolling terrain. Slopes are 0-8 percent. Approximately 1.0 -1.25 mile of new access road per mile of transmission line. Disturbed area is about 2.0 acres per mile for access roads and about 1.0 acre per mile for tower sites and marshalling yards.
4. New access roads in moderately steep slopes. Slopes are 8-35 percent. Approximately 1.0 - 2.0 miles of new access road per mile of transmission line. Disturbed area is about 4.0 acres per mile for access roads and about 1.0 acre per mile for tower sites and marshalling yards.
5. New access in steep terrain. Slopes are 35-65 percent. Approximately 2.0 - 3.0 miles of new road per mile of transmission line. Disturbed area is about 6.0 acres per mile for access roads and about 1.0 acre per mile for tower sites and marshalling yards.

The levels of potential increases in public accessibility that could result if new roads are constructed in remote areas are described below:

0 - 20%	the line routes could generally be accessed by existing roads; only a few short spur roads may be required; little to no increase in public access is expected
20 - 40%	there are some existing roads in the area; some new road construction may be needed to access the line route in some areas
40 - 50%	some existing roads are in the vicinity; new roads would be needed to large portions of the line route
50 - 100%	remote areas with few, if any, existing roads; new roads would be needed to gain access to much of the line route

The resulting data were summarized into profiles of 0.1 mile increments for each alternative corridor. The alternative corridors were then compared, and an environmentally preferred route identified.

COMPARISON OF FINAL ROUTING ALTERNATIVES

Preferred route selection was based upon the comparison of alternative routes between the Midpoint Substation near Shoshone, Idaho, and the proposed substation at Dry Lake northeast of Las Vegas, Nevada, and alternative routes between the Ely, Nevada area and the Delta, Utah area. Seven final routing alternatives were identified for the Midpoint to Dry

Lake portion based on combinations of routing alternatives environmentally preferred by the five major resources. Four final routes were identified for the Ely to Delta portion. These routes are compared later in this chapter of this document and the environmentally, agency, and utility preferred route(s) are identified (Refer to Map Volume).

The final selection of substation and series compensation station sites were based on the selection of the environmentally preferred route. The impacts of the microwave facilities sites are also documented in Appendix F.

To assist in the determination of routing preferences, the environmental consequences for each route were summarized based on the residual impact assessment results (after mitigation measures applied), specific environmental resource preferences, and agency and public comments. A reasonable number of the best environmental routing alternatives were determined from combining individual links to make complete routes.

Subroutes sets are made up of localized alternatives that have common beginning and end points. Subroutes were evaluated in order to reduce the potential number of routes that could be derived from the link segments. Figure 2-8 illustrates the twenty-four sets of subroutes that were identified and evaluated to help derive the alternative routes compared in this document. The link segments where no local routing decisions were necessary, were termed connectors. The environmentally preferred subroute within each set of subroutes was selected and combined with the connector links to form alternative routes. The subroute selection process is described in Appendix D of this document, and is accompanied by maps and summaries of the resource impacts for each subroute set (also refer to the Objectives, Procedures, and Results Technical Report).

Midpoint to Dry Lake

Transmission Line Alternatives

The resulting network of routes was organized into eight major routing alternatives from Midpoint Substation in Idaho to the proposed substation at Dry Lake northeast of Las Vegas, Nevada:

- **Route A** - 345kV*-Thousand Springs-Goshute Valley-Steptoe-Egan Range-Dry Lake Alternative is comprised of link segments:

10, 20, 41, 40, 50, 70, 72, 101, 102, 110, 130, 160, 161, 162, 1612, 152, 200, 211, 212, 230, 250, 259, 260, 261, 270, 291, 293, 310, 340, 362, 363, 669, 670, 672, 673, 675, 690, 700, 720

- **Route B** - 345kV*-Trout Creek-Wendover-Steptoe-Antone Pass-Dry Lake
Alternative is comprised of link segments:

10, 20, 41, 40, 50, 70, 72, 91, 92, 140, 141, 142, 144, 200, 221, 222, 224,
226, 259, 261, 270, 280, 310, 340, 362, 363, 669, 670, 672, 673, 675, 690,
700, 720
- **Route C** - 345kV*-Trout Creek-Goshute Valley-Steptoe-Egan Range-Dry Lake
Alternative is comprised of link segments:

10, 20, 41, 40, 50, 70, 72, 91, 92, 140, 141, 142, 144, 200, 211, 212, 230,
250, 259, 260, 261, 270, 291, 293, 310, 340, 362, 363, 669, 670, 672, 673,
675, 690, 700, 720
- **Route D** - 345kV*-Wells-Steptoe-Egan Range-Dry Lake Alternative is comprised
of link segments:

10, 20, 41, 40, 50, 70, 72, 101, 102, 110, 130, 160, 161, 162, 1611, 166, 167,
1613, 180, 190, 230, 241, 243, 245, 261, 270, 291, 293, 310, 340, 362, 363,
669, 670, 672, 673, 675, 690, 700, 720
- **Route E** - 345kV*-Thousand Springs-Wendover-Steptoe-Egan Range-Dry Lake
Alternative is comprised of link segments:

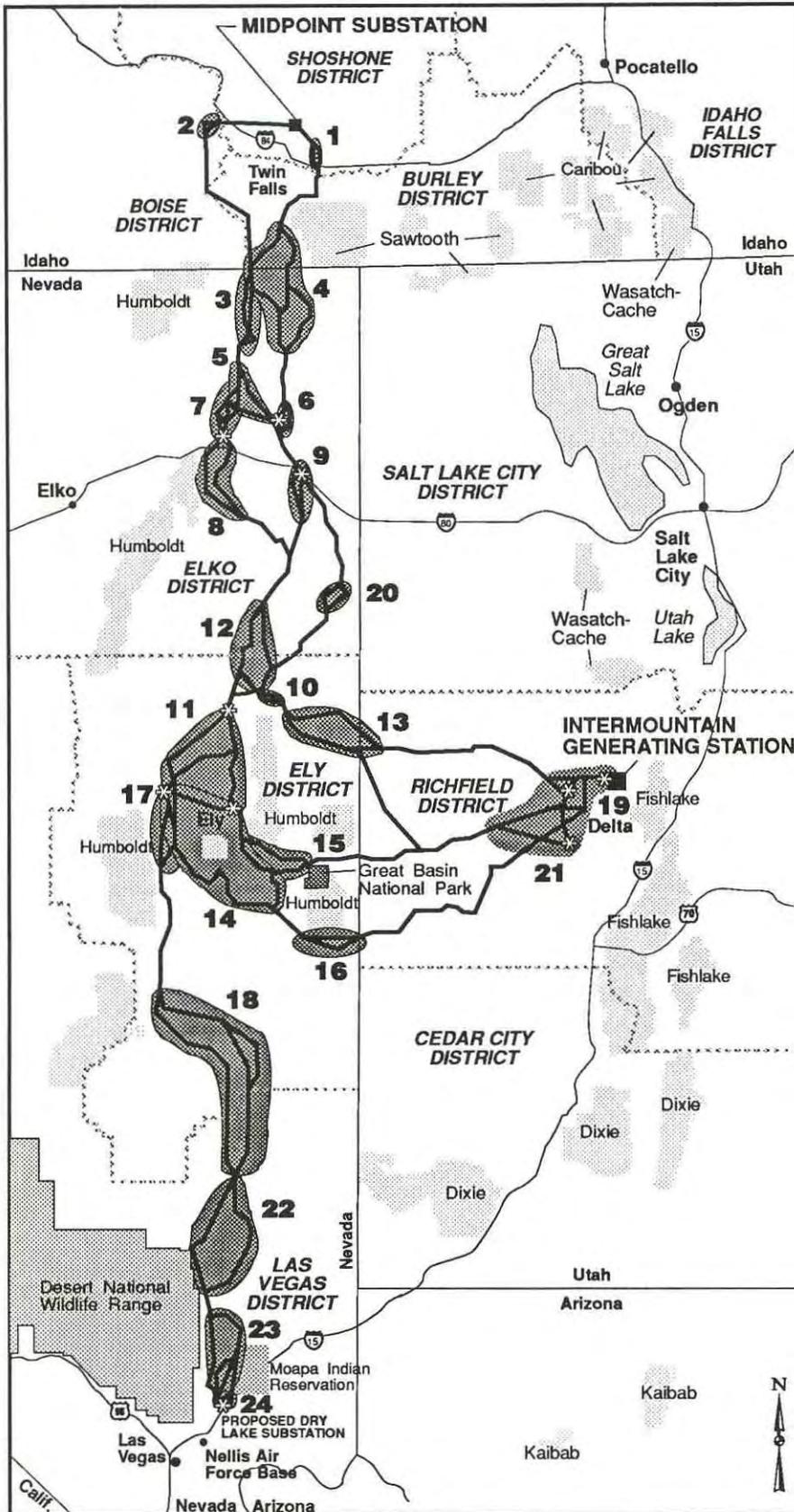
10, 20, 41, 40, 50, 70, 72, 101, 102, 110, 130, 160, 161, 162, 152, 200, 221,
222, 224, 226, 259, 261, 270, 291, 293, 310, 340, 362, 363, 669, 670, 672,
673, 675, 690, 700, 720
- **Route F** - Hagerman-Trout Creek-Goshute Valley-Egan Range-Dry Lake
Alternative is comprised of link segments:

61, 62, 64, 70, 72, 91, 92, 140, 141, 142, 144, 200, 211, 212, 230, 250, 259,
260, 261, 270, 291, 293, 310, 340, 362, 363, 669, 670, 672, 673, 675, 690,
700, 720
- **Route G** - 345kV*-Cottonwood Creek-Thousand Springs-Goshute Valley-Steptoe-
Egan Range-Dry Lake Alternative is comprised of link segments:

10, 20, 41, 40, 50, 70, 711, 714, 101, 715, 713, 110, 130, 150, 151, 152, 200,
211, 212, 230, 241, 243, 245, 261, 270, 280, 310, 340, 362, 363, 669, 670,
672, 673, 675, 690, 700, 720

* - parallels Midpoint to Valmy 345kV transmission line

The following section describes various issues and resource preferences for each route compared. Environmental data are summarized in Table 2-4 and committed mitigation by alternative route is shown in Table 2-5.



LEGEND

- ALTERNATIVE CORRIDORS
- BLM District Boundaries
- Forest Service Boundaries
- Alternative Substation
- Subroute location
- 21** and set number

Source: Dames & Moore

Note: Not to scale

Subroute Location Map

Figure 2-8

Route A: 345kV-Thousand Springs-Goshute Valley-Steptoe-Egan Range-Dry Lake

Alternative Route A would parallel the Midpoint to Valmy 345kV transmission line to south of Contact, Nevada. Just south of the Midpoint Substation this route would also parallel the double-circuit line of Midpoint-Stateline 345kV and Midpoint-Hunt 230kV transmission line.

