CULTURAL ENVIRONMENT

Cultural Resources

Introduction

Cultural resources within the project area are subject to both direct and indirect impacts. Direct impacts would result from terrain disturbance associated with construction activities, such as clearing vegetation, installing tower foundations, assembling and erecting towers, stringing and tensioning conductors, upgrading existing access roads, constructing new access roads, and any restoration and revegetation measures.

Cultural resources also could be subject to indirect impacts, and two types were evaluated. First, increasing general public accessibility to currently remote areas was considered. A major factor in the preservation of many archaeological and historical sites within the region is the relatively low intensity of land use. Increasing accessibility to remote areas could lead to degradation of cultural resources as a result of inadvertent damage due to uncontrolled recreational use or overland vehicle travel, or by facilitating intentional vandalism. Visual intrusions are another form of indirect impacts that were considered. A new transmission line could degrade some historic properties whose settings are important aspects of their historic values.

Methods

The assessment of direct impacts considered recorded resources and projected sensitivity zones, both of which were classified into resource quality categories as described in the technical report (Rogge and Woods 1992). The ratings for each site were entered into a GIS database. Each "grid cell" within the GIS database (approximately 100 meters square) was therefore associated with a cultural resource sensitivity rating.

Direct construction impacts were also modeled for each link using the GIS. The model included a level of disturbance based on tower pad and assembly areas per mile of line, plus a varying amount of access road development based on estimates of the extent of new access roads that might have to be developed. The estimates of access road requirements were based on consideration of the number of existing roads and the steepness of the local terrain, which is a crucial factor in determining whether access beyond the transmission line right-of-way would be needed.

The GIS was then used to compare the resource quality ratings for each grid cell with the projected degree of direct disturbance. These comparisons resulted in impact ratings for each grid cell of high, moderate, low, and no impacts. Those ratings were then accumulated for each link to facilitate link and route comparisons.

Indirect impacts due to increased public accessibility were modeled by estimating the relative increase in roads that could result from implementation of the project. The varying levels of increased accessibility were rated and segments of the alternative links were classified accordingly. The GIS was again used to compare cultural resource quality ratings, this time using the known resource database only, with these projected indirect impacts. The resulting impact ratings of high, moderate, low, and no impacts, were then totaled for each link.

Indirect visual impacts were analyzed on 36 previously recorded sites. These sites were selected for viewshed analysis because their settings could be an important aspect of their historic values (that is, they were significant for more than their information potential), and there could be substantial sentiment for preservation in place. The analysis considered distance to the proposed transmission line and the level of contrast within the local environmental setting (see the Visual Resource section for further details).

More details about the methods used to assess both direct impact and indirect impacts are presented in the technical report (Rogge and Woods 1992) (also refer to Appendix H for the locations where technical reports can be reviewed).

Results

The GIS was used to combine considerations of the direct and indirect impact models for each of the 11 proposed alternative routes. The number of miles rated as having a composite impact rating of high, moderate, low, and no impacts were tabulated for each of the alternative routes. (The centerline report, an accompanying data volume, lists the impact ratings associated with mileposts along the centerline of each link.)

To generate composite impact scores for each alternative route the relative importance of the ratings was weighted as follows. A value of 1 was assigned to each mile rated as having no impacts. Low impact zones were assigned a weighting of 2, and moderate impact zones were given a weighting of 5. High impact zones were weighted with a factor of 20 to reflect the efforts that might be required to avoid or mitigate impacts within these zones.

The resulting impact scores indicated that from a cultural resource perspective Route C (with an impact index of 1182) is the preferred route. It is one of the shortest routes and crosses less than 6 miles of projected high impact zones. Alternative Routes A and G are scored very similarly to Route C (1190 and 1197 respectively). Alternative Routes F and B are somewhat less preferable (with index scores of 1239 and 1267 respectively), and Routes D and E are the least preferred (scored 1279 and 1295 respectively).

None of the Midpoint to Dry Lake alternatives can avoid crossing some major resources such as the Oregon Trail, California Trail, and the Pony Express route. However, only somewhat more than one percent of each of the routes crosses what are projected as high impact zones. The range of variation among these alternative routes is not all that great from a cultural resource perspective, and is unlikely to be very significant in consideration of the margins of error associated with the models of resource sensitivities and projected impacts.

From a cultural resource perspective, the Direct Route is the preferred alternative among the Ely to Delta crossties (with an impact index of 314). It is the shortest route by almost 20 miles and crosses about 4.6 miles of projected high impact zones, and less than 20 miles of moderate zones. The Cutoff Route is the next preferred alternative (with an impact index of 394). It also crosses about 4.6 miles of projected high impact zones and 33 miles of moderate impact zones. The 230kV Corridor route is ranked third from a cultural resource perspective (scored 471). It crosses about 5.5 miles of projected high impact zones and 40 miles of moderate impact zones. The Southern Route is the least preferred (scored 643) because it crosses more than 11 miles of high impact zones, 41 miles of moderate impact zones, and is about 50 miles longer than any of the other crosstie alternatives.

Mitigation Measures

Mitigation potential is considered to be very high for most of the types of cultural resources that are likely to be present within any of the corridors. The proposed transmission line is relatively flexible within any given corridor. Once the results of a detailed cultural resource inventory are available, the alignment or the tower sites within the selected corridor can be shifted to some degree to avoid or minimize direct or indirect impacts. Alternatively, many of the resources likely to be affected would be significant for their information potential, and these data can be retrieved through professional study prior to construction resulting in minimal residual impacts.

The project would be implemented in compliance with Section 106 of the National Historic Preservation Act and the project specific programmatic agreement negotiated in accordance with that act. The compliance process would guarantee that regulatory agencies and interested parties would have opportunities to participate in further consultations. In sum, the available data indicate some variation among the routes but not a substantial amount, and there is high potential to satisfactorily mitigate most adverse effects identified as a result of subsequent detailed surveys within the selected route. Therefore, cultural resource considerations are not a crucial factor in selection among the alternatives.

Alternative Routes - Midpoint to Dry Lake

Route A

Route A is approximately 513 miles long. A little over 1 percent of the route (6.8 miles) was rated as having potentially high impacts. About 104 miles were rated as having moderate impacts, and the rest of the route was considered to have low or no identifiable impacts.

The potential high direct impacts would be related to the California Trail crossing (Link 1612), and predicted high sensitivity zones along Deep Creek (Link 40 and 50), Salmon Falls Creek (Link 72), Sagehen Springs and Salmon Falls Creek (Link 130), and Dry Canyon Spring (Link 293).

Visual intrusion into the settings of the Minidoka Relocation Center (Link 20), the Oregon Trail (Link 41), the historic Shafter town site (Link 211), the Pony Express/Lincoln Highway route (Link 291), the California Trail (Link 1612), and the City of Rocks archaeological district (Link 362).

Route B

Route B is approximately 516 miles long. A little more than 1 percent (7.4 miles) is rated as being subject to potentially high impacts. About 117 miles are rated as subject to moderate impacts, and the remainder of Route B is rated as having low or no identifiable impacts.

Potentially high direct impacts would be related to a prehistoric rockshelter (Link 91) and the California Trail crossing (Link 140). Other potentially high direct impacts would be related to projected sensitivity zones along the Deep Creek (Links 40 and 50), Salmon Falls Creek (Link 72), and Texas Spring Canyon (Link 92).

Other potentially high impacts related to direct and indirect impacts would be due to increased access in the vicinity of the Hastings Cutoff crossing, a railroad siding, and an antelope trap (Link 222).

Potentially high indirect visual impacts could result at the Minidoka Relocation Center (Link 20), the Oregon Trail (Link 41), the Hastings Cutoff and a prehistoric antelope trap (Link 222), the Pony Express Route (Link 280), the California Trail (Link 140), and the City of Rocks archaeological district (Link 362).

Route C

Route C is approximately 507 miles long. Somewhat more than 1 percent of the route (5.9 miles) is considered to be subject to potentially high impacts. Approximately 106 miles are rated has being subject to moderate impacts, and the remaining length of the alternative is projected to have low or no identifiable impacts.

Potentially high direct impacts could result at a prehistoric rockshelter (Link 91), the California Trail crossing (Link 140), the Hastings Cutoff crossing (Link 212), and at projected sensitivity zones along Deep Creek (Link 40 and 50), Salmon Falls Creek (Link 72), Texas Spring Canyon (Link 92), and Dry Canyon Spring (Link 293).

Potentially high indirect impacts could result from visual intrusion into the setting of the Minidoka Relocation Center (Link 20), the Oregon Trail (Link 140), the California Trail (Link 140), the Hastings Cutoff (Link 212), the Pony Express/Lincoln Highway route (Link 291), and the City of Rocks archaeological district (Link 362).

Route D

Route D is approximately 514 miles long. A little more than 1 percent of the route (6.6 miles) is considered to be potentially subject to high impacts. About 125 miles are rated as being subject to moderate impacts. The remaining portions of Alternative D are projected to have low or no impacts.

Potentially high direct impacts to known sites are predicted at the California Trail crossings (Link 166 and 180), the Hastings Cutoff crossing (Link 190), and at projected sensitivity zones along Deep Creek (Link 40 and 50), Salmon Falls Creek (Link 72), Sagehen Springs and Salmon Falls Creek (Link 130), Dry Canyon Spring (Link 293), and Duck Creek (Link 245).

Potentially high indirect impacts are predicted due to visual intrusion into the setting of the Minidoka Relocation Center (Link 20), the Oregon Trail (Link 140), the California Trail (Link 140), the Hastings Cutoff (Link 212), the Pony Express/Lincoln Highway route (Link 291), and the City of Rocks archaeological district (Link 362).

Route E

Route E is approximately 524 miles long. Somewhat more than 1 percent of the route (7.8 miles) is considered to be potentially subject to high impacts. About 122 miles are rated as being subject to moderate impacts and the rest of the route is projected to have only low or no identifiable impacts.

