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FINAL ENVIRONMENTAL ASSESSMENT

LOS REALES 115-kV TRANSMISSION LINE ALTERNATIVE ROUTES

TUCSON AQUEDUCT - PHASE B CENTRAL ARIZONA PROJECT

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MASTER

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PREFACE

Several changes have occurred since or as a result of the public review period for the draft environmental assessment (EA). These are highlighted below.

Additional preliminary design investigations resulted in an adjustment to the estimated construction cost of Alternative 4. Recent construction bids received by the Bureau of Reclamation (Reclamation) for another gas-insulated switching (GIS) station were 31 percent higher than Reclamation's design estimates. In the draft EA, overhead transmission line construction estimates were based upon construction contracts recently awarded; however, underground construction estimates for the GIS station were based upon design estimates. For consistency, the estimate for Alternative 4 in this final EA has been revised to reflect a 31 percent increase (almost \$1 million) in the cost of the GIS component. In addition, surveys conducted since the distribution of the draft EA identified over 80 utilities or structures that are located within Alternative 4's corridor. The estimated cost of Alternative 4 has also been adjusted to reflect the abnormally large number of relocations and construction considerations required with this alternative.

Subsequent to reviewing the draft EA, Pima County informed Reclamation that it has plans to expand the existing Valencia Road right-of-way to 200 feet sometime in the future. Reclamation had originally anticipated utilizing the existing transmission line corridor along Valencia Road for its transmission line. This would have minimized the impact to private landowners. However, Pima County has requested that Reclamation acquire new right-of-way from landowners that would correspond to a corridor along the edge of a future expanded Valencia Road. This would eliminate the need to relocate the transmission line if and when the road expansion occurs. Reclamation has agreed to consider accommodating the wider road alignment where such changes would not result in significantly higher social/environmental impacts or construction costs. However, Reclamation has committed not to consider accommodating an anticipated wider road alignment where the adjacent private land has been developed.

The draft EA failed to note that the existing TEP sub-transmission line has a distribution line "underbuilt" (attached to the poles). This distribution line would be replaced "in-kind" which means the double circuit transmission line along Valencia Road would also carry a distribution line.

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I. Introduction

A. Background

The Central Arizona Project (CAP) was authorized as a part of the Colorado River Basin Project Act (Public Law 90-537) on September 30, 1968. The primary purpose of the CAP is to furnish water for agricultural, municipal, and industrial uses in central and southern Arizona, and western New Mexico. Due to its magnitude, the CAP is divided into several major features serving separate but interrelated functions.

To comply with the National Environmental Policy Act of 1969, as amended (NEPA), the Bureau of Reclamation (Reclamation) prepared an overall environmental impact statement for the entire CAP (Reclamation 1972). This statement was filed with the Council on Environmental Quality on September 26, 1972. Reclamation subsequently prepared site specific environmental impact statements for the major features of the project. The final Environmental Impact Statement (FEIS) on the Tucson Aqueduct Phase B feature of the CAP (Reclamation 1985) was filed August 14, 1985. That document analyzed the environmental consequences of the construction, operation and maintenance of the Phase B portion of the Tucson Aqueduct and its associated electrical transmission system.

The FEIS indicated an electrical power transmission system would be constructed to supply power to the six Tucson Aqueduct Phase B pumping plants. Power would be provided from transmission lines that would tap into existing Western Area Power Administration (Western) 115-kilovolt (kV) transmission lines from two separate locations. One of these taps would occur at the Rattlesnake Substation located near the CAP Twin Peaks Pumping Plant, about five miles south of the town of Marana.

According to the FEIS, a second tap into a Western transmission line would occur at a switching station to be constructed near I-19 and Los Reales Road. An overhead 115-kV transmission line coming from this switching station would run along the Los Reales Road right-of-way west from I-19, and then go south along the CAP right-of-way to the Black Mountain Pumping Plant. The Black Mountain Pumping Plant is the last pumping plant of the CAP system; originally it was to be located within the Pascua Yaqui Indian Reservation. A 115-kV transmission line has been constructed within the CAP aqueduct right-of-way to interconnect the power system that operates all six Tucson area CAP pumping plants.