This route would cross open rangelands broken by small dispersed farm areas southeast from the Midpoint Substation to crossing the Snake River Canyon (Links 10, 20, 40, 41, 50, and 70). The Bureau of Reclamation is concerned about the visual impacts to the Minidoka Relocation Center (Link 20), a site on the National Register of Historic Places, the location where thousands of Americans of Japanese descent were interned during World War II. The site is also a designated park site for the Idaho Centennial. Other concerns in this area are visual impacts to rural residences and direct impacts to irrigated agricultural lands.

From the river canyon south to the toe of the foothills, the route (Link 41) would cross agricultural lands in the Snake River Valley. The route would turn west at the toe of the South Hills and follow them around to the southwest and south outside the Sawtooth National Forest boundary (Links 41, 40, and 50), primarily through rangelands. Throughout this area there are concerns about visual impacts to the scattered rural residences. A few miles north of the Idaho-Nevada state line, this route (Link 70) would meet and parallel the Upper Salmon to Wells 138kV transmission line. The route would continue south parallel to the existing 138kV and 345kV transmission lines passing just west of Jackpot, Nevada and would cross Salmon Falls Creek (Link 72) in the rolling terrain of the Browns Bench parallel to the 345kV transmission line.

The route would continue south parallel to U.S. Highway 93 (Link 101) to just north of Contact, Nevada, where the route would cross the highway parallel to the 345kV transmission line (Link 102). At Rocky Peak the 345kV transmission line turns southwest. Route A continues south parallel to the 138kV line crossing U.S. Highway 93 again (Link 160), then just north of the HD Summit (Link 162) the route would turn sharply east along the northern toe of the Windermere Hills (Link 1612) and cross U.S. Highway 93 a third time. As the route enters the Toano Draw, it would turn southeast (Link 152) along the western edge of the draw (Link 200) into the Goshute Valley. Along the eastern toe of the Pequop Mountains, the route (Link 211) would continue south passing just to the west of Oasis, Nevada before crossing Interstate 80. There were concerns expressed in the public workshops about visual impacts to a ranch headquarters in the Goshute Valley. In addition, the BLM has also expressed concerns about visual impacts at the Interstate 80 crossing, a designated "low visibility" corridor in the Wells Resource Management Plan.

The route would continue south through the Goshute Valley (Links 212, 230) parallel to an unused railroad bed past Shafter passing to the east of the South Pequop WSA. Northwest of the Dolly Varden Mountains, the route would turn south through the Currie Hills (Link 250) towards Lages Station, Nevada, in the northern portion of the Steptoe Valley. The BLM is concerned about the visual impacts to views in the North Steptoe Valley caused by the crossing of U.S. Highway 93A (Link 250) and the crossing of U.S. Highway 93 (Link 260). Routing around the northern tip of the Schell Creek Range (Links 259, 260) would introduce visually contrasting elements into foreground and middleground views from these highways where the Schell Creek Range and the Currie Hills (Link 250) would backdrop the proposed transmission line.

The route would continue to an alternative substation site located in the North Steptoe Valley over a mile west of U.S. Highway 93. From this substation site, the route would pass south along the western edge of Steptoe Valley (Links 270, 291) then cut southwest through Dry Canyon (Link 293) in the Egan Range. Once west of the Egan Range, the route would cross Butte Valley and enter the Robinson Summit area (Link 310), the location of a second alternative substation site in the Ely area, after crossing Nevada State Highway 50.

The route would continue on the east side of Jakes Valley (Links 340, 362, 363) into the White River Valley crossing the White River and Nevada State Highway 6 (Link 669). Just south of the Wayne Kirch National Wildlife Refuge it would cross the White River again, then turn southeast to a pass at the southern end of the Schell Creek Range (Link 672). Nellis Air Force Base has expressed concerns for low-altitude military aircraft operations where Route A would cross the Muleshoe Valley and into the north end of the Dry Lake Valley (Link 673). From the Black Canyon on the east edge of the Dry Lake Valley, the route would meet and parallel Lincoln Power's 69kV power line along the toe of the Burnt Springs Range (Link 675). The route would continuously parallel this 69kV line into Coyote Spring Valley, northeast of Las Vegas.

The route would continue into the Delamar Valley and past Delamar Lake to meet Pahrnagat Wash adjacent to Maynard Lake (Link 690). From this point, the route would parallel Pahrnagat Wash where several WSAs are of concern. The proximity of their boundaries cause significant routing constraints (pinch points) for several miles along Pahrnagat Wash south of Maynard Lake. On the east side of Pahrnagat Wash is the Delamar WSA, and on the west side is the Evergreen WSA. Although neither WSA is recommended by BLM to be designated as Wilderness, BLM is concerned about visual impacts from dispersed areas within the WSAs. The route would parallel the 69kV line, U.S. Highway 93, and the UNTP 500kV transmission line through this area. Because of these "pinch points," it may be necessary to build the SWIP and UNTP on double circuit towers for four to six miles along Pahrnagat Wash and parallel to U.S. Highway 93 (from milepost 28 to milepost 34 on Link 690). If these lines were built on double circuit towers, the future White Pine Power Project (WPPP) lines would be placed on the open circuits of each line. From milepost 34 of Link 690, the SWIP and UNTP lines would be on separate single circuit structures. The SWIP route would cross U.S. Highway 93 at about milepost 38 of Link 690.

The route would then cross Coyote Spring Valley and enter a corridor established by Congress in March 1988 for the Aerojet Land Exchange (Link 700). A portion of the area east of the route in the Coyote Spring Valley was set aside by Congress in the land exchange legislation for the management of desert tortoise. There is a concern by BLM throughout this area and into Coyote Spring Valley and Hidden Valley for visual impacts to views from U.S. Highway 93. The Arrow Canyon WSA is on the east side of the route and encompasses the Arrow Canyon Range from Nevada State Highway 7 south for several miles. Along the same corridor, several Fish and Wildlife WSAs lie on the west side of the Arrow Canyon WSA (Link 700). They begin at the northern portion of the Coyote Springs Valley and continue several miles south to Hidden Valley. South of these WSAs the route would turn east through a small pass in the southern Arrow Canyon Range, just east of Hidden Valley, and into the proposed substation at Dry Lake.

Although none of the WSAs potentially affected by the route are recommended by BLM to be designated as Wilderness, BLM is concerned about the potential visual impacts to dispersed recreational users within these WSAs.

Route B: 345kV-Trout Creek-Wendover-Steptoe-Antone Pass-Dry Lake Alternative This route is the same as Route B (above) from the Midpoint Substation to south of Jackpot, Nevada (Link 72).

Just south of Salmon Falls Creek, Route B would turn sharply southeast crossing U.S. Highway 93 (Link 91) to roughly parallel Trout Creek west of the Granite Range (Link 92) and Knoll Mountain (Link 140), and then cross Thousand Springs Valley. The route would pass just west of the Ninemile Mountain (Link 141) and continue south through Toano Draw which joins the Goshute Valley west of the Pequop Mountains. The route then would cross the Goshute Valley approximately three miles northeast of Oasis, Nevada (Links 221, 222).

The route would cross Interstate 80 in Silver Zone Pass and traverse south along the eastern toe of the Goshute Mountains (Link 222). The route would also pass east of the Bluebell WSA (Link 222). Near Ferguson Mountain the route would cross U.S. Highway 93A (Link 224) then would parallel it to Lages Station, Nevada (Link 226). The BLM has expressed concerns for visual impacts from dispersed areas where this route would pass adjacent to the Goshute Peak WSA, an area recommended for Wilderness designation (Link 226).

From Lages Station south into north Steptoe Valley, the route would parallel U.S. Highway 93 then cross the highway to reach the alternative substation site at the north end of Steptoe Valley. The BLM is concerned that the route would introduce visually contrasting elements into foreground and middleground views from U.S. Highway 93 as the route passes around the northern tip of the Schell Creek Range (Links 259, 260). The Schell Creek Range would be a backdrop to the proposed transmission line in this location.

From the substation site, the route would cross the Steptoe Valley passing east of the community of Cherry Creek while parallel to a Nevada Northern Railroad right-of-way. The route then would turn southwest into Antone Pass between the Cocomongo Mountains and the Egan Range. West of this pass, the route would traverse Butte Valley and enter the Robinson Summit alternative substation site from the north.

From Robinson Summit south to its terminus in Dry Lake Valley, northeast of Las Vegas, Nevada, Route B is identical to Route A (above).

Route C: 345kV-Trout Creek-Goshute Valley-Steptoe-Egan Range-Dry Lake Alternative Route C is the same as Route A from Midpoint Substation to just south of Jackpot, Nevada.

From south of Jackpot to the vicinity of Oasis, Nevada (Link 200), Route C is the same as Route B. Then, from Oasis (Link 211), Route C is identical to Route A to the southern terminus in the Dry Lake Valley, northeast of Las Vegas, Nevada.

Route D: 345kV-Wells-Steptoe-Egan Range-Dry Lake Alternative Route D is the same as Route A from Midpoint Substation south to just north of HD Summit (end of Link 162) at southern end of Thousand Springs Valley.

From HD Summit, Route D would parallel the Upper Salmon to Wells 138kV transmission line in the narrow valley west of U.S. Highway 93 south into the northern end of the Town Creek Flats (Links 1611, 166, 167, 1613). The route would turn southeast crossing U.S. Highway 93 towards Wells Peak, cross the eastern half of the Town Creek Flats, and then pass along the northwestern toe of the Wood Hills several miles east of Wells, Nevada (Link 180). The BLM has expressed concern about visual impacts at the crossing of U.S. Highway 93 north of Wells, and the crossing of Interstate 80 about two miles west of Moor Summit.

From the Wood Hills, the route would cross the Independence Valley (Link 180) and begin paralleling a Union Pacific Railroad right-of-way (Link 190) near the center of the valley. The route would cross the Pequop Mountains over the Union Pacific railroad tunnel near Hogan and enter the Goshute Valley. The route then passes one mile east of the South Pequop WSA (Link 190), which has been recommended for Wilderness designation. A short distance after the WSA, the route would turn south-southwest and pass the town of Dolly Varden. Just south of Mizpah, the route would turn south away from the railroad and would cross U.S. Highway 93 several miles south of Currie, Nevada (Link 241). The route would pass to the east of the Goshute Canyon WSA and the adjacent Natural Area (junction of Links 241, 242 & 243). Continuing south along the western edge of Goshute Lake, the route would then turn southeast to an alternative substation site located at the north end of the Steptoe Valley.

From the North Steptoe Valley (Link 270), Route D is identical to Route A south to the southern terminus in the Dry Lake Valley, northeast of Las Vegas, Nevada.