Potentially high direct impacts are predicted at the California Trail crossings (Link 1612), the Hastings Cutoff crossing, a railroad siding station and a prehistoric antelope trap (Link 222). Potentially high direct impacts could also result at projected sensitive zones along Deep Creek (Link 40 and 50), Salmon Falls Creek (Link 72), Sagehen Springs and Salmon Falls Creek (Link 130), and at Dry Canyon Spring (Link 293).

Potentially high indirect impacts could result from visual intrusion into the setting of the Minidoka Relocation Center (Link 20), the Oregon Trail (Link 41), the California Trail (Link 1612), the Hastings Cutoff and a prehistoric antelope trap (Link 222), the Pony Express/Lincoln Highway route (Link 291), and the City of Rocks archaeological district (Link 362).

Route F

Route F is approximately 524 miles long. A little over 1 percent of the route (8.2 miles) is considered to be potentially subject to high impacts. About 104 miles are rated as being subject to moderate impacts, and the rest of the alternative is projected to be subject to low or no identifiable impacts.

Potentially high direct impacts to known sites are predicted at the Snake River crossing where numerous historic and prehistoric sites are recorded (Link 61), the Oregon Trail crossing (Link 64), the California Trail crossing (Link 140), and the Hastings Cutoff crossing (Link 212). Potentially high direct impacts could also result at the projected sensitivity zones along Salmon Falls Creek (Link 72), Texas Spring Canyon (Link 92), and at Dry Canyon Spring (Link 293).

Potentially high indirect impacts could result from visual intrusions into the setting of four historic structures and the Kelton Road (Link 61), the Snake River crossing (Link 61), the Oregon Trail (Link 64), the California Trail (Link 140), the historic Shafter town site (Link 211), the Hastings Cutoff Trail (Link 212), the Pony Express/Lincoln Highway route (Link 291), and the City of Rocks archaeological district (Link 362).

Route G

Route G is approximately 505 miles long. A little over 1 percent of the route (7.3 miles) is considered to be subject to potentially high impacts. About 105 miles are evaluated as subject to moderate impacts, and the remaining portions of the alternative are projected to result in low or no identifiable impacts.

Potentially high direct impacts to known sites are predicted at the Hastings Cutoff crossing (Link 212), and one site along Link 151. Other potentially high direct impacts could result at crossings of projected sensitivity zones along Deep Creek (Links 40 and 50), Sagehen Springs and Salmon Falls Creek (Link 130), Chalk Springs (Link 150), and Duck Creek (Link 245).

Indirect visual intrusions could result in high indirect impacts at the Minidoka Relocation Center (Link 20), the Oregon Trail (Link 41), the historic Shafter town site (Link 211), and the City of Rocks archaeological district (Link 362).

Alternative Routes - Ely to Delta

Direct Route

The Direct Route is approximately 133 miles long. A little over 3 percent of the route (4.6 miles) is considered to be potentially subject to high impacts. About 19 miles are evaluated as being subject to moderate impacts, and the remaining length of the route is projected to have low or no identifiable impacts.

Potentially high direct impacts could result at projected sensitivity zones across the Schell Creek Range (Links 262 and 263) and at an unnamed spring northwest of Dipping Tank Spring (Link 265). Potentially high indirect impacts due to increased accessibility are predicted in this same general area (Links 262 and 263), and other high impacts could result from visual intrusion into the setting of the Pony Express route (Link 263), and the Pony Express/Lincoln Highway route (Link 266).

Cutoff Route

The Cutoff Route is approximately 154 miles long. About 3 percent of the route (4.6 miles) is rated as subject to potentially high impacts. About 33 miles are rated as subject to moderate impacts and the rest of the route is rated as subject to low or no identifiable impact.

Potentially high direct impacts could result within sensitivity zones projected at the Schell Creek Range (Links 262 and 263) and at an unnamed spring northwest of Dipping Tank Spring (Link 265). High indirect impacts due to increased accessibility also could result along the Schell Creek Range (Links 262 and 263). Other indirect high impacts could result from visual intrusions into the setting of the Pony Express route (Link 263), the Pony Express/Lincoln Highway route (Link 266), and the Deseret petroglyph panel (Link 268).

230kV Corridor

The 230kV Corridor Route is approximately 161 miles long. A little over 3 percent of the route (5.5 miles) is considered to be subject to potentially high impacts. About 40 miles of this alternative route are rated as being subject to moderate impacts, and the remainder of the alternative route is projected to result in low or no identifiable impacts.

Potentially high direct impacts to sensitivity zones are predicted across the Schell Creek Range (Link 380), and potentially high indirect impacts due to increased accessibility could result in the same area. Other potentially high indirect impacts could result form visual intrusion into the setting of the historic Osceola Ditch (Link 460). High direct and indirect impacts, including visual intrusion, could result at the crossing of the Nevada Northern Railroad (Link 370). This segment of the railroad, extending from McGill Junction to Keystone Junction, is used as a historic tourist railroad.

Southern Route

The Southern Route is approximately 211 miles long. About 5.5 percent of the route (11.6 miles) is considered to be potentially subject to high impacts. Approximately 41 miles are rated as subject to moderate impacts, and the rest of the route is projected to result in low or no identifiable impacts.

Potentially high direct impacts could result within projected sensitivity zones across the Schell Creek Range (Link 364), and high indirect impacts due to increased accessibility are also predicted in this area (Links 364 and 420). Potentially high indirect impacts due to visual intrusions is predicted at the City of Rocks archaeological district (Link 362).

Irreversible and Irretrievable Commitment of Resources

Resources committed to the proposed project would be material and nonmaterial, including financial. Irreversible commitment of resources for the purposes of this section has been interpreted to mean that those resources once committed to the proposed project would continue to be committed throughout the 40-year life of the project. Irretrievable commitment of resources has been interpreted to mean that those resources used, consumed, destroyed or degraded during construction, operation, maintenance, and abandonment of the proposed project could not be retrieved or replaced for the life of the project or beyond. Irreversible and irretrievable commitment of resources for the proposed project are summarized below in tabular form.

Resource	Type of Commitment Reason for Commitment	Irreversible	Irretrievable
Air	Degradation of air quality. Construction Activities.	No	Construction Phase
Soils	Soil loss and erosion. Construction activities.	Yes	Yes
Water	None (See Construction Materials)	----	----
Geological	None	----	----
Paleontological	Disturbance or removal of fossils. Construction activities.	----	----
Biological	Disturbance to and loss of vegetation and wildlife species. Construction and operation.	Yes	Yes
Land Use	Exclusion of residential, institutional and industrial uses.	Yes	Project life
Parks, Recreation & Preservation	Increased recreation use of preservation areas and ORV areas. Increased access for construction.	Yes	Yes

Visual	Degradation of natural scenic quality, viewshed intrusion. Construction and operation.		Yes	Project Life
Acoustical	Noise-levels exceeding ambient. Construction and operation.		Yes	Project Life
Archaeological	Disturbance or removal of sites. Construction, operation, maintenance, abandonment.		Yes	Yes
Historical	Disturbance or removal of sites; interference with visual setting. Construction, operation, maintenance, abandonment.		Yes Yes	Yes Project life
Native American	Disturbance or removal of sites. Interference with visual setting. Aural disturbance. Construction, operation, maintenance, abandonment.		Yes Yes Yes	Yes Project life Construction phase
Human Health	Potential adverse electrical effects. Operation.		Unknown	Unknown
Socioeconomic	Increased regional and local revenues. Construction and operation.		Yes	Project Life
Construction Materials & Fuels	Use of:	Aggregate	Yes	Yes
		Water	Yes	Yes
		Steel	Yes	No
		Aluminum	Yes	No
		Concrete	Yes	Yes
		Wood	Yes	No
		Fossil Fuels	Yes	Yes

Cumulative Effects

Existing Transmission Lines

There are numerous existing transmission lines, distribution lines, and other linear facilities throughout the study area. Several of the most significant features are listed below:

- 345kV Midpoint to Valmy
- 138kV Upper Salmon to Wells
- 230kV Gondor to IPP
- 230kV Gondor to Pavant
- 500kV Utah Nevada Transmission Project
- 69kV Lincoln County Cooperative
- 500kV Midpoint to Malin
- 230kV Midpoint to Boise Bench
- 500kV IPP to Adelanto (DC)
- 230kV Midpoint to Hunt
- 230kV Gondor to Machacek

Also refer to the Land Uses section in Chapter 3 and the Map Volume for further information on existing features.

BLM Utility Corridors

BLM in Nevada designates utility corridors through their Resource Management Plant (RMP) process. BLM in Idaho and Utah recognize existing utility lines as corridors. The Stateline Resource Area is currently preparing a RMP which will designate utility corridors. The RMP corridor studies and the SWIP EIS studies have been coordinated, and the preferred alternatives are similar. The Federal Lands Policy and Management Act (FLPMA) of 1976 mandates to the extent practical, BLM will consolidate future utility projects within the corridors that is established.

Future Transmission Lines

It is expected that there will be other future transmission projects constructed and operated in the same corridor as the SWIP from the Ely, Nevada area south to the Las Vegas, Nevada area. The SWIP would parallel the Utah-Nevada Transmission Project (UNTP) from the Delamar Valley south to Coyote Spring Valley. These project effects are discussed previously in this chapter. The White Pine Power Project (WPPP) and the UNTP are not dependent on the construction of the SWIP, nor is the purpose and need for the SWIP dependent on the WPPP or the UNTP.