Since the filing of the FEIS, the Black Mountain Pumping Plant has been relocated adjacent to the Snyder Hill Pumping Plant, approximately 3.5 miles north of its original location. The Tucson Aqueduct Phase B Modifications Environmental Assessment was prepared by Reclamation describing this and other substantial changes made to the Tucson Aqueduct-Phase B design subsequent to the FEIS (Reclamation 1988). In addition, much of the land adjacent to the Los Reales Road right-of-way has been developed into residential and commercial properties. Construction of the originally proposed overhead transmission line alignment would necessitate placing power poles within residential backyards. Reclamation considered this to be

undesirable. Due to siting problems along the original alignment and the relocation of the Black Mountain Pumping Plant, Reclamation initiated an evaluation of four alternative transmission line alignments in addition to the original alignment.

B. Project Location

All alternatives evaluated for this EA fall within roughly a 64 square mile area bounded by Ajo Way on the north, State Route 89 on the east, Spencer Avenue on the west, and the Alternative III alignment on the south. A general location map of this area is provided as Figure 1.

C. Proposed Project

The proposed project consists of construction of a 115-kV transmission line to complete the electrical transmission system for the Tucson Aqueduct Phase B pumping plants. Reclamation proposes to use an alignment that is different from the one identified in the FEIS and approved in the Record of Decision. The transmission line and switching station would be owned by the United States, under the operational jurisdiction of Western.

D. Purpose and Need for the Project

The Tucson Aqueduct Phase B pumping plants were designed and constructed to operate on a looped power system. The entire looped power system, including two switching stations and connecting 115-kV transmission lines, was identified in the FEIS and approved for construction in the Secretary of Interior's Record of Decision dated September 24, 1985. The loop begins in the vicinity of the Twin Peaks Pumping Plant--the northernmost Phase B pumping station, at the Rattlesnake Switching Station. All of the looped power system has been constructed with the exception of the switching station and portion of transmission line proposed to be constructed in this project. Without construction of this final portion of the looped power system, the Phase B pumping plants will not be able to operate normally without negatively affecting nearby power sources. The CAP will also not be able to provide the reliability necessary for municipal water systems dependent upon CAP water.

The purpose of this EA is to describe impacts that would result from relocating the Los Reales 115-kV transmission line, and possibly the switching station, originally identified in the FEIS. It should be mentioned the Department of Energy will complete a separate NEPA review.

FIGURE 1

II. Proposed Action and Alternatives

A. Background

The originally proposed alignment of the second 115-kV transmission line serving the Tucson Aqueduct Phase B pumping plants would have been from Western's Tucson-Apache 115-kV transmission line, where it crosses Los Reales Road, to the Black Mountain Pumping Plant. The original alignment is no longer considered viable because of the lack of space for a transmission corridor along much of its route. Four alternative alignments were considered. Reclamation's proposed action is to construct an alignment referred to as Alternative 5. A sixth alternative, one of no Federal action (the "No Action Alternative"), is also presented.

Subsequent to the signing of the Record of Decision for the FEIS, the Black Mountain Pumping Plant was relocated from its original site on the Pascua Yaqui Indian Reservation to an area adjacent to the Snyder Hill Pumping Plant (north of Ajo Way). Because of the relocation of the Black Mountain Pumping Plant, a "spreader yard" was designed to convert the Rattlesnake 115-kV overhead transmission line to underground cables going into the Black Mountain and Snyder Hill Pumping Plants. This would result in no overhead transmission lines blocking the view of Cat Mountain from Ajo Way, a State-designated scenic route. This spreader yard was described in the Tucson Aqueduct Phase B Modifications EA and will be constructed as part of another contract (Reclamation 1988). This spreader yard will be referred to as the Ajo Way spreader yard in this document; it is not included in the description of the Los Reales transmission line project. The 115-kV transmission line to be constructed in this project would terminate at the Ajo Way spreader yard, located at the southeast corner of the intersection of Ajo Way and the CAP pipeline right-of-way.

To provide a clearer idea of the proposed project, and to assist the reader in understanding the discussion in Section III on environmental consequences from construction-related activities, a brief description of the major activities that are expected with any of the alternatives is provided below.