Route E: 345kV-Thousand Springs-Wendover-Steptoe-Egan Range-Dry Lake Alternative Route E is the same as Route A from Midpoint Substation to Oasis, Nevada near Interstate 80 (refer to Route A description above).

From Oasis to the alternative substation site in the North Steptoe Valley, Route E is identical to Route B (refer to Route B description above). Route E is the same as Route A from the north Steptoe Valley south to the southern terminus in the Dry Lake Valley, northeast of Las Vegas, Nevada.

Route F: Hagerman-Trout Creek-Goshute Valley-Egan Range-Dry Lake Alternative Route F would depart Midpoint Substation to the west towards the Hagerman area crossing rural agricultural lands broken by dispersed sage scrub range areas (Link 61). Visual impacts to the many residences in the area and land use conflicts with agriculture operations in the Snake River Valley were among the concerns expressed at public meetings in the area. The route would descend the bluff into the Hagerman area just south of Malad Gorge State Park and cross the Snake River (Link 61). On the west side of the Snake River, the route would climb the steep, eroded wall of the canyon and traverse parallel to the north and west boundaries of the Hagerman Fossil Beds National Monument (Links 62, 64). The National Park Service has expressed concerns about visual impacts to the visitors' center and interpretation facilities planned for the Hagerman Fossil Beds National Monument.

As the route would turn south (Link 64), agricultural lands are avoided because the route follows a long, narrow strip of BLM lands known as Dickey Bird Lane (Link 62). BLM is concerned about the route crossing this land because of its use for vegetation and upland game research by BLM and Idaho Department of Fish and Game. From the end of Dickey

Bird Lane, the route would traverse rural agricultural lands passing near several rural residences. There is concern that the route could impact a utility airstrip used by aerial spraying operations located near the southern boundary of the Hagerman Fossil Beds National Monument.

Just north of Balanced Rock State Park, the route would cross Salmon Falls Creek Canyon and parallel the Upper Salmon to Wells 138kV transmission line along the western rim of the canyon (Link 64). The route would continue south with the 138kV transmission line roughly paralleling this canyon. East of the Salmon Falls Reservoir, the route would cross the Idaho-Nevada state line near Jackpot, Nevada (Link 70).

Route F is the same as Route B from just south of Jackpot to near Oasis, Nevada. Then from Oasis to the southern terminus in Dry Lake Valley, Nevada, this route is identical to Route A.

Route G: 345kV-Cottonwood Creek-Thousand Springs-Goshute Valley-Steptoe-Egan Range-Dry Lake Alternative Route G is the same as Route A from Midpoint Substation south to the Idaho-Nevada state line (Link 70).

West of Jackpot, Nevada the route would cross Salmon Falls Creek (Link 711) a mile west of the Upper Salmon to Wells 138kV transmission line crossing. BLM representatives from the Elko District favor this crossing over the crossings used by other routes about two miles to the south.

Route G would then continue south paralleling the west side of the Midpoint to Valmy 345kV transmission line and the 138kV Upper Salmon to Wells transmission line. Sage grouse habitat between the transmission line corridor and Grassy Mountain is of concern along this area of the route. However, cumulative effects to the sage grouse are expected to be lower where the route parallels existing transmission lines (refer to Chapter 4).

Continuing south (Link 101, 715), the route would then turn southeast to cross U.S. Highway 93 and the two existing transmission lines (Link 713) just north of Contact, Nevada. The BLM has expressed concerns about visual impacts to views from U.S. Highway 93 and residences in the Contact area. The route would continue south paralleling the two transmission lines on the east side to Rocky Peak (Links 110, 130). Then, the route would turn southeast away from the existing transmission line corridor and cross Thousand Springs Valley east of the Wilkins Ranch (Link 150, 151), and southeast into the Toano Draw.

The route would traverse the western edge of the Toano Draw (Link 200) into Goshute Valley. Along the eastern toe of the Pequop Mountains, the route (Link 211) would continue south passing just to the west of Oasis, Nevada before crossing Interstate 80. There were concerns expressed in the public workshops about visual impacts to a ranch headquarters in the Goshute Valley. In addition, the BLM has also expressed concerns about visual impacts at the Interstate 80 crossing, a designated low visibility corridor in the Wells Resource Management Plan.

The route would continue south through the Goshute Valley (Links 212, 230) parallel to an unused railroad bed passing Shafter and Dolly Varden. A little south of Mizpah, the route

would turn south away from the railroad crossing U.S. Highway 93 several miles southeast of Currie, Nevada (Link 241). The route would then pass to the east of the Goshute Canyon WSA and the adjacent Natural Area (junction of Links 241, 242 and 243). Continuing south along the western edge of Goshute Lake, the route would turn southeast to an alternative substation site located at the north end of the Steptoe Valley.

Route G is the same as Route B from this substation site to the southern terminus in Dry Lake Valley, Nevada.

Substation and Series Compensation Sites

Three new facilities would be required between Midpoint Substation and the proposed terminus in the Dry Lake Valley. A series compensation facility would be required north of Wells, Nevada. The facility near Wells could be expanded to include switching equipment if an interconnection with Sierra Pacific Power is needed in the future. This site was formerly proposed as a potential interconnection with the Thousand Springs Power Project (TSPP), which was canceled in 1991. However, Sierra Pacific has expressed interest in a transmission interconnection at this site. The second new facility would be a new substation facility in the vicinity of Ely, Nevada, to provide an interconnection point for the Ely to Delta routes (Crosstie) and potentially the 230kV transmission system already in the area. The third new facility is a new substation in the Dry Lake Valley northeast of Las Vegas, the proposed termination point for the SWIP. A fourth facility, a series compensation station, may be required in the Delamar Valley, which would require a separate environmental assessment (EA) if constructed.

In the Ely area, only one substation site would be selected for the SWIP. If a substation is developed at the Robinson Summit site, a substation may also be developed at the North Steptoe site, if the WPPP is developed in the future. If the North Steptoe substation site is developed as part of the SWIP, the Robinson Summit substation site may also be developed in the future to provide an interconnection with the 230kV transmission system in the area. However, only one substation site would be developed as part of the SWIP.

Seven facility siting areas were identified and studied between Midpoint and Dry Lake. The North Steptoe, Robinson Summit, and Hercules Gap siting areas were identified to locate a new substation in the vicinity of Ely. The U.S. Highway 93, Thousand Springs, and Goshute Valley siting areas northeast of Wells, Nevada, were identified to locate a series compensation station between Midpoint and Ely. The seventh siting area in the Dry Lake Valley northeast of Las Vegas was identified for a new substation facility and the proposed southern terminus of the SWIP.

These siting areas are shown on the route map in the map volume that accompanies this document. Environmental resource data for each of these siting areas were collected and mapped during the inventory.

Alternative facilities sites within these seven siting areas were determined through a siting process which compiled environmental and engineering data using GIS. The analysis of

these data produced environmental and engineering constraints maps that were used by project planners to determine specific alternative facility sites within each of the siting areas. Potential resource impacts for alternative facilities sites were then determined using GIS models (modified versions of those used for the alternative transmission lines routes). The selection of the specific sites was determined by a review of the environmental impacts in conjunction with the transmission line route selection process.

Among the three substation siting areas in the vicinity of Ely, a total of six alternative substation sites were identified and assessed for impacts. Of these six alternative substation sites, only two were considered environmentally acceptable:

- North Steptoe - located in the North Steptoe Valley north of McGill, Nevada, adjacent to the proposed site of the White Pine Power Project
- Robinson Summit - located just south of U.S. Highway 50 west of Ely, Nevada

Among the three series compensation station siting areas north and east of Wells, a total of seven alternative sites were identified and assessed for impacts. Because the final selection of the series compensation station site would be determined by the route selection process, one site from each series compensation station siting area was selected.

Comparative resource impacts and further description of the substation siting and impact assessment process are found in Appendix E (also refer to the technical reports for additional detailed descriptions of resource data and impacts).

Communication Facilities

A total of 16 alternative microwave communication sites were identified and studied for the portion of the transmission line from Midpoint Substation to the proposed Dry Lake substation site. Two alternative microwave communication paths have been identified (refer to Map Volume). These alternative paths depend on where the substation near Ely is sited, the North Steptoe site or Robinson Summit site.

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).

The communications path from Midpoint Substation to the Robinson Summit substation site to the proposed substation at Dry Lake would require the development of new microwave facilities at ten (10) of the alternative microwave sites studied. Of these ten sites, eight sites would be developed at locations adjacent to existing electronic facilities and two of the sites would require new construction on previously undeveloped sites. The specific microwave sites required for each of the paths are listed below, from north to south:

Robinson Summit

Path 1

Hansen Butte
Cottonwood
Ellen D
Rocky Point
Proctor
Bald Peak
Raiff
Squaw Peak
Cave Mountain
Mount Wilson
Highland Peak

North Steptoe

Path 2

Hansen Butte
Cottonwood
Ellen D
Six-Mile
Spruce Mountain
Long Valley
Copper
Cave Mountain
Mount Wilson
Highland Peak

The other path would link Midpoint Substation to the North Steptoe substation site at Dry Lake and would require the development of new microwave facilities at eleven of the alternative microwave sites studied. Of these eleven sites, eight sites would be developed adjacent to similar existing facilities. Three of the sites would require new development.

The alternative microwave sites were identified based on a set engineering criteria and consideration for environmental concerns. Alternative sites were located at existing facility developments wherever possible. The locations of microwave sites are not dependent on the location of the transmission line route. Rather, they are dependent on the locations of the substations that they would control (e.g., Robinson Summit or North Steptoe).

The importance of the microwave facilities is to provide a communications link between substation, series compensation station, and switching facilities in the transmission line system. The microwave system provides the transmission line with a highly reliable and secure communication circuit for protective relaying, voice communications, telemetering, and supervisory control and data acquisition (SCADA).

Potential resource impacts for each site and additional environmental data are summarized in Appendix F of this document. Also refer to the technical reports under each resource for additional information on data inventory and potential impacts.

Ely to Delta

Transmission Line Alternatives

Four major routing alternatives were developed on the crosstie portion of the SWIP (east-west segments) from the Ely area to the Delta area:

- **Direct Route** - is comprised of link segments:
262, 263, 265, 266, 620, 621, 630, 640, 572, 580, 581, 582
- **Cutoff Route** - is comprised of link segments:
262, 263, 265, 266, 267, 268, 462, 470, 540, 571, 572, 580, 581, 582
- **230kV Corridor Route** - is comprised of link segments:
350, 351, 352, 370, 380, 460, 461, 462, 470, 540, 571, 572, 580, 581, 582
- **Southern Route** - is comprised of link segments:
340, 362, 364, 420, 430, 450, 451, 490, 510, 560, 571, 572, 580, 581, 582

The following section describes various issues and resource preferences for each route. Comparative environmental data are summarized in Table 2-5.