When the White Pine Power Project (WPPP) is developed the transmission lines running south from the generating station would parallel the SWIP. Cumulative effects from the construction and operation of the two 500kV lines would be similar and generally additive to the impacts described for the SWIP. The WPPP generation station is to be constructed in the Steptoe Valley north of McGill, Nevada. The transmission system would connect the generation station with two 500kV lines through the Robinson Summit area southwest of Ely to the Las Vegas area. However, if the SWIP transmission system is constructed, it would also pass the WPPP development site (the North Steptoe substation site) to the Robinson Summit substation site. Subsequently, only one 500kV transmission line would be needed between these two points when WPPP is developed.

If the Cutoff Route is selected for the crosstie, a substation would need to be developed at North Steptoe when the crosstie route (SWIP Ely to Delta transmission system) is constructed and a second substation would be needed at Robinson Summit for the SWIP Midpoint to Dry Lake transmission line to interconnect with the 230kV system (also refer to page 2-52). If the 230kV Corridor Route is selected for the crosstie, a substation would be developed at Robinson Summit to interconnect with the 230kV system, but no substation would be needed in the North Steptoe substation until WPPP is developed in the future. Subsequently, the short-term effects to the North Steptoe substation site if the 230kV Corridor Route is selected would be somewhat less. However, the overall cumulative effects from WPPP to Robinson Summit area are expected to be about the same in the future regardless of whether the 230kV Corridor Route or the Cutoff Route is selected.

Since successive transmission line projects will be constructed in different timeframes and rehabilitation of disturbed areas will be done for each project, a similar amount of disturbed area would likely result for each. Also refer to the maps and cross-sections in the Map Volume which illustrates the foreseeable future of four 600kV transmission facilities in the same utility corridor.

When all of these projects are constructed and operating there would likely be a cumulative loss of habitats relative to the total amount of ground disturbed for small birds, insects, and mammals. Some of the ground disturbed for access roads, spur roads, marshalling yards, tower pads, etc. would be rehabilitated at the culmination of each line's construction. More of this land would naturally rehabilitate.

Where the SWIP would parallel the proposed Utah-Nevada Transmission Project (UNTP) south of the Delamar Valley, the right-of-ways of the SWIP and UNTP would need sufficient separation to meet reliability and outage criteria of the Western Systems Coordinating Council (WSCC) (also refer to page 1-2 and 2-17). Based on the terrain and environmental considerations in the area of parallel right-of-way, it is believed that 2000 feet would be adequate. Also refer to Corridor Studies (page 2-28) and Reliability (page 1-8).

The SWIP and UNTP would converge near Robber's Roost Hills (Link 675), and would travel parallel for approximately 140 miles (Links 690, 700, and 720) into Coyote Spring Valley in southern Nevada, where the UNTP would continue south and the SWIP would cross through the southern end of the Arrow Canyon Range into the Dry Lake Valley. Separation of 2000 feet is needed for this entire distance except where it is not physically possible to maintain this separation.

In the Pahranagat Wash area, the SWIP and UNTP lines may need to be closer for two miles or more. Because the Delamar Mountains and Evergreen WSAs are within about 1/2 mile of each other and other linear features are also present (e.g., U.S. Highway 93 and the Lincoln County COOP 69kV line), the SWIP and UNTP lines would be constructed on double circuit towers, each with an open circuit. The SWIP line is proposed to be on the west side and the UNTP on the east. The plan is for the two future WPPP lines to be placed on the open circuits of the SWIP and UNTP lines through this area. The proposed configuration of the planned lines through this area is shown schematically in the cross-sections included in the Map Volume. To help compensate for this lack of separation and to meet the WSCC criteria outlined above, the structures within this area would need to be engineered to a higher standard to better withstand potential physical disturbances (e.g., earthquakes, etc.). Also refer to page 2-17.

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

In the approximately 140 miles where the SWIP and UNTP lines can be separated by 2000 feet, the SWIP and UNTP lines would form the outside edges of the utility corridor that would include the two planned 500kV WPPP transmission lines. The cross-sections in the Map Volume schematically shows the relationship of the four planned 500kV transmission facilities. Also refer to page 2-17.

Land Use Effects - Cumulative impacts to land uses are expected to be minimal. Small areas of rangeland used for grazing and forage would be permanently removed from production by tower foundations and permanent access roads. Though these impacts would accumulate with each successive project, the total area lost from production is very small in the context of the region.

Recreational uses would not be significantly affected, although off-road vehicle use could increase along some of the transmission line access roads. Wilderness areas and WSAs would not be directly affected. Indirect effects (e.g., visual impacts) to WSAs and Wilderness areas are addressed under visual resource effects.

Impacts to agricultural lands accumulate additively with each project with respect to land potentially physically removed from production. Spraying operations on agricultural lands could potentially be terminated on smaller parcels crossed by a large corridor by the addition of a single line. Soil compaction impacts are confined to the construction activities and would be largely alleviated over time through cultivation. Impacts to agricultural lands are concentrated within the state of Idaho with small portions occurring in the states of Utah and Nevada. Agricultural lands located south of Hansen, Idaho, would be crossed by Link 41 which parallels a Midpoint-Valmy 345kV transmission line. In addition, agricultural lands crossed by Link 61 and Link 62 would parallel the Midpoint-Malin 500kV and the Midpoint-Boise Bench 230kV transmission line. Link 64 parallels the Upper Salmon-Wells 138kV transmission line south of Hagerman, Idaho and would result in an increase in cumulative impacts. Agricultural lands in Utah and Nevada are crossed by Link 461 near Weaver Creek and near the Utah-Nevada state line. The proposed project would parallel the Gondor-IPP 230kV line through this area.

Impacts to military operating areas (MOAs) occur within the states of Utah and Nevada between the Hercules Gap substation site and Intermountain substation site. The proposed project would parallel the existing 230kV corridor (Gondor-IPP, Gondor-Pavant). The use of the MOAs would not have significant cumulative effects because of the shorter towers being proposed to mitigate potential conflicts with military operations.

The Marketplace Allen Transmission Project (MAT) is proposed by Nevada Power Company (NPC) to connect from the Dry Lake area northeast of Las Vegas south to a new substation in the area of the McCullough Substation. 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 site) and south end (new marketplace substation near McCullough Substation). The approximately 35 mile MAT project would consist of two 500kV lines with the capacity for about 2000 megawatts each. 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.

Visual Effects - Normally the first man-built objects in a natural setting cause the most noticeable change because of their contrast of form, line, color, and texture to the surroundings. However, each successive change becomes less noticeable than the first. However, the sum of all the changes (e.g., form, line, color, and texture) are more evident to the casual observer. Likewise, for transmission lines it is normally the first line in a natural area that causes the greatest incremental change. However, the cumulative visual impacts of each new line within the corridor increases with each new line. Hence, a multi-line corridor would be more visible at greater distances because of the cumulative physical contrast with the natural landscape than a single transmission line.

The proposed SWIP transmission line would increase the cumulative visual impacts to the highway views in the rural areas of Twin Falls, Idaho where Link 41 would cross Interstate 84 and parallel the Midpoint-Valmy 345kV transmission line. Visual impacts would also increase at the crossing of the U.S. Highway 30 scenic route, near the town of Hagerman, Idaho where Link 61 would parallel the Midpoint-Malin 500kV and the Midpoint-Boise Bench 230kV transmission lines west out of the Midpoint Substation. Because the landscapes of agricultural areas typically have similar structures such as center pivot and line irrigation systems, silos, barns, and distribution lines, the contrast of transmission lines is somewhat less apparent.

U.S. Highway 6/50 would be crossed by Link 460 in Sacramento Valley and Link 470 within the Swasey Mountains. Because these links would parallel the existing Gondor-IPP and Gondor-Pavant 230kV transmission lines, the cumulative visual impacts would be higher. The route would also pass within one mile of the Notch Peak and King Top WSAs.

Some cumulative visual impacts to views from local residences would occur along Link 61 near Hagerman, where the SWIP would parallel the Midpoint-Malin 500kV and the Midpoint-Boise Bench 230kV line west out of the Midpoint Substation. Residences near Eden, Idaho, would be impacted along Link 41 which would parallel the Midpoint-Valmy 345kV line from Midpoint Substation to Valmy. Occasional dispersed residences adjacent to U.S. Highway 93, near Rogerson, Idaho, and near Jackpot, Nevada, (Link 70) and Contact, Nevada, (Link 110), would also be impacted where the proposed project parallels the Upper Salmon-Wells 138kV and the Midpoint-Valmy 345kV lines. Other occurrences of impacts would include residences along Town Creek Flats and Wells, Nevada (Link 170) and Wilkins (Link 162) which would parallel the Upper Salmon-Wells 138kV line, and where the Gondor-Machacek 230kV line parallels Link 370 adjacent to Ely and Link 460, north of Hamlin Valley. Link 461 near the town of Eskdale, Utah, parallels the Gondor-Pavant and Gondor-IPP 230kV transmission lines. Links 580 and 581 near Sugarville, Utah, parallel the IPP-Adelanto 500kV DC line and the Gondor-IPP 230kV line to the Intermountain substation site.

Some cumulative visual impacts would occur to visitors of the interpretive facilities at the Minidoka Relocation Center (Link 30), where the proposed project would parallel the Midpoint-Valmy 345kV line south out of the Midpoint Substation. The SWIP routes that would cross the Salmon Falls Creek near Blue Gulch (Link 64) would parallel the Upper Salmon-Wells 138kV line. Adding the SWIP line to the existing transmission line corridor would cause some significant cumulative visual impacts.

Cumulative visual impacts would occur to views from recreation destination roads near Rogerson, Idaho, (Link 50), a road which parallels the Midpoint-Valmy 345kV line. Similar impacts would occur near Cave Lake State Recreation Area (Link 380), which parallels the Gondor-IPP and Gondor-Pavant 230kV line. Recreational viewers from the Hagerman Fossil Bed National Monument would also experience significant cumulative visual impacts where Link 61 would parallel the Midpoint-Boise Bench 230kV and the Midpoint-Malin 500kV line west of Midpoint Substation.