Direct Route - The Direct Route would connect to the north-south SWIP transmission system at the North Steptoe substation. It would cross east of this area through the Schell Creek Range at the Dry Canyon, and into the Spring Valley. The route would cross the creek and continue southeast past Twelvemile Summit, Red Hills, and Mike Springs Wash, and then just north of the Little Hills.

The route would continue east through the Tin Springs Mountain, and would continue east paralleling the Juab-Millard County lines in Utah. The route would cross into the Snake Valley on the south end of the Deep Creek Range. In the middle of Snake Valley the route would cross the Leland-Harris Spring Complex, which is known to have several sensitive species of fish, the spotted frog, and a butterfly species. BLM is extremely concerned about the potential for increased public access into this area through road construction or upgrading. BLM would request emergency listing with Fish and Wildlife Service (FWS) of at least four species as threatened or endangered under the Endangered Species Act (1974) if this route is selected.

The route would continue east crossing through the Confusion Range and into Tule Valley south of the Middle Range. The route from the Nevada-Utah state line would be within the R-6405 Restricted Area of the Utah Training and Testing Range (UTTR) of Hill Air Force Base (AFB). Hill AFB is extremely concerned about their low-level flying missions through this entire area, and especially within the valleys. The high level of concern is amplified due to the current round of base closures throughout the U.S. Hill AFB is not scheduled to be closed. If the SWIP is constructed on this route, Hill AFB is requesting that it be designed and built at a height that is lower than would be technically feasible.

The route would then continue east, passing south of the Fish Springs WSA (Link 630) and north of the Swasey Mountain WSA near Swasey Point. It would then pass on the north end of the House Range and continue southeast between the Drum Mountains and Little Drum Mountains. The route would again turn straight east and passing south of the Drum

Mountains and just north of Greener Reservoir. The last twelve miles into the Intermountain substation site would parallel the IPP to Adelanto 500kV DC line.

Cutoff Route - The first segment of the Cutoff Route from the North Steptoe substation to just east of the Little Hills is the same as the Direct Route (refer to above section). From here the route would pass across the north and east sides of Government Peak in the Little Valley. At this point the line would turn south and cross through the edge of the restricted area of the UTTR. If the SWIP is constructed on this route, Hill AFB is requesting that shorter towers be constructed in specified areas to reduce the potential for conflict with low-level flying on the UTTR.

As the route proceeds southeast it would cross Snake Valley and into Coyote Pass in the Conger Range approximately three miles from the Marble Canyon WSA and Mount Moriah Wilderness area. BLM is concerned about the visual effects from dispersed areas within both of these areas.

At this point the route would join the route of the two existing 230kV transmission lines (Gondor-IPP, Gondor-Pavant) passing east through Sheepmens Little Valley and Payson Canyon. The route would cross Tule Valley as it continues east, then through Marjum Canyon between the Howell Peak and the Notch Peak WSAs. BLM is also concerned about the potential visual effects to these WSAs.

The 230kV corridor splits just east of Marjum Canyon. The SWIP route would follow the Gondor to IPP 230kV route northeast across the Whirlwind Valley to the south end of the Little Drum Mountains. It would continue along this corridor joined by the IPP to Adelanto 500kV DC line into the Intermountain Generating Station.

230kV Corridor Route - This route would begin at the Robinson Summit substation site and cross east into Smith Valley just south of the Hercules Gap. The route would continue east across U.S. Highway 93 before joining with the two existing 230kV transmission lines that make up this existing corridor. The corridor would cross east of Ely and enter the Humboldt National Forest in Cooper Canyon.

The corridor would continue east across Spring Creek and cross the Snake Range in Weaver Creek, just north of Great Basin National Park. There are concerns expressed by the National Park Service and the public about potential visual effects to Great Basin National Park. These concerns include background views from the proposed visitors' center and other proposed scenic vista sites. Outside the park boundaries there are also concerns for park visitors' views while driving to or away from the park along the major access routes and views from the proposed wayside stations near Sacramento Pass and near the Utah-Nevada border. The location of these wayside stations have been identified in Great Basin National Park's Draft General Management Plan, but have not been finalized. They are included for purposes of analysis in this EIS only.

The corridor would cross U.S. Highway 6/50 twice in this area, and then continues east across the Snake Valley. The route would cross south of Eskdale and into the Buckskin Hills. From here this route follows the 230kV corridor as described above for the Cutoff Route. If

the line is constructed along this route, Hill AFB is requesting that shorter towers be constructed to reduce the potential for conflict with low-level flying on the UTTR.

Southern Route - The route would head south from the Robinson Summit substation site along the east side of the Jakes Valley, south of Duck Peak, and across the White River Valley. It would cross the Egan Range in Water Canyon and Williams Creek, and then would cross Cattle Camp Wash in the south end of the Steptoe Valley, and north of the Cattle Camp Spring and the Burnt Knoll Spring.

It would then cross into the Spring Valley north of the Fortification Range. It would follow across the south end of the Snake Range south of Big Spring, then across the north end of the Mountain Home Range.

In the Antelope Valley Wash, the route would cross Utah State Highway 21 adjacent to the proposed site of a wayside interpretive site (location has not been finalized and is for SWIP analysis only) for the Great Basin National Park. The route would continue northeast through Cowboy Pass, then turning east across the Ferguson Desert north of the Wah Wah Mountains WSA and on through Snake Pass. The route would then pass just south of the King Top WSA and turn sharply north into the Tule Valley at a point south of the Barn Hills. The route would turn to the northeast in Tule Valley and pass south of the Notch Peak WSA near Skull Pass and would cross the Sevier Desert north of Sevier Lake to join the IPP to Adelanto 500kV DC transmission line to the Intermountain Generating Station. Hill AFB has expressed concerns about potential conflicts with low-level flying operations conducted in the UTTR. Shorter towers would be required along several portions of this route with the UTTR.

Substation and Series Compensation Station Areas

Two new substations would be required for the east-west transmission line from Ely to Delta. One of these substations would be located in the Ely, Nevada area (previously described under the Midpoint to Dry Lake section on page 2-44). The other substation site would be located near IPP. Three substation siting areas were identified in the vicinity of Delta, Utah:

- Sevier - this siting area is located at the north end of the Cricket Mountains near the Old Sevier River, northeast of Sevier Lake
- Smelter Hills - this siting area is located near the Smelter Hills about 15 miles west of Delta, Utah
- Intermountain - this siting area is located adjacent to the Intermountain Generating Station

These siting areas are shown on the route map in the map volume that accompanies this document. A total of four alternative substation sites were identified within these three siting areas. These alternative sites were determined through a siting process which compiled and analyzed environmental and engineering data using GIS, as described previously. Each of these alternative sites was assessed for potential impacts. The selection

of a preferred site was determined through an analysis of the potential environmental impacts in conjunction with the transmission line route selection process.

The siting process, inventory, and the impact assessment are described in Appendix E. In addition, potential resource impacts for each of the alternative substation sites are described in the supporting technical reports.

Communication Facilities

The Ely to Delta portion of the SWIP route would use an existing microwave communications system. LADWP currently operates a microwave system between Ely and Delta for the Gondor to IPP 230kV transmission line. Each of these existing microwave facilities would require some modifications (e.g., new equipment). However, these modifications are not expected to require any ground disturbing activities.

IDENTIFICATION OF PREFERRED ALTERNATIVES

Environmentally Preferred Alternatives

Midpoint to Dry Lake

Routes A and E would have the fewest miles of high visual impacts, however, both of these routes would have a large number of miles of moderate visual impacts. Route A also has the second lowest number of miles of high biological impacts. Route A is the environmentally preferred route. Refer to the Alternative Routes map in the Map Volume for Route A through G locations.

Routes B and E are two of the longer routes because they both pass east of the Goshute Mountains. As a result, Route B would have the most miles of high biological impacts, while Route E would have more mileage of moderate impacts to all resources than the other alternative routes.

Although Route C would have the fewest miles of high cultural impacts, this route and Route B would have large numbers of miles of high biological impacts. Both of these routes would disturb sage grouse habitat and leks in the area from Trout Creek to Thousand Springs Valley (Links 91, 92, 140, 141, 142, and 144), which cause the biological impacts for these routes to be somewhat higher than the other alternative routes.

Route G would have the largest mileage parallel to existing transmission lines and would also best use BLM utility corridors. Routes B, C, and F are outside BLM utility corridors where these routes pass through the Trout Creek area into the Thousand Springs Valley, while Routes A, C, D, E, and F are outside BLM utility corridors where they cross the Egan

Range through Dry Canyon. Routes C and F would have the greatest mileage outside BLM utility corridors.

Route F, the only route that uses the western links in Idaho, would be the longest of the alternative routes. Because Route F traverses more rural agricultural lands and passes adjacent to the new Hagerman Fossil Beds National Monument, this route has the greatest mileage of high visual impacts to sensitive viewpoints, and therefore would not be environmentally preferred.

Although Route G is the shortest route, it would have the second greatest mileage of high biological impacts. Construction in undisturbed sage grouse habitat in areas south of Jackpot and in Toano Draw contribute to these biological impacts. In addition, Route G has a large number of miles of high visual impacts. For these reasons, Route G also would not be environmentally preferred.

Route D does not pass through the area previously proposed as the Thousand Springs Power Project (TSPP) site, and therefore would not integrate potential regional resources with the SWIP as well as the other routes. The TSPP has been canceled. The final EIS on the project was not released. Should a project be proposed for this site in the future it would be important for regional integration with the SWIP.

Although impacts would not be particularly significant, the BLM has expressed considerable concern for Route D where it passes near Wells, Nevada and for the potential of wet soils and standing water occurring at certain times of the year in the Independence Valley.

In summary, Routes A, C, D, and E would have resource impacts that are very similar. Routes A and D both would better use existing BLM utility corridors. However, Route D would not adequately accommodate the integration of future resources if TSPP or another generation project is developed in the Toano Draw. Subsequently, Route A is the environmentally preferred route between Midpoint Substation and the proposed substation in Dry Lake followed closely by Routes C, D, and E.

The alternative substation sites at Robinson Summit (Sites #9 or #10) are very similar environmentally and there is no distinctive preference (also refer to Appendix E). Site #8 is the only substation site identified within the North Steptoe substation siting area, and therefore would be the preferred environmentally. The alternative substation sites within the Hercules Gap substation siting area is the least preferred substation area for the Midpoint to Dry Lake alternative routes due to potential wetland problems on Link 292 and visual impacts to residences for both Sites #11 and #12. The preference between the alternative substation siting areas is determined mainly by the environmental preference of the routing alternative in or out of the substation site. Therefore, the preferred substation site is either #8 (if Cutoff Route is selected) or #9 or #10 (if the 230kV Corridor Route is selected).