Links 690, 700, and 720 would parallel the proposed UNTP 500kV transmission line and the Lincoln County 69kV line through the Coyote Spring Valley. Cumulative visual impacts would likely be adverse, long term, and significant where the corridor is within one half mile of U.S. Highway 93, even though the highway is a moderate sensitivity viewpoint in this area. In addition, two WPPP 500kV lines would likely be constructed through this same area in the future. Especially at the "pinch points" where rough terrain would force the corridor to be adjacent to or across the highway, the cumulative visual impacts would be high, long term, and significant. This would be the case in Pahranagat Wash, where double circuit towers would be required (Link 690, milepost 27.5 to approximately milepost 33.0), in one area in Coyote Spring Valley (Link 720, approximately milepost 12.0), and where the four lines would cross U.S. Highway 93 near Link 690 milepost 39.5). Also refer to the maps and

cross-sections in the Map Volume which illustrate the foreseeable future of four 500kV transmission facilities in the same utility corridor.

Visual effects (indirect effects) to users of Wilderness areas and WSAs would accumulate with each successive project constructed. The cumulative visual contrast would be stronger as each new project is added, and the multiple lines would more likely attract the view of and be more noticeable to the casual observer.

Biological Effects - The cumulative biological effects would also be generally additive, and would usually be directly proportional to the amount of ground disturbed.

Impacts from other transmission line projects are expected to be similar to those identified in the technical report. The cumulative effect of several projects constructed in the same area (corridor) i.e., SWIP and UNTP, at the local level is likely to produce impacts that are of slightly higher degree (from low to moderate, for example) and possibly of longer duration. The effects depend to some extent on whether project construction activities are concurrent or overlapping in a given area. If construction is occurring concurrently a higher volume of traffic may result and possibly greater amounts of ground disturbance (erosion, etc.) would occur. Overlapping activity, on the other hand may create disturbance to wildlife for a longer period of time, resulting in prolonged or permanent displacement of wildlife from crucial habitats.

Where utility right-of-ways are adjacent to one another, the increased width of clearing would create a larger gap in the protective cover for large animals in some areas (forested habitats), and create a more visually noticeable corridor which may deter animals from crossing. In some situations the increase in vegetation diversity due to an expanded corridor can provide additional habitat for some species.

It is assumed that the effects of multiple transmission lines would "multiply" to some extent the amount of area of native habitat disturbed or lost. However, where designated corridors are used, access roads may serve more than one line and would therefore minimize ground disturbance and the amount of increased access in some areas.

In general, the effects of transmission line construction on biological resources are short-term (sage grouse are one exception). On a regional level cumulative effects for the proposed project and other related (utility) projects in the area are expected to be less than significant over the long-term. It is difficult to identify the extent of cumulative effects to wildlife resources given that some populations of animals are highly mobile and a "zone of influence" cannot be accurately defined.

There has been increasing attention given to the importance of preserving biodiversity as a management objective. According to Chadwick (1989) the primary reason so many species are threatened with extinction is that habitat is being lost and what remains is badly fragmented. There is a definite correlation between species richness and area. Large geographic areas support large numbers of species. In contrast, small isolated areas cannot hold enough members of a given species, especially large animals, to maintain a stable gene pool (Chadwick, 1989). These populations lack the genetic flexibility to cope with changes in the environment such as cycles of drought, fire, etc. and their vulnerability increases as

undesirable traits accumulate through inbreeding (Chadwick 1989). Diversity provides stability to ecosystems, whereas simplified ecosystems are subject to sudden collapse from even minor shifts in the environment.

Habitat fragmentation brought about by various kinds of development (roads, pipelines, housing developments, etc.) results in an increasing number of isolated plant and wildlife populations. Four major consequences for wildlife result from this fragmentation:

- the loss of wilderness species- those that are area sensitive and depend on large patches of habitat for the maintenance of viable populations
- loss of larger species that normally occur in low densities and move over wide areas (large carnivores)
- fragmented, human-influenced landscapes become invaded or dominated by alien or already common species adapted to interaction with human activity (pigeons, starlings, skunks, etc.)
- inbreeding depression results as a consequence of low densities and isolated populations (Harris and Gallagher, 1989).

The intrusion of roads may effectively isolate small mammal, reptile and amphibian populations. Development of roads, especially highways, reduces total amount of habitat, squeezing remaining wildlife into smaller and more isolated patches and high speed traffic eliminates more of the remaining populations (Harris and Gallagher, 1989).

Increased development and human activity in previously undisturbed habitats results in wildlife being displaced from traditional use areas. If this disturbance is temporary, significant impacts may not occur, because animals generally return once the disturbance has stopped. However, if several types of activities are occurring in an area and disturbance is prolonged, animals may be displaced to suboptimal habitats for longer periods of time (perhaps permanently). Animals forced to use areas with insufficient protective cover and insufficient quantity or quality of food, may suffer losses due to increased winter mortality, increased harvest and/or reduced reproductive effort.

Increasing numbers of powerlines, roads and development into areas of shrinking wildlife habitat is a significant issue for natural resource managers. Cooperation between federal and state agencies and private developers is critical. With an ever increasing number of consumptive uses of our natural resources it is imperative that there be coordination and cooperation between those consumers. One way impacts can be minimized is through the concentration of linear projects (transmission lines, pipelines) into designated corridors which can potentially reduce the amount of habitat fragmentation.

The following addresses potential cumulative impacts to two species of primary concern on the SWIP, desert tortoise and sage grouse.

Sage grouse - Construction of additional transmission lines would increase human activity and traffic in areas already degraded and disturbed. Continued disturbance may result in breeding failure in some areas and long-term/permanent displacement of birds from some areas. Escalating development in other areas, such as mining, would produce additional pressures on sage grouse populations, and breeding populations may become fragmented

and reduced. While small losses of sagebrush habitat are not significant, the sum of incremental losses from a variety of land management practices could produce significant declines in sage grouse numbers.

This loss of habitat cumulates with other historical land management practices which have affected loss of habitat. For example, the emphasis on cattle grazing on federal and private lands have led to chaining and controlled burning to eliminate sage brush and to encourage the growth of palatable nonwoody species. This historical practice has been largely responsible for the loss of sage grouse habitat.

Desert Tortoise - The addition of multiple transmission lines would further reduce the amount of suitable tortoise habitat and any additional access roads would increase potential for human activity in tortoise habitat. Increased vehicle traffic in these areas would result in increased mortality due to collisions with vehicles, illegal collecting, shooting, and destruction of burrows. It is unclear how much additional disturbance in tortoise habitat can be permitted without putting the Mojave tortoise population in jeopardy.

There are also concerns for raven predation of juvenile desert tortoise. Ravens, especially in and around developed areas, are known to use transmission towers as hunting perches. Although raven predation is not a serious problem in this area, there is concern that the problem may spread over time as Las Vegas continues to grow.

Potential biological effects from electric or magnetic fields from the transmission lines has received much public attention for several years. The many scientific studies on the subject show no definitive cause and effect relationship between electric or magnetic fields and possible biological effects. The utility industry and the scientific community continue studies on the subject (also refer to Electric and Magnetic Field Effects section in Chapters 3 and 4).

Other sensitive species would likely be affected by the physical loss of habitat from each successive project. Careful siting, construction sequencing, and monitoring would effectively mitigate these impacts.

Anadromous and Resident Fisheries - If the operation of the SWIP affects the operation of hydroelectric facilities, there could be beneficial, adverse or no effects to anadromous or resident fisheries. However, the SWIP could provide additional transmission capacity to accommodate system operation alternatives.

Cultural Resources Effects - The cultural resource base within the region through which the proposed transmission line runs is not very well characterized. Standards for inventory survey have evolved dramatically during the last couple of decades and only a small percentage of the region has been inventoried to current standards. For example, it is estimated that only about 3.5 percent of the Elko BLM District has been surveyed for cultural resources. Approximately 8,000 archaeological and historical sites have been inventoried and a straight line projection suggests that there may be something on the order of 200,000 unrecorded cultural resources within that district alone. The available data are quite limited, but it does seem reasonable to project that there may be half a million unrecorded cultural resources within the study region. It appears that approximately 20 to 30 percent of the

cultural resources within the region are significant resources as evaluated against criteria for listing on the National Register of Historic Places.

In general, site densities throughout the region seem to average about 2 to 6 per square mile. Linear features would encounter a disproportionately large number of sites because of a statistical "edge effect," but there are virtually no directly comparable prior linear surveys through the region to indicate how many sites might be encountered. The available data do indicate that it is not unreasonable to expect that, on the average, a cultural resource could be encountered at least every 2 to 3 miles along any of the alternative corridors. This indicates that some 200 to 400 cultural resources could be present along the selected alternative. Many of these could probably be avoided by minor adjustments in the project, but the project would undoubtedly diminish the regional resource base.

Every year more surveys are conducted within the region on federal lands or in response to federally funded or licensed projects. These are resulting in the recording of approximately several hundred resources annually. Most of these are not being damaged or destroyed, but the resource base is undoubtedly being reduced by tens if not scores of sites annually.

The proposed SWIP transmission line is not the only major development being proposed for the region. The Utah-Nevada Transmission Project (UNTP) and two additional lines within the corridor from Ely to Dry Lake (WPPP) are likely to be constructed within the next several years. None of the project areas have been intensively inventoried for cultural resources but using the parameter estimates given above, it is estimated that the impact zones for the SWIP could contain some 200 to 400 cultural resources, and some 50 to 125 of these might be considered significant. More than half and perhaps as many as 90 percent may be avoidable by minor project modifications. Thus, it is estimated that something on the order of 10 to 65 significant sites might be damaged or destroyed as a result of the construction of the SWIP. The other three proposed transmission lines are not as long as the SWIP, but if it is assumed that they would approximately triple the impacts of the SWIP, some 30 to 195 additional significant cultural resources might be damaged or destroyed. Construction of all of the projects could represent a substantial increase in the average annual rate at which cultural resources are currently being destroyed within the region, but it would be a short term increase. The aggregate loss of all or parts of approximately 40 to 260 significant sites would be a minor part of the regional resource base, which could include some 100,000 to 150,000 significant cultural resources.

Impacts to significant cultural resources would be mitigated with each project constructed or maintained. Significant resources that would be affected by construction activities would be avoided, or if this is not possible, recovered for their scientific value. The cumulative effects of all of the transmission lines being in place is not measurably different than the additive impacts of each single project, but again, the impacts of direct disturbance to sites would be mitigated.

Indirect impacts to cultural resources can result from:

- degrading the setting of a significant cultural feature

- incidental destruction of cultural sites by unwitting off-highway vehicle (OHV) recreationists

In the case of the latter, if transmission lines make formerly remote areas of the landscape more accessible (due to construction access roads), OHV users may use these roads to gain easier access to these areas. Cumulative damage to cultural sites could result over time from repeated incremental damage caused by being run over by OHVs. Illegal "pot hunting" could also increase over time due to increased accessibility into remote areas depending upon public access control by the utilities and the land managing agencies. The presence of multiple transmission lines would not likely contribute measurably to the this type of cumulative effect over a single transmission line.

Visual effects to the setting of significant cultural sites would increase with each successive transmission line, but would likely be less than additive.

Earth Resources Effects - The cumulative effects to earth resources would not be measurably different than the additive impacts of each of the incremental transmission line effects. Each transmission line would add to potential wind and water soil erosion, stream bank degradation, and sedimentation loading in water bodies, dependent on the mitigation implemented for each project.

Generally, ground disturbance and new access would be incrementally less for each successive project, which would typically add less impact from each project. However, the cumulative effects of all transmission lines would likely be greater than any single project. Indirect and off-right-of-way impacts could result from increased OHV access into remote areas. OHV travel on and off access roads could result in greater ground disturbance over time depending upon control of public access (e.g., gates, road closures, etc.) by the utilities and the land managing agencies.

Socioeconomics - Cumulative socioeconomic impacts are generally only a socioeconomic concern if they would overextend public services and accommodations in the project area. The UNTP is the only permitted project that is expected to be scheduled for construction between 1993 and 1995 within the project area. Because of the small size of the work force associated with transmission line construction, and its transitory nature, cumulative impacts are not expected to be a problem.

Air Quality - The air quality may be improved in some areas and may be degraded in others because of the development of the SWIP, depending upon the specific operation of the electrical system by SWIP participants. However, since the participants have not been determined and no federal action regarding electrical system operation in the western U.S. is required, the nature and extent of possible beneficial or adverse impacts cannot be determined.

For example, it can be surmised that if excess hydroelectric power is transferred to the southwest in the spring or summer during their peak electrical demand periods, air quality in the Northwest and the Southwest should improve if hydroelectric power is used and fossil fuel generation is reduced. Also, if fossil fuel generated power is transferred to the Northwest in the winter during peak electrical demand periods, the potentially degraded air

quality near the generation source may be offset by less emissions in other parts of the western U.S. Some fossil fuel plants in the Southwest are scheduled to be retrofitted with pollution control equipment, thereby reducing air quality concerns of potentially increasing utilization of these plants in seasonal exchanges with the Northwest. Specific operation of the SWIP, the western system in the U.S., and potential atmospheric emission of pollutants would also depend on annual weather conditions (e.g., water storage for hydroelectric generation) and the changing mix of nuclear and other generation sources (e.g., cogeneration, solar, etc.).

Future Development Projects

Energy needs throughout the western U.S. could increase over time. Several electrical generating projects of various sizes have been proposed in the past two decades, including the:

- Harry Allen Project - a proposed coal-fired generating station northeast of Las Vegas, Nevada. The Record of Decision was issued by BLM in 1980. The project has not been constructed. Nevada Power Co. has recently prepared an amendment to this original proposal. This amendment will be the subject of supplement to the Harry Allen EIS.

- White Pine Power Project - a proposed coal-fired generating station near Ely, Nevada. The Record of Decision was issued by BLM in 1985. The project has not been constructed.

- Other smaller cogeneration project currently being proposed or constructed in the Las Vegas area. Some are being pursued concurrent with preparation of this document.

- Thousand Springs Power Plant - a proposed coal-fired generating station northeast of Wells, Nevada. Following release of the DEIS in 1990 the project was discontinued.

- Various hydroelectric proposals throughout the West, many of which are being pursued concurrent with this project

- Transmission upgrades within the IPCo system and other utility systems in the western U.S. may occur to increase efficiency or transfer capabilities. This would largely depend upon the composition and percentage ownership of the potential SWIP participants (not yet determined).

- If a fiber optic groundwire is installed as part of the SWIP, it is possible in the future that capacity may be sold to a commercial communication company. If this were to occur, regeneration stations along the right-of-way would be required to carry and boost the signals similar to other fiber optic commercial carrier's facilities.

- Las Vegas Valley Water Development Project - a proposed water development project is being planned by Clark County to increase the municipal and industrial water supply of the Las Vegas area. The pipeline planned to transport the water from north of Clark County will utilize utility corridors used by the SWIP or prepare a plan amendment. The pipeline could be in the range of 36 inches in diameter

  Soils - Expected ground disturbance would be similar to the recently constructed Kern River Gas Transmission Pipeline. The disturbed area would be about 100 feet wide. Revegetation is difficult in the dry deserts of southern Nevada.

  Visual Resources - Long-term visual impacts of light colored soils and soil erosion impacts could result.

  Cultural Resources - Impacts would be similar to the Kern River Gas Transmission Pipeline. Intensive cultural surveys will be done to locate resources. Reports will be completed that will document the significance of and the mitigation for located cultural resources.

  Biological Resources - Short-term impacts and long-term impacts will be similar to those caused by the Kern River Gas Transmission Pipeline. In southern Nevada there will likely be significant concern for impacts to desert tortoise, potentially within the same corridor as the SWIP. Direct impacts to desert tortoise would be caused from their burrows being crushed or excavated during construction. Appropriate mitigation would minimize these effects. However, federal and state wildlife biologists are concerned that these linear disturbed areas may cause short-term habitat fragmentation.

Although not directly connected or related to the SWIP, these projects have been or are being proposed as alternative means of meeting current or projected electrical energy needs in various locations of the West. Of course demand for electrical energy varies with economic and demographic cycles throughout the region.

Construction and operation of any of these projects would likely result in environmental impacts to air quality, land uses (e.g., grazing) visual impacts, impacts to vegetation and wildlife, earth resources, and cultural resources. Coal-fired or cogeneration projects would cumulatively affect air quality, increasing particulate, CO_2, NO_X, and other gaseous emissions. Hydroelectric projects would likely cumulatively affect fish populations (e.g., anadromous fish) and water quality. Any new sources of generation would generally also require a new transmission system. The impacts from transmission would be similar to those for the SWIP (also refer to discussion of impacts earlier in this chapter).

The operation of the SWIP would more efficiently use existing regional generation resources. It could result in the delayed need for additional generation resources to be brought on line.

Other future potential corridor uses include fiber optic lines, and gas and water pipelines. Although the cumulative effects of a fiber optic line is minimal, a Wil-Tel fiber optic line is

presently located in Arrow Canyon. Although only in its initial planning stages, it is possible that a proposed water development project by Clark County could use one of the corridors established by the SWIP in east-central and southern Nevada for its water transport system.

Global Warming

The operation of the SWIP itself is not expected to contribute to global warming or the buildup of CO_2 in the atmosphere. However, because operating the SWIP implies operating parts of the electrical system in the western U.S., the SWIP may contribute positively or negatively to the buildup of CO_2 from the burning of fossil fuels depending upon how the system is operated on a day to day, seasonal, or long-term basis. However, since the participants have not been determined and no federal action (e.g., EIS) regarding electrical system operation in the western U.S. is required, the nature and extent of possible beneficial or adverse impacts cannot be determined.

CHAPTER 4

TABLES

TABLE 4-1

Generic Mitigation Measures Included In The Project Description

1. All construction vehicle movement outside the right-of-way would normally be restricted to predesignated access, contractor acquired access or public roads.

2. The areal limits of construction activities would normally be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents would be applied to rocks or vegetation to indicate survey or construction activity limits.

3. In construction areas where recontouring is not required, vegetation would be left in place wherever possible and original contour would be maintained to avoid excessive root damage and allow for resprouting.

4. In construction areas (e.g., marshalling yards, tower sites, spur roads from existing access roads) where ground disturbance is significant or where recontouring is required, surface restoration would occur as required by the landowner or land management agency. The method of restoration would normally consist of returning disturbed areas back to their natural contour, reseeding (if required), cross drains installed for erosion control, placing water bars in the road, and filling ditches.

5. Watering facilities (e.g. - tanks, developed springs, water lines, wells, etc.) would be repaired or replaced if they are damaged or destroyed by construction activities to their predisturbed condition as required by the landowner or land management agency.

6. Towers and/or ground wire would be marked with high-visibility devices where required by governmental agencies (Federal Aviation Administration).

7. On agricultural land, right-of-way would be aligned, in so far as practical, to reduce the impact to farm operations and agricultural production.

8. Prior to construction, all supervisory construction personnel would be instructed on the protection of cultural and ecological resources. To assist in this effort, the construction contract would address: (a) Federal and state laws regarding antiquities and plants and wildlife, including collection and removal; (b) the importance of these resources and the purpose and necessity of protecting them.