The environmental preference for the U.S. Highway 93 series compensation station siting area (used if Route D is selected) is Site #1, but is only slightly preferred over Site #2, mainly due to cultural resource concerns. The environmental preference for the Thousand Springs series compensation station siting area (could be used if Routes B, C, or F are selected) would be Site #5 due to fewer potential effects to sage grouse. There is a slight environmental

preference for Site #6 within the Goshute Valley series compensation station siting area (could be used if Routes A, B, C, E, F, or G are selected), due to lower cultural resource and flood zone concerns. Therefore, the preferred series compensation site is #6, followed closely by Site #5 (if Route C is selected) or site #1 (if Route D is selected)(also refer to Appendix E).

The final selection of a substation in the Dry Lake area would depend on the routing decision for the future Marketplace-Allen Transmission Project (MAT) proposed by Nevada Power Company (NPC) to connect from this area south to the area of the McCullough Substation. In 1990 BLM asked IPCo to coordinate the transmission needs through this area with the other regional utilities. Subsequent discussions with NPC and other utilities resulted in the MAT project being proposed.

Although the Mat would be operated by NPC, several other regional utilities would likely be participants in the project. Once completed the MAT would provide a major electrical interconnection point for the inland southwest, with connection points on its north end (Dry Lake substation) and south end (new marketplace substation near McCullough Substation). The approximately 53 mile MAT project would consist of two 500kV lines with a combined capacity of 3000-3500 megawatts. This high capacity rating is possible because of the relatively short distance between the two proposed marketplace substations. The high capacity of this system would allow the planned transmission lines to connect on either end, while minimizing the number of lines through this sensitive area. The MAT is proposed to be in service in 1997.

There are two major potential routing alternatives for this project. The first would run straight south through the Apex development parallel to the proposed Utah-Nevada Transmission Project 500kV line, then cutting southeast to the Gypsum Wash area, then south through Sunrise Mountain and Henderson areas. The second major routing alternative would cross Interstate-15 at the north end of the Dry Lake range and run straight south paralleling the IPP-Adelanto 500kV DC line and the Navajo-McCullough 500kV line to the Sunrise Mountain and Henderson areas.

In the proposed Dry Lake substation siting area, all of the potential substation sites are environmentally acceptable. Substation Sites 17 and 18 are the preferred sites if the route south to MAT travels on the east side and south of the Dry Lake range. Substation sites 18 and 20 are the preferred sites if the route south to MAT travels south through the Apex development (also refer to Appendix D and E).

There are also no distinctive environmental preferences for the communication path for the Midpoint to Dry Lake alternatives.

The mileage of selectively committed mitigation for the environmentally, agency, and utility preferred routes are documented Table 2-6.

Ely to Delta

The Direct Route (refer to the Map Volume) would be the shortest route for the crosstie routes from Ely to Delta. The major concern for this route, which crosses lands with restricted air space, has been expressed by Hill AFB. Hill AFB is opposed to any structures exceeding 35 feet high through the area of restricted air space along this route. Because this route crosses largely uninhabited public lands, there are fewer significant visual effects. However, both the public and the BLM have expressed serious concern for protecting the undisturbed landscape through which the route passes and other potentially unknown (e.g., cultural sites) or not understood resources (e.g., Leland Harris Spring complex). Because of these high concerns for the Leland Harris spring complex and military aircraft operations in the Hill AFB's R-6405 Restricted Area, the Direct Route is less preferred environmentally than the Cutoff Route.

The Cutoff Route (refer to the Map Volume) generally crosses public lands through areas that are mostly uninhabited. Visual impacts are slightly higher than the Direct Route, although the visual impacts are the same in the common portions of the two routes through Spring Valley and the Little Hills area. This route has a similar total mileage of biological resource impacts as the Direct Route. It would also use the existing 230kV corridor for about half of its length. Hill AFB has requested that towers crossing through specific areas of the military operating areas (MOAs) along this route be restricted to a maximum tower height of 105 feet above the ground level. To meet this request while maintaining ground-clearance requirements, the distance between towers would typically be less, and more towers would be required through these areas.

The 230kV Corridor Route (refer to the Map Volume) would have about the same mileage of significant visual impacts as the Cutoff Route. These significant visual impacts are generally associated with rural residences (e.g., Ely, Hercules Gap, and Sacramento Pass), U.S. Highway 6/50, and both existing and planned recreation viewpoints along the route. Because it follows existing transmission corridors for its entire length the 230kV Corridor Route best satisfies the Federal Land Policy Management Act of 1976 (FLPMA) mandate to "consolidate corridors" where possible. This route also crosses through MOAs of the UTTR of Hill AFB. The cumulative environmental effects of the future WPPP transmission system would not be significantly different regardless of whether the 230kV Corridor Route or the Cutoff Route is selected. Refer to Chapter 4 for a further discussion on cumulative effects.

The Southern Route (refer to the Map Volume), the longest crosstie route, has substantially more miles of high cultural and biological impacts than the other crosstie (Ely to Delta) routes. This route also has the second largest mileage of high visual impacts. Because of the Southern Route's greater length and significant impacts, it is the least environmentally preferred of the crosstie routes.

In summary, because of the concerns for the Leland-Harris Spring Complex and the restricted air space of the UTTR for the Direct Route, the Cutoff Route is the environmentally preferred route. However, the 230kV Corridor Route would also be an environmentally acceptable alternative, and is quite similar environmentally to the Cutoff Route. If the Robinson Summit substation site is developed, the 230kV alternative route would be considered

environmentally preferred because of the additional miles of transmission system needed to connect the North Steptoe substation site to the Robinson Summit substation site.

The environmentally preferred substation site (Site #14) in the Delta area is located in the Intermountain substation siting area, and is preferred primarily due to lower visual impacts from its proximity to the Intermountain Generating Station. The alternative substation sites at Robinson Summit (Sites #9 or 10) are very similar environmentally and there is no distinctive preference. Site #8 is the only substation site identified within the North Steptoe substation siting area, and therefore would be the preferred, environmentally. The substation site at Hercules Gap is the least preferred of the substation sites for the Ely to Delta alternative routes due to visual impacts to residences and travel routes. The preference between the alternative substation siting areas is determined mainly by the environmental preference of the routing alternative in or out of the substation site. Therefore, the preferred substation site is #14 in the Delta area and either #8 (if Cutoff Route is selected) or #9 or #10 (if the 230kV Corridor Route is selected). Refer to Appendix E for additional information on substations and series compensation stations.

There are no new communication facilities anticipated for the crosstie routes.

Mitigation commitments for the environmentally, agency, and utility preferred routes are documented in the Mitigation Summary in Table 2-6.

Utility Preferred Alternatives

Midpoint to Dry Lake

IPCo's preferred alternative route from Midpoint to Dry Lake is based primarily on economic considerations and transmission system reliability. IPCo agrees with most segments of the environmentally preferred alternative with one localized route variation.

This variation is the preference of Links 242 and 244 over Links 243, 245, and 261. Route G, as defined in this area, would result in unnecessary additional distance to provide an interconnection to the North Steptoe substation site. If Robinson Summit is developed, and WPPP is developed in the future, a short tap could be constructed to interconnect the two facilities. If the WPPP is not developed, the construction of additional miles of line now would be an unneeded cost and would cause additional environmental impacts. However, if North Steptoe substation site is developed, IPCo recognizes that constructing Links 243, 245, and 261 would be prudent over Links 242 and 244.

IPCo recognizes that the North Steptoe and Robinson Summit substation sites are both environmentally viable, and that the third substation site near Hercules Gap, would have significant environmental issues if developed. Of the two acceptable substation sites, IPCo prefers the Robinson Summit substation site.

The owners of an existing 230kV transmission system in the area have expressed interest in a future interconnection with the SWIP. This potential interconnection with a 230kV system at the Robinson Summit substation site would facilitate developing the Ely area into an open marketplace substation. The owners of the existing 230kV system would not likely choose to extend their 230kV system north to the North Steptoe substation site. Therefore, the construction of the substation at North Steptoe may not eliminate the need for a future substation at Robinson Summit. If Robinson Summit is developed the SWIP line would be designed to accommodate a possible future interconnection with the WPPP.

IPCo selects Route G as the preferred alternative route from Midpoint to North Steptoe with several important variations. The first variation is that Link 102 is selected over the combination of Links 715 and 713 in Route G just north of Contact, Nevada. The SWIP would cross over the Upper Salmon-Wells 138kV line on the northern end of Link 102. The route needs to stay on the west side of the existing 345kV line until the southern end of Link 102, where it would then cross. Using Links 715 and 713 would make it difficult and more costly to cross the two existing lines.

The second important variation from Route G would occur if the Robinson Summit substation site is developed over the North Steptoe site. This would be the selection of Links 242 and 244 over Links 243, 245, and 261. Route G would provide unnecessary additional distance to provide an interconnection to the North Steptoe substation site. If Robinson Summit is developed, and WPPP is developed in the future, a short SWIP line tap could be constructed to interconnect the two facilities. If WPPP is not developed the construction of additional miles of line now would be an unneeded cost and would cause additional environmental impacts. However, if the North Steptoe substation site is developed, IPCo recognizes that constructing Links 243, 245, and 261 would be prudent over Links 242 and 244.

Route G is selected as the utility preferred route by IPCo from Robinson Summit south to Dry Lake. Route G is the same as Route A (the environmentally preferred route) for this segment.

Additional documentation of IPCo's preferred route is in the SWIP project files.

Mileage of selectively committed mitigation for the environmentally, agency, and utility preferred routes are documented in Table 2-6.

Ely to Delta

LADWP, the constructing and operating agent for the crosstie routes from Ely to Delta selects the 230kV Corridor Route as the utility preferred alternative for the reasons stated in the discussion below. The main criteria used by LADWP for their selection of the utility preferred route was system reliability and construction and operation costs. They also considered environmental preferences and the political aspects of each route.

Engineering, material, and construction costs are directly related to the length of the transmission line. Although the Direct Route is nearly 24 miles shorter than the Cutoff Route, 30.7 miles shorter than the 230kV Corridor Route, and 80.9 miles shorter than the Southern Route, the military issues with the restricted air space and the uncertain environmental issues of the Direct Route cause this alternative to be the least desirable alternative.

The impacts to the MOAs have been discussed with the military and can be acceptably mitigated with the use of 105 feet maximum height towers in specified areas of concern. However, as pointed out above, the Direct Route crosses through restricted airspace as well. The military is opposed to any structures over 30 feet maximum height in the Restricted R-6405 Area. It would not be possible to meet the military's wishes and maintain economic or engineering feasibility, or NESC safety criteria.