9. Cultural resources would continue to be considered during post-EIS phases of project implementation in accordance with the programmatic agreement that would be developed in conjunction with preparation of the EIS. This would involve intensive surveys to inventory and evaluate cultural resources within the selected corridor and any appurtenant impact zones beyond the corridor, such as access roads and construction

Table 4-1 (continued)
Generic Mitigation Measures included in the Project Description

equipment yards. In consultation with appropriate land managing agencies and state historic preservation officers, specific mitigation measures would be developed and implemented to mitigate any identified adverse impacts. These may include project modifications to avoid adverse impacts, monitoring of construction activities, and data recovery studies.

10. The Project Sponsors would respond to complaints of line-generated radio or television interference by investigating the complaints and implementing appropriate mitigation measures. The transmission line would be patrolled on a regular basis so that damaged insulators or other line materials that could cause interference are repaired or replaced.

11. The Project Sponsors would apply necessary mitigation to eliminate problems of induced currents and voltages onto conductive objects sharing a right-of-way, to the mutual satisfaction of the parties involved.

12. The Project Sponsors would continue to monitor studies performed to determine the effects of audible noise and electrostatic and electromagnetic fields in order to ascertain whether these effects are significant.

13. Roads would be built as near as possible at right angles to the streams and washes. Culverts would be installed where necessary. All construction and maintenance activities shall be conducted in a manner that would minimize disturbance to vegetation, drainage channels, and intermittent or perennial streambanks. In addition, road construction would include dust-control measures during construction in sensitive areas. All existing roads would be left in a condition equal to or better than their condition prior to the construction of the transmission line.

14. All requirements of those entities having jurisdiction over air quality matters would be adhered to and any necessary permits for construction activities would be obtained. Open burning of construction trash would not be allowed unless permitted by appropriate authorities.

15. Fences and gates would be repaired or replaced to their original predisturbed condition as required by the landowner or the land management agency if they are damaged or destroyed by construction activities. Temporary gates would be installed only with the permission of the landowner or the land management agency; and would be restored to its original predisturbed condition following construction.

16. Transmission line materials would be designed and tested to minimize corona. A bundle configuration (three conductors per phase except for the Ely to Delta segment would be two conductors per phase) and larger diameter conductors would be used to limit the audible noise, radio interference (RI), and television interference (TVI) due to corona. Tension would be maintained on all insulator assemblies to assure positive contact

Table 4-1 (continued)
Generic Mitigation Measures included in the Project Description

between insulators, thereby avoiding sparking. Caution would be exercised during construction to avoid scratching or nicking the conductor surface which may provide points for corona to occur.

17. During operation of the transmission line, the right-of-way would be maintained free of non-biodegradable debris.

18. The primary focus of paleontological mitigation efforts should be areas of greatest disturbance and areas likely to have significant fossils.

19. Mitigation measures that will be developed during the consultation period under Section 7 of the Endangered Species Act (1974) will be adhered to as specified in the Biological Opinion of the USDI Fish and Wildlife Service.

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

TABLE 4-2

Selectively Committed Mitigation Measures

Note: These selective mitigation measures apply only to specific impact locations that were identified in the EIS or during field investigations.

1. No widening or upgrading of existing access roads would be undertaken in the area of construction and operation, except for repairs necessary to make roads passable, where soils and vegetation are very sensitive to disturbance.

2. There would be no blading of new access roads in the area of construction and operation. Existing crossings would be utilized at perennial streams, National Recreational Trails, and irrigation channels. Off-road or cross-country access routes would be used for construction and maintenance. This would minimize ground disturbance impacts. These access routes must be flagged with an easily seen marker and the route must be approved in advance of use by the authorized officer.

3. The alignment of any new access roads or overland route would follow the designated area's landform contours where possible, providing that such alignment does not additionally impact resource values. This would minimize ground disturbance and/or reduce scarring (visual contrast).

4. All new access roads not required for maintenance would be permanently closed using the most effective and least environmentally damaging methods appropriate to that area with concurrence of the landowner or land manager (e.g., stock piling and replacing topsoil, or rock replacement). This would limit new or improved accessibility into the area.

5. Modified tower design or alternate tower type would be utilized to minimize ground disturbance, operational conflicts, visual contrast and/or avian conflicts.

6. In designated areas, structures would be placed so as to avoid sensitive features such as, but not limited to, riparian areas, water courses, and cultural sites, and/or to allow conductors to clearly span the features, within limits of standard tower design. This would minimize amount of sensitive feature disturbed and/or reduce visual contrast.

7. Standard tower design would be modified to correspond with spacing of existing transmission line structures where feasible and within limits of standard tower design. The normal span would be modified to correspond with existing towers, but not necessarily at every location. This would reduce visual contrast and/or potential operational conflicts.

8. At highway, canyon, and trail crossings, towers are to be placed at the maximum feasible distance from the crossing, to reduce visual impacts.

Table 4-2 (continued)
Selectively Recommended Mitigation Measures

9. Nonspecular conductors would be used, where specified by the authorized officer, to reduce visual impacts.

10. "Dulled" metal finish towers would be used to reduce visual impacts.

11. With the exception of emergency repair situations, right-of-way construction, restoration, maintenance, and termination activities in designated areas would be modified or discontinued during sensitive periods (e.g., nesting and breeding periods) for candidate, proposed threatened and endangered, or other sensitive animal species. Sensitive periods, species affected, and areas of concern would be approved in advance of construction or maintenance by the authorized officer.

12. Helicopter placement of towers would be used to reduce ground disturbance impacts (e.g., soil erosion).

TABLE 4-3

Range Allotments Crossed By Alternative Routes - Midpoint to Dry Lake

		ROUTE A		ROUTE B		ROUTE C		ROUTE D		ROUTE E		ROUTE F		ROUTE G	
ALLOTMENT NAME	TOTAL ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES
AMSTERDAM KUNKEL	1,100	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
ANTELOPE VALLEY	45,458	-----	-----	6.6	6.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
ARROW CANYON	88,448	17.3	9.2	17.3	9.2	17.3	9.2	17.3	9.2	17.3	9.2	17.3	9.2	17.3	9.2
ARTESIAN KIDD	6,160	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	-----	-----	1.3	1.3
BADGER SPRING	24,125	39.7	26.7	39.7	26.7	39.7	26.7	39.7	26.7	39.7	26.7	39.7	26.7	39.7	26.7
BECKY CREEK	13,104	2.2	0.1	2.2	0.1	2.2	0.1	-----	-----	2.2	0.1	2.2	0.1	-----	-----
BECKY SPRING	40,621	18.4	13.9	25.0	18.4	18.4	13.9	-----	-----	25.0	18.4	18.4	13.9	-----	-----
BIG CREEK ISO	320	13.3	6.3	13.3	6.3	13.3	6.3	13.3	6.3	13.3	6.3	-----	-----	13.3	6.3
BIG SPRINGS	482,616	72.7	45.7	54.8	23.8	72.7	45.7	-----	-----	54.6	23.8	72.7	45.7	72.7	45.7
BISHOP FLAT	4,631	-----	-----	-----	-----	-----	-----	4.1	4.1	-----	-----	-----	-----	-----	-----
BOONE SPRING	79,733	-----	-----	25.8	17.7	-----	-----	-----	-----	25.8	17.7	-----	-----	-----	-----
BUCKHORN	82,968	20.8	8.8	20.8	8.8	26.8	8.8	20.8	8.8	20.8	8.8	20.8	8.8	20.8	8.8
CAMP 1	12,188	2.7	2.3	2.7	2.3	2.7	2.3	2.7	2.3	2.7	2.3	1.9	1.3	2.7	2.3
CHERRY CREEK	153,107	43.1	24.9	44.4	24.6	43.1	24.9	54.9	39.2	43.1	24.9	43.1	24.9	56.2	38.9
CLIFF SPRING	35,821	9.5	9.1	9.5	9.1	9.5	9.1	9.5	9.1	9.5	9.1	9.5	9.1	9.5	9.1
COVE	26,538	18.4	17.5	18.4	17.5	18.4	17.5	18.4	17.5	18.4	17.5	18.4	17.5	18.4	17.5
DELAMAR	240,755	19.2	11.0	19.2	11.0	19.2	11.0	19.2	11.0	19.2	11.0	19.2	11.0	19.2	11.0
DOUGLAS CANYON	12,222	13.1	10.9	13.1	10.9	13.1	10.9	13.1	10.9	13.1	10.9	13.1	10.9	13.1	10.9
DRY LAKE	69,339	12.6	9.8	12.6	9.8	12.6	9.8	12.6	9.8	12.6	9.8	12.6	9.8	12.6	9.8
DUCK CREEK FLAT	33,805	4.9	1.6	-----	-----	4.9	1.6	4.9	1.6	4.9	1.6	4.9	1.6	-----	-----
ELY SPRINGS AMP	56,128	26.8	21.9	26.8	21.9	26.8	21.9	26.8	21.9	26.8	21.9	26.8	21.9	26.8	21.9
FOREST MOON	99,968	20.6	8.9	20.6	8.9	20.6	8.9	20.6	8.9	20.6	8.9	20.6	8.9	20.6	8.9
FOX MOUNTAIN	75,436	30.0	16.8	30.0	16.8	30.0	16.8	30.0	16.8	30.0	16.8	30.0	16.8	30.0	16.8
GIROUX WASH	48,200	42.0	22.9	42.0	22.9	42.0	22.9	42.0	22.9	42.0	22.9	42.0	22.9	42.0	22.9
GOLD CANYON	23,640	11.9	3.7	-----	-----	11.9	3.7	11.9	3.7	11.9	3.7	11.9	3.7	-----	-----
GOODTIME	16,766	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.1	0.0	-----	-----
HARDY SPRINGS	108,331	25.5	15.1	25.5	15.1	25.5	15.1	25.5	15.1	25.5	15.1	25.5	15.1	25.5	15.1

Table 4-3 (continued)
Range Allotments Crossed By Alternative Routes - Midpoint to Dry Lake

		ROUTE A		ROUTE B		ROUTE C		ROUTE D		ROUTE E		ROUTE F		ROUTE G	
ALLOTMENT NAME	TOTAL ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES
HD	380,659	99.7	58.0	86.8	58.9	86.8	58.9	46.4	21.0	75.7	39.0	86.8	58.9	73.2	30.7
HOLBORN	49,196	-----	-----	-----	-----	-----	-----	16.1	14.4	-----	-----	-----	-----	-----	-----
INDIAN JAKE	57,542	11.7	11.2	11.7	11.2	11.7	11.2	11.7	11.2	11.7	11.2	11.7	11.2	11.7	11.2
JACKPOT	70,137	25.6	18.6	13.6	13.0	13.6	13.0	25.6	18.6	25.6	18.6	16.2	14.9	21.1	13.6
JONES GOAT SPRINGS	1,431	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.4	2.4
KERR - BERGER	2,229	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.4	1.1	-----	-----
KERR - LOST CREEK	15,308	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	-----	-----	-----	-----
KUNKEL - BERGER	1,516	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.7	0.2	-----	-----
LEAD HILLS	80,797	-----	-----	28.5	26.7	-----	-----	-----	-----	28.5	26.7	-----	-----	-----	-----
LEHMANN & PETERSON	21,353	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.9	4.7	-----	-----
LEPPY HILLS	72,995	-----	-----	16.0	14.0	-----	-----	-----	-----	16.0	14.0	-----	-----	-----	-----
LOST CREEK - U2	4,173	3.4	2.4	3.4	2.4	3.4	2.4	3.4	2.4	3.4	2.4	-----	-----	3.4	2.4
LOWER LAKE	107,317	18.1	9.2	18.1	9.2	18.1	9.2	18.1	9.2	18.1	9.2	18.1	9.2	18.1	9.2
McQUEEN FLAT	10,403	3.6	3.2	3.6	3.2	3.6	3.2	3.6	3.2	3.6	3.2	3.6	3.2	3.6	3.2
MEDICINE BUTTE	294,355	4.6	4.6	7.4	4.7	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	7.4	4.7
MIDDLE STEPTOE	2,361	4.4	2.2	-----	-----	4.4	2.2	4.4	2.2	4.4	2.2	4.4	2.2	-----	-----
MILNER PLOT	2,530	3.2	0.0	3.2	0.0	3.2	0.0	3.2	0.0	3.2	0.0	-----	-----	3.2	-----
MOOR SUMMITT	18,323	-----	-----	-----	-----	-----	-----	12.3	6.6	-----	-----	-----	-----	-----	-----
NORTH COVE	25,446	9.4	9.2	9.4	9.2	9.4	9.2	9.4	9.2	9.4	9.2	9.4	9.2	9.4	9.2
NORTH MILNER	28,184	14.5	5.0	14.5	5.0	14.5	5.0	14.5	5.0	14.5	5.0	-----	-----	14.5	5.0
OAK SPRINGS AMP	195,049	19.2	18.8	19.2	18.8	19.2	18.8	19.2	18.8	19.2	18.8	19.2	18.8	19.2	18.8
PILOT	143,082	-----	-----	28.0	18.7	-----	-----	-----	-----	28.0	18.7	-----	-----	-----	-----
PITTMAN WELL	39,595	13.8	5.1	13.8	5.1	13.8	5.1	13.8	5.1	13.8	5.1	13.8	5.1	13.8	5.1
POINT RANCH	36,179	30.6	27.3	30.6	27.3	30.6	27.3	30.6	27.3	30.6	27.3	26.8	23.5	30.6	27.3
POLELINE	4,889	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.6	2.6	-----	-----
RIDGE ISOLATED	8,705	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	-----	-----	5.3	5.3
SALMON RIVER	311,575	63.1	39.7	64.8	49.1	64.8	49.1	63.1	39.7	63.1	39.7	64.8	49.1	65.7	34.6
SAND BUTTE	6,488	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.5	2.5	-----	-----
SCHNELL SALMON TRACT	14,138	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	-----	-----	8.1	8.1

Table 4-3 (continued)
Range Allotments Crossed By Alternative Routes - Midpoint to Dry Lake

		ROUTE A		ROUTE B		ROUTE C		ROUTE D		ROUTE E		ROUTE F		ROUTE G	
ALLOTMENT NAME	TOTAL ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES
SEVEN MILE	2,182	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.7	2.0	-----	-----
SHOESTRING CATTLE	2,523	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	9.4	6.0	-----	-----
SIMPSON	8,379	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
SOUTH BUTTE	28,776	12.1	8.4	-----	-----	12.1	8.4	12.1	8.4	12.1	8.4	12.1	8.4	-----	-----
SPRUCE	813,267	72.9	43.5	-----	-----	72.9	43.5	80.4	45.4	-----	-----	72.9	43.5	55.0	40
SQUAW JOE	8,702	11.5	10.6	11.5	10.6	11.5	10.6	11.5	10.6	11.5	10.6	-----	-----	11.5	10.6
SQUAW JOE ISO	56,904	5.7	4.6	5.7	4.6	5.7	4.6	5.7	4.6	5.7	4.6	-----	-----	5.7	4.6
STEPTOE	46,532	15.8	9.1	-----	-----	15.8	9.1	15.8	9.1	15.8	9.1	15.8	9.1	-----	-----
SUNNYSIDE	219,519	10.9	7.8	10.9	7.8	10.9	7.8	10.9	7.8	10.9	7.8	10.9	7.8	10.9	7.8
TELGRPH CR. MED. BTE.	287,368	-----	-----	20.9	20.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
THIRTY MILE SPRING	178,716	33.6	30.3	49.2	42.2	33.6	30.3	33.6	30.3	33.6	30.3	33.6	30.3	49.2	42.2
TOM PLAIN	74,020	19.6	9.9	19.6	9.9	19.6	9.9	19.6	9.9	19.6	9.9	19.6	9.9	19.6	9.9
TOWN CREEK	11,446	-----	-----	-----	-----	-----	-----	14.9	14.2	-----	-----	-----	-----	-----	-----
UTAH - NEV #1	120,617	-----	-----	27.8	16.5	-----	-----	-----	-----	27.8	16.5	-----	-----	-----	-----
WENDELL CATTLE	10,441	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.2	3.6	-----	-----
WEST WHITE HORSE	7,208	-----	-----	6.5	5.4	-----	-----	-----	-----	6.5	5.4	-----	-----	-----	-----
WESTERN STOCKGRWERS	25,053	20.7	14.5	20.7	14.5	20.7	14.5	20.7	14.5	20.7	14.5	-----	-----	20.7	14.5
WHISKEY CREEK	19,393	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	20.4	6.8	-----	-----
WHISKEY CREEK ISO	19,393	2.3	2.1	2.3	2.1	2.3	2.1	2.3	2.1	2.3	2.1	-----	-----	2.3	2.1
WHITE HORSE	61,571	26.2	21.5	32.7	18.3	26.2	21.5	33.4	17.0	32.7	18.3	26.2	21.5	33.4	17.0
WILSON CREEK	1,077,994	54.1	46.1	54.1	46.1	54.1	46.1	54.1	46.1	54.1	46.1	54.1	46.1	54.1	46.1
WOOD HILLS	71,457	-----	-----	-----	-----	-----	-----	44.6	33.4	-----	-----	-----	-----	-----	-----
GRAND TOTAL	7,038,944	1098.1	732.6	1127.9	786.2	1080.9	737.3	1070.0	720.3	1128.8	748.5	1042.0	703.7	1022.7	676.6

TABLE 4-3A

Range Allotments Crossed by Alternative Routes - Ely to Delta

		DELTA DIRECT		*CUTOFF*		*230kV CORRIDOR*		*SOUTHERN*	
ALLOTMENT NAME	TOTAL ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES
ANTELOPE	79213	-----	-----	10.20	10.10	10.20	10.10	-----	-----
BADGER SPRING	24125	-----	-----	-----	-----	-----	-----	39.70	26.70
BAKER CREEK	55515	-----	-----	-----	-----	6.30	6.30	-----	-----
BASTIAN CREEK	13527	-----	-----	-----	-----	5.70	4.50	-----	-----
BECKY CREEK	13104	14.40	10.30	14.40	10.30	-----	-----	-----	-----
BLACK HAM	33828	-----	-----	-----	-----	-----	-----	18.20	17.80
BLIND VALLEY	45856	-----	-----	-----	-----	-----	-----	13.30	11.60
BRECKS KNOLL	81495	-----	-----	-----	-----	-----	-----	17.00	14.90
BUCK SKIN	24270	-----	-----	18.00	17.50	-----	-----	-----	-----
CATTLE CAMP - CAVE VALLEY	76816	-----	-----	-----	-----	-----	-----	30.50	27.30
CHALK KNOLL	51738	-----	-----	-----	-----	-----	-----	1.30	0.10
CHERRY CREEK	153107	3.50	0.00	3.50	0.00	-----	-----	-----	-----
COPPER FLAT	40058	-----	-----	-----	-----	17.60	6.10	-----	-----
DARK PEAK	20223	-----	-----	-----	-----	-----	-----	6.10	3.20
DEADMANS WASH	58435	-----	-----	-----	-----	-----	-----	25.40	24.80
DEATH CANYON	31229	-----	-----	16.40	6.10	40.60	24.20	-----	-----
DESERET	324749	-----	-----	14.00	7.30	-----	-----	42.30	19.70
DEVILS GATE	17686	-----	-----	28.00	25.50	-----	-----	-----	-----
GARRISON	50954	-----	-----	-----	-----	1.60	1.30	-----	-----
GEORGE TOWN RANCH	23688	-----	-----	-----	-----	20.50	16.20	-----	-----
GIROUX WASH	48200	-----	-----	-----	-----	-----	-----	19.20	9.90
GRANITE	55704	-----	-----	19.20	11.80	19.20	11.80	-----	-----
HAMBLIN SPRING	105831	-----	-----	-----	-----	-----	-----	22.20	19.70
HEUSSER MOUNTAIN	33956	-----	-----	-----	-----	6.70	5.80	-----	-----
INDIAN GEORGE	41650	19.80	18.00	9.60	8.20	-----	-----	-----	-----
INDIAN JAKE	57542	-----	-----	-----	-----	-----	-----	11.70	11.20
KLONDIKE	36223	-----	-----	-----	-----	-----	-----	15.10	12.30
KNOLL SPRINGS	38409	-----	-----	7.80	3.00	6.00	3.20	-----	-----