LADWP preference to construct the proposed line along the 230kV Corridor Route best meets the mandate of the FLPMA to consolidate corridors to the degree possible, and also reflects LADWP's commitment to minimize environmental impacts whenever possible even at reasonable increased project costs. The reliability of the interconnected system would not be impacted by the operation of the proposed 230kV Corridor Route because of the substantial difference in capacity between the existing 230kV lines and the proposed SWIP crosstie line (Ely to Delta). In addition, this configuration would allow for routine line patrol and maintenance on both the 230kV system and the 500kV system simultaneously.

Also, because it is expected that the Midpoint to Dry Lake portion of the SWIP would be constructed before the WPPP or the Ely to Delta portion of the SWIP, and market access is closer to the existing 230kV lines, it is appropriate until the WPPP is built to locate a potential 500/230kV "marketplace" substation at Robinson Summit (also refer to page 2-49).

Additional documentation of LADWP's preferred route is in the SWIP project files.

Mileage of selectively committed mitigation for the environmentally, agency, and utility preferred routes are documented in Table 2-6.

Agency Preferred Routes

The various offices of BLM, representatives from the Humboldt National Forest, and Great Basin National Park met on June 18, 1991, to select a preferred routing alternative for the SWIP. Criteria considered and used to select the agencies' preference include:

- provide capacity for future utilities
- minimize new access roads needed for construction and operation
- consider public preferences expressed throughout the process
- avoid agricultural lands to the degree possible
- use existing utility and planning corridors
- minimize visual impacts

- minimize impacts to environmental resources (e.g., wildlife, cultural and historical resources)
- minimize conflicts with military airspace
- allow for good transmission system reliability

Midpoint to Dry Lake

The agency preferred route is a combination of Route A and Route G for the Midpoint to Dry Lake portion of the line. Following are the reasons for selecting these routes.

For the segment between Midpoint Substation and the Idaho-Nevada state line, Links 10, 20, 40, 41, 50, and 70 were selected. These link segments would parallel the Midpoint to Valmy 345kV transmission line to the Idaho - Nevada state line. Links 10, 20, 40, 41, and 70 would be on the west and north sides of the existing 345kV line. The assumed centerline of all these links could be easily accessed for construction and operation by existing roads, and would minimize impacts to agricultural uses. Link 20 would avoid direct conflicts with feed lots and several farm structures along Link 30.

From the Idaho-Nevada state line south to the proposed North Steptoe substation site, the agency preferred route would use Links 711, 714, 101, 715, 713, 110, 130, 150, 151, 200, 211, 212, 230, 241, and 242. Visual impacts would be reduced at the crossing of Salmon Falls Creek on Link 711. Link 101 would parallel the existing 138kV line to the west, and would minimize visual impacts from U.S. Highway 93. Links 713 and 110 cross U.S. Highway 93 in a location that would also minimize visual impacts. Link 130 parallels Upper Salmon to Wells the existing 138kV line, and would be the approximate location of the crossing of the existing 345kV line from the west side to the east side. Links 150 and 151 utilize the BLM "planning" corridor. Link 211 uses a better crossing of Interstate 80 than the existing designated BLM utility corridor. Links 212, 230, and 241 follow the BLM designated utility corridor from the Wells Resource Management Plan.

The remainder of the route south to Dry Lake is the same as the environmentally preferred route (refer to the previous section, Environmentally Preferred Alternative).

Mileage of selectively committed mitigation for the environmentally, agency, and utility preferred routes are documented in Table 2-6.

Ely to Delta

The agency preferred route for the Ely to Delta portion of the SWIP is the 230kV Corridor Route. Because the 230kV Corridor Route parallels two existing 230kV transmission lines for its entire length, this route best meets the agency criteria and Section 503 of FLPMA of utilizing existing utility corridors to the degree possible. The use of the existing utility corridor by the 230kV Corridor Route also complies with the direction in the BLM's House Range Resource Management Plan (RMP), the Warm Springs RMP, and the Schell

Management Framework Plan (MFP). Because the 230kV Corridor Route and the Cutoff Route have similar environmental impacts (refer to environmentally preferred route discussion above and Table 2-4) and this route best fulfills FLPMA's mandate to consolidate corridors where possible, the BLM favors the 230kV Corridor Route as the agencies' preferred routing alternative.

Also because of the comment letters received on the various SWIP newsletters and from comments received during the series of public meetings held during the EIS process (refer to Chapter 5), the BLM favors the placement of new lines in existing utility corridors to minimize adverse impacts and to maintain open space values in previously undeveloped areas. The Southern Route and Delta Direct Route were least favored by the public. The Cutoff Route was favored by some of the public because it would be in more remote areas and would not be seen by tourists and visitors to Great Basin National Park. However, the BLM favors avoiding the Cutoff Route, which would pass through areas that are largely undisturbed.

Concerns expressed about the Cutoff Route include resource impacts to biological, cultural, land uses, and visual resources. The public concerns about the 230kV Corridor Route include proximity to homes, health effects, land uses (e.g., agricultural lands near Silver Creek), property value impacts, and visual impacts from Great Basin National Park viewpoints. Because of concern for visual impacts to the park and to visitors driving to the park, Great Basin National Park favors the Cutoff Route (refer to Chapter 4).

Mileage of selectively committed mitigation for the environmentally, agency, and utility preferred routes are documented in the Mitigation Summary in Table 2-6.

TABLES

TABLE 2-1

Design Characteristics of the 500kV Transmission Line

Line Length	
• Midpoint - Ely - Dry Lake	approximately 500-530 miles
• Ely - Delta	approximately 130-200 miles
Type of Structure	Steel-lattice, guyed towers Tubular-steel, H-frame towers Self-supporting, steel-lattice towers
Structure Height	Average 120 to 130 feet (range 90 to 160 feet)
Span Length	1,000 to 1,500 feet average ruling span
Number of Structures Per Mile	3 to 5
Right-of-Way Width	200 feet
Land Temporarily Disturbed:	
(1) Tower Base:	
• steel-lattice, guyed	200 X 200 feet (0.9 acre)
• tubular-steel, H-frame	200 X 200 feet (0.9 acre)
• self-supporting, steel-lattice	200 X 200 feet (0.9 acre)
(2) Wire-Pulling Sites	200 X 200 feet (0.9 acre) per 2 miles
(3) Wire-Splicing Sites	20 X 50 feet (0.02 acre) per 2 miles
(4) Construction Yards	400 X 540 feet (5 acres) per 20 to 30 miles
(5) Batch Plants	1 to 2 acres per 20 to 30 miles
Land Required Permanently:	
(1) Tower Base:	
• steel lattice guyed	125 X 125 feet approximate dimensions to guy anchors
• tubular steel H-frame	20 X 50 feet approximate dimension
• self-supporting steel lattice	50 X 50 feet approximate dimension
(2) Access Roads (average acres per mile of transmission line):	
• New Roads Required	2.0 acres
• Upgrade Existing Roads	1.5 acres
• Use Existing Roads	0.5 acre

Table 2-1 (continued)
Design Characteristics of the 500kV Transmission Line

Voltage	500,000 volts AC
Capacity	1200 MW
Circuit Configuration	Single circuit per structure, three-conductor bundle, (2 or 3 LADWP) per phase with three phases, horizontal configuration
Conductor Size	1781 kcmil (1.602 in. diameter) ACSR (Midpoint to Dry Lake) 2312 kcmil (1.802 in. diameter) ACSR (Ely to Delta)
Maximum Anticipated Electric Field at Edge of Right-of-Way	2.0kV/meter
Magnetic Field at Edge of Right-of-Way	200 milli-Gauss (mG)
NESC Standard for Ground Clearance of Conductor	31 feet minimum at 176° F
Tower Foundations	Drilled piers - cast-in-place concrete or pre-cast pads or inserts

TABLE 2-2**Design Characteristics of a Substation and Series Compensation Site**

	SUBSTATIONS	SERIES COMPENSATION
Site Size (approx.)	80 acres	15-20 acres
Equipment	<ul style="list-style-type: none"> •transmission line takeoff structures •power circuit breakers •power transformers •switches equipment •buswork or bus conductor •control house 	<ul style="list-style-type: none"> •electrical towers •series capacitor banks •switching equipment •bus conductors •control house
Access Road		
<ul style="list-style-type: none"> • right-of-way width • road Surface • grading 	20' gravel heavy road base to support larger equipment	20' gravel
Power Source For Construction	Yes, 50 kilowatts	Yes, 50 kilowatts
Fire Protection Facilities	fire wall barriers for protection from transformers	
Building	2200 square feet	1500 square feet
Slopes/Drainage	0.5-1 percent	0.5-1 percent
Substation/Series Compensation Grounding	Use copper wire for personnel safety and grounding	Use copper wire for personnel safety and grounding

Table 2-2 (Continued)
 Design Characteristics of a Substation and Series Compensation Site

	SUBSTATIONS	SERIES COMPENSATION
Land Temporarily Disturbed	Site specific, all work done within fenced area	Site specific, all work done within fenced area
Land Permanently Disturbed	Site specific grading and drainage, within enclosed area	Site specific grading and drainage, within enclosed area
Voltage	Multiple voltages, can change current from 500kV to 230kV	500kV single voltage

**500kV Transmission Station
 Electrical Requirements and Ratings**

- Transfer Capacity - 1500 MVA
- Operating Voltage Range - 475-525kV, rms
- Bus Capacity @ 525kV, 1650 Amps
- Basic Insulation Levels (BIL) - 1500kV for bus support insulation
 1800kV for bushings and switch gaps
- Phase-to-phase clearances (metal-to-metal) 20-28 feet
- Phase-to-ground clearances (metal-to-metal) 10-12 feet
- Phase-to-ground clearances (personal Safety) 23 feet minimum
- Phase-to-ground clearances (station roadways) 40 Feet minimum

TABLE 2-3

Construction Work Force and Equipment

Road Construction - 10 people (including maintenance)

equipment:	2 bulldozers (D-6 or D-8)
	2 motor graders
	2 pickup trucks
	2 water trucks (for construction and maintenance)

Footing Installation - 20 people

equipment:	2 hole diggers
	1 bulldozer (D-6)
	1 truck (2 ton)
	6 concrete trucks
	6 hydro crane (15 ton)
	2 pickup trucks
	2 carry alls
	1 batch plant
	2 dump trucks
	2 wagon drills

Structure Steel Haul - 10 people

equipment:	6 steel haul trucks
	1 yard crane (heavy duty)
	2 pickup trucks

Structure Assembly - 20 people

equipment:	4 carry alls
	4 pickup trucks
	4 cranes (rubber tired)
	4 trucks (2 ton)

Table 2-3 (continued)
Construction Work Force and Equipment

Survey - 6 people
equipment:

1 helicopter
2 pickups

Structure Erection - 10 people

equipment:
2 cranes (60 ton)
2 pickup trucks
2 trucks (2 ton)

Conductoring - 40 people

equipment:
1 helicopter and fly ropes
3 drum pullers (1 light, 1 medium, 1 heavy)
2 splicing trucks
2 double-wheeled tensioners (1 light, 1 heavy)
6 wire reel trailers
2 diesel tractors
1 crane (2-4 ton)
1 sagging equipment
4 trucks (5 ton)
6 pickup trucks

Clean-up - 12 people

equipment:
2 pickup trucks
2 trucks (2 ton)

Road Rehabilitation - 4 people

equipment:
1 bulldozer (D-8)
2 motor graders
1 pickup truck

TOTAL PERSONNEL REQUIRED - 150*

*more than 1 contractor may be used simultaneously on difference line segments

TABLE 2-4
Route Comparison Table - Midpoint to Dry Lake Routes

	Route A*	Route B	Route C	Route D	Route E	Route F	Route G	Utility	Agency
Construction Access Levels (miles crossed)									
Agricultural lands	16.8	16.8	16.8	16.8	16.8	22.0	16.8	16.8	16.8
Existing access with spur roads	211.0	215.1	208.1	212.6	213.1	210.7	207.0	206.8	201.9
New access roads in flat (0-8%) terrain	152.5	130.1	151.0	155.6	134.2	157.0	163.2	162.7	165.3
New access roads in rolling (8-35%) terrain	92.4	109.1	91.4	89.6	111.4	89.4	85.1	84.8	86.1
New access roads in steep (35-65%) terrain	40.3	45.0	39.6	38.9	48.2	36.9	32.6	30.5	33.0
NATURAL ENVIRONMENT									
WILDLIFE (miles crossed)									
Desert tortoise habitat	52.1	52.1	52.1	52.1	52.1	52.1	52.1	52.1	52.1
Bald eagle nesting	15.3	32.8	16.3	5.8	18.2	16.3	19.6	19.6	6.0
Peregrine falcon	0	23.1	0	0	23	0	0	0	0
Ferruginous hawk nest	1.3	1.4	1.3	1.3	1.3	1.3	1.4	1.4	1.3
Sage grouse leks or winter range	35.2	36.8	30.7	34.1	36.3	32.8	40.6	42.2	37.2
Crucial Elk habitat	0	0	0	0	0	0	0	0	0
Bighorn sheep habitat and movement corridor	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Crucial pronghorn habitat	24.1	7.2	16.2	34.9	18.6	16.5	39.7	39.7	43.2
Critical Mule deer habitat	22.8	27.4	24.4	25.1	25.8	24.4	22.7	22.7	22.7
VEGETATION (miles crossed)									
Rare plants	1.3	1.3	1.3	1.3	1.3	4.2	1.3	1.3	1.3
Grasslands	109.1	97.3	96.3	97.3	116.3	110.2	97.8	98.6	104.8
Sage scrub	314.3	331.2	320.6	319.8	320.0	317.4	312.4	308.8	303.9
Mojave desert scrub	55.8	55.8	55.8	55.8	55.8	55.8	55.8	55.8	55.8
Woodland/mountain shrub/grasses	3.6	4.1	3.7	3.6	3.6	1.9	4.1	4.1	3.7
Riparian	3.2	3.2	3.7	5.3	3.3	3.8	4.8	4.5	5.1
EARTH RESOURCES (miles crossed, except as noted**)									
Prime/Unique farmland	21.4	21.2	21.2	21.4	21.4	32	21.1	21.1	21.1
High water erosion potential soils	39.0	53.1	44.4	35.5	48.6	47.8	36.4	36.4	37.3
High wind erosion potential soils	58.8	58.9	58.8	52.1	64.3	73.3	46.7	44.1	49.5
Flood hazard areas	6.2	1.2	2.1	3.1	4.1	1.8	3.1	3.1	3.1
Landslide hazard areas	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0
High paleontological sensitivity areas	23.8	38.6	35.3	21.9	25.5	37.4	30.6	19.4	20.5
Number of springs within 1/2 mile of route**	42	20	20	45	17	17	45	45	45
Number of perennial streams crossed**	26	27	23	22	22	8	27	20	20

* Environmentally Preferred Route

Note: Totals for the Utility and Agency preferred routes vary from Route G because several different alternative routes segments are used (refer to p. 2-54).

TABLE 2-4, Route Comparison Table - Midpoint to Dry Lake Routes (continued)

	Route A*	Route B	Route C	Route D	Route E	Route F	Route G	Utility	Agency
HUMAN ENVIRONMENT									
LAND JURISDICTION (miles crossed)									
Bureau of Land Management	412.5	413.6	397.1	409.6	430.0	406.1	414.5	409.4	409.9
Forest Service	0	0	0	0	0	0	0	0	0
State	5.2	5.2	5.2	5.2	5.2	2.3	5.2	5.2	5.2
Private	95.2	97.3	104.6	98.7	88.5	115.6	85.3	87.0	88.0
Bureau of Reclamation	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
LAND USE (miles crossed, except as noted**)									
Miles within 1 mile of wilderness study areas	32.8	50.6	32.6	47.3	50.6	42.3	32.8	32.8	32.8
Approximate number of residences within 1 mile**	83	78	80	83	83	94	93	92	96
Miles parallel to H-frame 69kV transmission line	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
Miles parallel to H-frame 138kV transmission line	30.0	5.9	5.9	50.8	39.9	5.9	14.2	14.2	14.2
Miles parallel to H-frame 230kV transmission line	0	0	0	0	0	25.0	0	0	0
Miles parallel to 345kV transmission line	96.5	73.0	73.0	80.0	96.5	33.5	96.5	96.5	96.5
Miles parallel to 500kV transmission line	0	0	0	0	0	27.5	0	0	0
Miles within designated or planning utility corridor	341.8	358.1	335.4	328.7	312.9	387.9	343.5	340.1	320.0
Miles outside designated or planning utility corridor	136.1	116.4	136.1	151.3	175.7	136.4	161.5	161.5	183.1
Miles within Military Operating Area/Restricted Area	130.0	182.0	130.0	128.4	182.0	130.0	130.0	130.0	130.0
Agricultural lands	16.8	16.8	16.8	16.8	16.8	22.0	16.8	16.8	16.8
Range allotments	491.9	493.0	485.8	492.4	502.6	507.3	473.2	472.1	470.4
Mining claims	38.0	65.2	39.5	48.3	61.0	32.5	36.8	36.6	35.9
Number of tanks and wells along centerline**	11	10	11	12	11	10	10	10	10
Number of corrals along centerline**	0	1	0	0	1	0	1	1	1
VISUAL RESOURCES (miles crossed, except as noted**)									
Number of scenic highways and roads crossings**	1	1	1	1	1	2	1	1	1
Route visible from residences within 1 mile	65.7	52.3	57.1	61.9	64.1	56.9	59.9	59.9	63.1
Scenic quality Class A landscapes	0.9	0.9	0.9	0.9	0.9	5.0	0.5	0.5	0.5
VRM Class II landscapes	7.3	17.8	5.6	10.0	19.5	7.5	8.1	8.1	8.1
CULTURAL ENVIRONMENT									
CULTURAL RESOURCES (miles crossed, except as noted**)									
Number of historic sites within 1 mile of route**	53	46	50	68	46	54	61	61	58
Number of ethnohistoric sites within 1 mile of route**	13	16	14	12	15	16	14	14	14
Number of prehistoric sites within 1 mile of route**	388	413	408	430	386	510	399	388	381
Number of other cultural sites within 1 mile of route**	9	8	7	12	11	6	9	10	9
Miles through predicted high cultural sensitivity zones	18.4	19.3	17.2	20.5	18.4	11	20.6	20.5	18.4
Oregon Trail crossings**	1	1	1	1	1	1	1	1	1
California Immigrant Trail crossings**	3	1	2	3	2	3	2	3	3
Pony Express Trail crossings**	1	2	1	1	1	1	1	1	2

* Environmentally Preferred Route

Note: Totals for the Utility and Agency preferred routes vary from Route G because several different alternative routes segments are used (refer to p. 2-54).

Table 2-4, Route Comparison Table - Midpoint to Dry Lake Routes (continued)

SUMMARY OF ENVIRONMENTAL CONSEQUENCES																											
Impact Value	Route A*			Route B			Route C			Route D			Route E			Route F			Route G			Utility			Agency		
	<i>High</i>	<i>Mod</i>	<i>Low</i>	<i>High</i>	<i>Mod</i>	<i>Low</i>	<i>High</i>	<i>Mod</i>	<i>Low</i>	<i>High</i>	<i>Mod</i>	<i>Low</i>	<i>High</i>	<i>Mod</i>	<i>Low</i>	<i>High</i>	<i>Mod</i>	<i>Low</i>	<i>High</i>	<i>Mod</i>	<i>Low</i>	<i>High</i>	<i>Mod</i>	<i>Low</i>	<i>High</i>	<i>Mod</i>	<i>Low</i>
VISUAL RESOURCES	13.5	72.7	427.0	14.5	62.6	439.2	14.5	66.8	425.8	13.5	68.5	431.4	13.5	71.7	438.7	19.5	71.0	433.7	14.7	65.4	424.9	14.9	67.5	419.5	14.9	70.7	417.8
BIOLOGICAL RESOURCES	15.0	36.5	200.3	26.2	24.2	204.2	20.4	25.6	181.7	13.5	48.4	214.6	17.8	34.8	221.2	17.8	27.2	177.7	24.8	41.0	191.7	25.6	45.0	206.4	22.6	42.5	206.9
CULTURAL RESOURCES	6.8	104.0	131.6	7.4	117.4	142.2	5.9	106.1	138.5	6.6	124.8	140.2	7.8	122.2	134.5	8.2	103.9	143.2	7.3	105.0	132.5	7.5	102.1	261.9	7.0	109.0	132.2
LAND USE RESOURCES	0	64.1	88.8	0	75.2	129.6	0	64.1	88.9	0	64.1	87.6	0	75.5	129.5	0	64.1	101.2	0	64.1	88.4	0	63.8	71.0	0	63.8	71.0
EARTH RESOURCES	0	46.7	454.3	0	50.6	453.5	0	45.0	449.9	0	46.9	452.4	0	54.6	455.3	0	45.4	465.4	0	40.9	456.4	0	23.3	473.7	0	25.5	471.2