Table 4-3A (continued)
Range Allotments Crossed by Alternative Routes - Ely to Delta

		DELTA DIRECT		CUTOFF		230kV CORRIDOR		SOUTHERN	
ALLOTMENT NAME	TOTAL ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES	TOTAL ACRES	VIABLE ACRES
LADY LAIRD	60022	21.90	13.50	10.10	4.60	10.10	4.60	10.10	4.60
LAKE AREA	29836	-----	-----	-----	-----	-----	-----	9.70	9.70
LITTLE DRUM	76382	26.30	23.30	21.80	15.10	21.80	15.10	22.40	15.60
MAJORS	104861	-----	-----	-----	-----	20.10	13.50	-----	-----
McCLINTOCK	3480	1.30	1.20	1.30	1.20	1.30	1.20	1.30	1.20
MORMAN GAP	53101	-----	-----	-----	-----	-----	-----	20.10	20.10
MUNCY CREEK AMP	207906	26.00	18.70	8.60	0.90	-----	-----	-----	-----
NORTH CANYON	21264	-----	-----	12.30	1.90	-----	-----	-----	-----
PAINTED POTHOLES	42663	-----	-----	-----	-----	-----	-----	28.70	26.30
PAINTER SPRINGS	38003	-----	-----	29.60	18.00	29.60	18.00	-----	-----
PARTOUN	92186	26.40	24.10	-----	-----	-----	-----	-----	-----
RED HILLS	35489	23.90	10.40	-----	-----	-----	-----	-----	-----
SACRAMENTO PASS	21843	-----	-----	-----	-----	11.90	7.10	-----	-----
SAND PASS	32229	20.90	13.10	-----	-----	-----	-----	-----	-----
SKULL ROCK	57171	-----	-----	-----	-----	-----	-----	18.00	17.30
SMELTER MOUNTAIN	74048	21.20	10.60	21.20	10.60	21.20	10.60	21.20	10.60
SMITH CREEK	17820	-----	-----	40.60	27.90	43.00	38.60	-----	-----
SMITH CREEK AMP	68072	-----	-----	8.50	8.30	15.70	12.20	-----	-----
SOUTH SPRINGS VALLEY	83723	-----	-----	-----	-----	-----	-----	29.70	23.90
STATE LINE	36538	-----	-----	-----	-----	-----	-----	15.60	15.20
STRAWBERRY	21625	-----	-----	-----	-----	9.40	7.50	-----	-----
SWASEY KNOLL	53709	30.10	19.20	-----	-----	-----	-----	-----	-----
TATOW	65407	-----	-----	5.00	3.10	5.00	3.10	-----	-----
THIRTY MILE SPRING	178716	-----	-----	-----	-----	23.70	23.70	10.40	10.40
THOUSAND PEAKS	375439	63.60	23.60	-----	-----	-----	-----	-----	-----
TIPPETT	200041	26.90	20.40	-----	-----	-----	-----	-----	-----
TIPPETT PASS	77161	28.60	23.70	-----	-----	-----	-----	-----	-----
WHITE ROCK	83547	-----	-----	-----	-----	-----	-----	61.70	50.00
WILLOW SPRINGS	602	-----	-----	-----	-----	-----	-----	29.30	24.60
GRAND TOTALS	3850015	354.8	230.1	300.1	191.4	347.2	244.7	540.2	428.7

TABLE 4-4

Estimated County Tax Revenues[1] by Alternative Route

State/ County	Midpoint to Dry Lake Alternative Routes						
	Route A	Route B	Route C	Route D	Route E	Route F	Route G
IDAHO							
Cassia	20,800	20,800	20,800	20,800	20,800	-----	20,800
Gooding	-----	-----	-----	-----	-----	211,500	-----
Jerome	455,700	455,700	455,700	455,700	455,700	144,100	455,700
Twin Falls	570,700	570,700	570,700	570,700	570,700	916,600	570,700
NEVADA							
Elko	759,200	769,100	727,100	767,600	801,200	727,100	729,200
White Pine	582,000	588,300	582,000	576,200	596,100	582,000	568,400
Lincoln	539,400	539,400	539,400	539,400	539,400	539,400	539,400
Nye	261,800	261,800	261,800	261,800	261,800	261,800	261,800
Clark	150,800	150,800	150,800	150,800	150,800	150,800	150,800

State/ County	Ely to Delta Alternative Routes			
	Direct	Cutoff	230kV Corridor	Southern
UTAH				
Millard	355,200	846,000	853,700	998,700
Juab	296,100	-----	-----	-----
NEVADA				
White Pine	255,700	289,200	320,500	494,900

Estimates are based on average 1990 property tax rates in each county and an average cost for the transmission lines and associated communication and substation facilities. Figures are rounded to the nearest hundred. Estimates represent revenues during the first year of operation without depreciation.

TABLE 4-5

Electric Field Calculations

Calculated electric fields for the proposed Southwest Intertie Project 500kV line operated at maximum voltage. Minimum clearance associated with a conductor temperature of 120° F (49° C) has been used. Calculated fields are reported as the maximum level on the right-of-way (PEAK) and at the edge of the right-of-way (ROW).

		Electric Field, kV/m					
		Existing Corridor			Proposed Corridor		
Case	Figure	ROW Width, ft.	Peak	ROW	ROW Width, ft.	Peak	ROW
0	1				200	8.4	1.9
1	A1	60	1.9	1.4	260	8.4	1.6, 1.9
2	A2	150	6.2	0.9, 1.3	350	8.4	0.9, 2.0
3	A3	150	6.2	0.9, 1.3,	350	8.4	0.9, 2.0
4	A4	140	6.9	1.4	340	8.4	1.5, 1.9
5	A5	200	7.0	1.4, 1.4	400	8.4	1.5, 1.9
6	A6	200	7.1	1.5, 1.9	400	8.4	1.5, 1.9
7	A7	285	7.7	1.3, 2.3	485	8.4	1.3, 2.0
8	A8	175	7.7	2.3	375	8.4	2.3, 2.0
9	A9	125	2.5	0.8	325	8.4	0.8, 1.9
10	A10	280	4.2	1.0, 1.3	480	8.4	1.0, 1.9
11	A11	230	4.2	1.0, 1.3	430	8.4	1.1, 1.9
12	A12	150	DC	DC	350	8.4	1.9
13	A13	260	2.2	1.3, .04	460	8.4	1.3, 1.9
14	A14	110	2.2	1.3, 1.3	310	8.4	1.4, 1.9
15	A15	120	4.2	1.0	320	8.4	1.1, 1.9
16	A16	100	0.8	0.2	300	8.4	0.4, 1.9
17	double-circuit configuration would result in field equal or less than the values shown for Case 8						

TABLE 4-6

Magnetic Field Calculations

Calculated magnetic fields in milligauss (mG) for the proposed Southwest Intertie Project 500kV line. A minimum clearance associated with a conductor temperature of 120° F (49° C) and the maximum continuous current at the proposed line have been used. Calculated fields are reported as the maximum level on the right-of-way (PEAK) and at the edge of the right-of-way (ROW). Calculated values for both average current and maximum continuous current are given. Fields for maximum current conditions are given in brackets [ ].

		Magnetic Field, mG					
		Existing Corridor			Proposed Corridor		
Case	Figure	ROW Width, ft.	Peak	ROW	ROW Width, ft.	Peak	ROW
0	1	—	—	—	200	117 [234]	27 [55]
1	A1	60	44 [89]	21 [42]	260	116 [232]	29, 28 [59, 55]
2	A2	150	44 [100]	11, 15 [34]	350	118 [237]	15, 28 [43, 56]
3	A3	150	44 [100]	11, 15 [34]	350	118 [237]	15, 28 [43, 56]
4	A4	140	66 [136]	14 [29]	340	115 [230]	19, 28 [38, 56]
5	A5	200	64 [132]	24, 15 [47, 31]	400	115 [230]	26, 28 [51, 56]
6	A6	200	67 [137]	25, 19 [50, 39]	400	115 [229]	27, 29 [54, 57]
7	A7	285	137 [274]	19, 37 [44, 75]	485	131* [262]*	20, 31 [48, 61]
8	A8	175	139 [277]	37 [74]	375	133* [267]*	40, 31 [80, 61]
9	A9	125	** [175]	** [47]	325	113 [229]	26, 30 [56, 57]
10	A10	280	246 [301]	54, 6 [66, 12]	480	244* [297]*	55, 28 [70, 56]
11	A11	230	246 [301]	54, 9 [67, 15]	430	243 [296]	56, 29 [71, 56]
12	A12	150	—	—	350	117 [234]	4, 27 [9, 55]
13	A13	260	7 [21]	3, 0 [9, 1]	460	117 [233]	4, 27 [12, 55]
14	A14	110	7 [121]	3 [9]	310	117 [233]	8, 27 [20, 55]
15	A15	120	247 [302]	54 [66]	320	240* [290]*	59, 30 [76, 58]
16	A16	100	26 [32]	4, 0 [6]	300	117 [233]	11, 27 [19, 55]
17	double-circuit configuration would result in field equal or less than the values shown for case 8						

* Occurs under existing line

** Average currents for existing line not provided; fields estimated for proposed corridor.