COMMENTS															
Route A - least impacts to ferruginous hawks - least miles of riparian habitat crossed - most residences within one mile - crosses most miles of sage grouse habitat Agency Preferred Route - reduces visual impacts to U.S. Highway 93 - crosses most miles of crucial pronghorn habitat - crosses high mileage of sage grouse habitat Utility Preferred Route - crosses least steep terrain - reduces visual impacts to U.S. Highway 93 - crosses most miles of sage grouse leks				Route B - crosses least miles of riparian habitat - crosses most miles of bald eagle nesting areas - least mileage visible from residences - most mileage in high erosion potential soils Route C - crosses least miles of sage grouse habitat - crosses least miles of BLM-administered lands - crosses least miles of VRM Class II landscapes				Route D - crosses most miles of riparian habitat - least mileage in high erosion potential soils - crosses high mileage of sage grouse habitat				Route E - crosses most BLM-administered lands - crosses high mileage of sage grouse habitat - most impacts to peregrine falcon Route F - visual impacts to Hagerman Fossil Beds National Monument - crosses most agricultural land - crosses most private lands - most cultural sites within one mile Route G - reduces visual impacts to U.S. Highway 93 - crosses least miles of private land - crosses high mileage of crucial pronghorn habitat			

	Route A*	Route B	Route C	Route D	Route E	Route F	Route G	Utility	Agency
ESTIMATED COST									
Estimated cost (x millions)	248	251	245	248	254	253	244	242	243
ROUTE LENGTH									
Total Route Mileage	513.0	516.1	506.9	513.5	523.7	524.0	504.7	503.1	501.6
ENVIRONMENTALLY PREFERRED ROUTE									
Ranking	1	4	2	2	2	5	3	3	3

* Environmentally Preferred Route

Note: Totals for the Utility and Agency preferred routes vary from Route G because several different alternative routes segments are used (refer to p. 2-54).

TABLE 2-5
Route Comparison Table - Ely to Delta Routes

	Direct Route	Cutoff Route**	230kV Corridor Route***	Southern Route
Construction Access Levels (miles crossed)				
Agricultural lands	0	0	2.1	0
Existing access with spur roads	35.0	39.9	59.1	55.7
New access roads in flat (0-8%) terrain	38.5	50.2	49.1	73.3
New access roads in rolling (8-35%) terrain	44.8	46.4	34.9	60.8
New access roads in steep (35-65%) terrain	17.5	17.4	15.6	21.2
NATURAL ENVIRONMENT				
WILDLIFE (miles crossed)				
Desert tortoise habitat	0	0	0	0
Bald eagle nesting	7.0	8.4	17.8	0
Peregrine falcon	0	0	0	0
Ferruginous hawk nest	0	0	4.5	10.1
Sage grouse leks or winter range	7.9	6.8	7.1	11.8
Crucial Elk habitat	0	0	5.5	0
Bighorn sheep habitat and movement corridor	0	0	0	0
Crucial pronghorn habitat	56.5	70.1	71.5	85.7
Critical Mule deer habitat	12.3	11.0	14.1	12.5
VEGETATION (miles crossed)				
Rare plants	0	0	0	3.0
Grasslands	27.3	33.2	36.0	27.0
Sage scrub	83.3	100.9	104.5	155.0
Woodland/mountain shrub/grasses	0.6	0.5	3.5	7.0
Riparian	1.6	1.2	0.9	0.1
EARTH RESOURCES (miles crossed, except as noted*)				
Miles of high water erosion hazard soils crossed	14.4	22.1	31.2	17.1
Miles of high wind erosion hazard soils crossed	8.6	12.6	19.2	40.1
Number of springs within 1/2 mile of route*	2	2	6	12
Number of perennial streams crossed*	0	0	4	3
Miles of flood hazard areas crossed	0	0	0	0
Miles of landslide hazard areas crossed	0	0	0.6	0
Areas of high paleontological sensitivity	55.5	55.6	64.9	84.7

** Environmentally Preferred Route

*** Utility and Agency Preferred Routes

Table 2-5, Route Comparison Table - Ely to Delta Routes (continued)

	Direct Route	Cutoff Route*	230kV Corridor Route**	Southern Route
HUMAN ENVIRONMENT				
LAND JURISDICTION (miles crossed)				
Bureau of Land Management	125.7	143.4	131.0	197.4
Forest Service	0	0	9.0	0
State	7.2	10.5	9.0	12.0
Private	0	0	11.8	1.6
LAND USE (miles crossed)				
Miles within 1 mile of wilderness study areas	0	13.8	12.3	14.1
Number of residences within 1 mile	0	2	26	0
Miles parallel to H-frame 69kV transmission line	0	0	34.5	0
Miles parallel to H-frame 230kV transmission line	11.3	72.3	159.8	18.5
Miles parallel to 500kV transmission line	12.8	20.0	20.0	31.0
Miles within designated or planning utility corridor	26.7	78.0	163.0	213.5
Miles outside designated or planning utility corridor	102.9	78.1	0	0
Miles within military operating area/Restricted Area	104.2	123.0	79.0	102.5
Agricultural lands	0	0	2.1	0.1
Prime/Unique farmlands	0	0	1.2	0
Range allotments	135.1	153.9	151.9	211.0
Mining claims	7.8	6.9	28.7	1.9
Number of tanks and wells along route*	1	0	1	0
Number of corrals along route*	0	0	0	0
VISUAL RESOURCES (miles crossed, except as noted*)				
Number of scenic highway or road crossings*	0	0	0	1
Mileage of route visible from residences within 1 mile	3.3	5.1	23.9	4.8
Scenic quality Class A landscapes crossed	0	4.2	4.2	0
VRM Class II landscapes crossed	0	0	0	2.0
CULTURAL ENVIRONMENT				
CULTURAL RESOURCES (miles crossed, except as noted*)				
Number of historic sites within 1 mile of route*	4	5	12	8
Number of ethnohistoric sites within 1 mile of route*	8	8	8	10
Number of prehistoric sites within 1 mile of route*	21	26	80	66
Number of other cultural sites within 1 mile of route*	1	1	1	1
Miles through predicted high cultural sensitivity zones	0.8	0.8	8.0	6.0
Pony Express Trail crossings*	1	1	0	0

** Environmentally Preferred Route

*** Utility and Agency Preferred Routes

Table 2-5, Route Comparison Table - Ely to Delta Routes (continued)

	Direct Route			Cutoff Route**			230kV Corridor Route***			Southern Route		
SUMMARY OF ENVIRONMENTAL CONSEQUENCES												
<i>Impact Value</i>	<i>High</i>	<i>Mod</i>	<i>Low</i>	<i>High</i>	<i>Mod</i>	<i>Low</i>	<i>High</i>	<i>Mod</i>	<i>Low</i>	<i>High</i>	<i>Mod</i>	<i>Low</i>
VISUAL RESOURCES	0.6	6.4	128.1	1.2	13.7	139.0	7.3	31.6	121.8	4.1	22.5	183.1
BIOLOGICAL RESOURCES	4.7	5.1	82.2	5.8	7.7	94.1	0.4	12.4	117.3	10.3	17.7	120.8
CULTURAL RESOURCES	4.6	19.1	16.3	4.6	32.7	21.4	5.5	39.7	44.5	11.6	41.7	48.0
LAND USE RESOURCES	0.0	65.3	38.9	0.0	0.0	123.0	0.0	0.0	80.9	0.0	0.0	103.2
EARTH RESOURCES	0.0	8.4	125.9	0.0	7.8	144.0	0.0	6.9	152.7	0.0	2.4	200.2

COMMENTS

Direct Route

- shortest route
- avoids visual impacts to Great Basin National Park
- crosses Leland-Harris spring complex
- crosses through R-6405 Restricted Area of UTTR
- crosses least aricultural lands
- crosses least miles of crucial pronghorn habitat

Cutoff Route**

- crosses least aricultural lands
- avoids visual impacts to Great Basin National Park
- crosses least mileage of sage grouse habitat

**Environmentally Preferred Route
(and preferred by National Park Service)

230kV Corridor Route***

- best utilizes the existing utility corridor
- crosses most miles of bald eagle nesting areas
- crosses high mileage of crucial pronghorn habitat
- most residences within 1 mile
- crosses most national forest lands and private lands

Southern Route

- longest route and most miles in steep terrain
- highest overall environmental impacts
- crosses most BLM-administered lands
- least miles in military operating areas of UTTR

***Agency and Utility Preferred Route

	Direct Route	Cutoff Route**	230kV Corridor Route***	Southern Route
ESTIMATED COST				
Estimated cost (x million)	66	72	77	100
ROUTE LENGTH				
Total Route Mileage	132.9	153.9	160.8	211.0
ENVIRONMENTALLY PREFERRED ROUTE				
Ranking	3	1	2	3

TABLE 2-6
Summary of Selectively Committed Mitigation

Midpoint to Dry Lake Routes

Alternative	Mitigation Measures* (miles)											
	1	2	3	4	5	6	7	8	9	10	11	12
Route A**	140.5	202.5	204.0	165.4	102.7	158.3	0	17.4	334.0	92.1	89.6	2.2
Route B	142.2	201.2	212.1	181.3	113.8	179.9	0	11.9	335.4	109.5	93.6	5.3
Route C	138.2	195.1	199.3	158.5	102.7	155.8	0	12.7	328.7	97.2	87.7	1.9
Route D	140.6	232.8	223.0	179.1	102.7	162.4	0	13.5	364.0	94.8	90.4	0.7
Route E	142.2	221.3	226.8	199.1	113.8	183.0	0	13.1	358.3	109.7	92.9	4.3
Route F	141.7	193.1	198.0	161.4	91.1	160.4	27.4	18.8	347.5	106.3	86.1	1.6
Route G	135.5	201.7	195.8	162.2	102.7	159.6	0	12.7	313.7	97.0	84.9	2.3
Utility	131.2	204.9	196.2	164.2	102.7	160.4	0	12.7	319.2	99.0	83.6	1.4
Agency	135.2	199.3	193.3	159.9	102.7	161.3	0	12.7	312.5	97.0	86.5	2.3

Ely to Delta Routes

Alternative	Mitigation Measures* (miles)											
	1	2	3	4	5	6	7	8	9	10	11	12
Delta Direct	13.2	59.8	75.8	75.0	67.8	17.1	9.0	3.3	57.3	4.2	19.6	2.9
Cutoff **	23.5	83.4	86.2	83.5	15.5	43.3	16.6	3.9	85.1	15.4	18.0	2.9
230kV Corridor***	48.9	87.0	78.0	64.8	11.8	82.4	16.6	6.9	117.4	19.3	30.6	0
Southern	37.0	124.9	118.6	99.6	7.3	62.2	27.8	5.5	127.2	31.0	43.6	4.9

* Numbers indicate Selectively Committed Mitigation Measures described in Table 4-2

** Environmentally Preferred Route

*** Agency and Utility Preferred Route