Construction of an Overhead 115-kV Transmission Line

Overhead transmission line alternatives include a single-circuit line and a double-circuit line. A single-circuit 115-kV transmission line would be a three-phase line (three wires called conductors), mounted on 55- to 80-foot tall single wood poles. These poles would be placed about 400 feet apart. A double-circuit 115-kV transmission line would consist of two three-phase lines, mounted on 60- to 70-foot tall single steel poles. These poles would be placed about 450 feet apart (Figure 2). Reclamation does not typically construct double-circuit transmission lines on single wood poles. This is because single wood poles would need to be placed closer together for a double-circuit line, requiring at least twice as many poles for the same length of line. This would increase the cost of construction, operation, and maintenance, and would increase the visual impact from pole structures.

Figure 2. Typical Overhead Transmission Poles

SINGLE CIRCUIT
WOOD POLE STRUCTURE

DOUBLE CIRCUIT
STEEL POLE STRUCTURE

Construction of either a single- or double-circuit overhead transmission line is generally done in a staged process. Surveys are first conducted along the right-of-way, to determine structure locations. Holes are then dug at the identified structure locations along the entire alignment using a truck mounted auger. These holes are approximately 14 feet deep. A dirt road may be bladed to the pole sites, unless these sites are readily accessible. The structure components are trucked to the site, unloaded, and then partially or fully assembled. The structures are then lifted into position with a crane for final assembly on their foundations. The pole structures may be direct buried or concrete backfilled.

Once all the poles have been installed, the wires are strung. A reel truck, a tensioner, and a puller are stationed at intervals along the right-of-way. Between 10,000 and 16,000 feet of wire are pulled from each setup. The wires are unreeled from the reel truck and placed in a tensioner, and are fed through stringing blocks on the structures to the puller. The tension and sag of the wires are then adjusted. Finally, the wires are attached to the insulator assemblies by the line crew, who also removes the stringing blocks. Lift trucks and pickups are also used in these activities.

Once the line goes into operation, routine maintenance activities would consist of periodic spot inspections, foundation inspections, and general maintenance to tighten bolts, etc.

Construction of an Underground 115-kV Cable

The underground 115-kV cable would also be a three-phase line. A trench approximately eight feet wide and five feet deep would be excavated to accommodate cable installation.

Excavation of a cable trench is usually done with a backhoe; however, blasting may be required for excavation in rock. A foot of bedding material, which is a type of sand, is placed into the bottom before the cable is laid in the trench. Additional bedding material is placed on top of the cable. (Bedding material is used to prevent physical damage to the cable from rock and to improve heat dissipation of the cables.) A concrete slab is often placed over the top layer of bedding material to protect the buried lines. The remainder of the trench is then backfilled and compacted. Generally, about a 3,000-foot long stretch of the alignment would be under construction at any given time. Under certain construction constraints, "pull" boxes are required to pull the cable through areas where open trench excavation is not possible. Pull boxes are approximately 10 feet long by 10 feet wide by 20 feet deep, and are permanent buried structures used for maintenance and repair purposes.

Once the line goes into operation, there would be no real maintenance activities. However, should the cable need to be inspected for any reason or repaired, the cable would need to be re-excavated where there are no pull boxes.

Presently, Reclamation knows of no existing buried transmission cable (115-kV or greater) in the world that is more than five miles long. It

is unknown whether or not operating a buried transmission cable longer than five miles is technically or physically possible. Other factors such as adverse geologic conditions, the possibility of unforeseen system problems, and extremely high construction costs, were also taken into account. These factors contributed to Reclamation's decision to limit consideration of underground transmission cable alternatives to segments that were five miles or less.

Construction of a Spreader Yard

A spreader yard would be needed wherever the transmission line converts from overhead type construction to underground type construction, or vice versa.

Each spreader yard constructed through this project would be about 75 feet by 75 feet, or just over one-eighth of an acre in size. Within the yard there would be one 45-foot steel A-frame tower, called a take-off structure. The spreader yard would look similar to Figure 3, except that Figure 3 shows two take-off structures. The major pieces of equipment would arrive at the site already assembled. Construction-related activities would include grading, fencing, placing a concrete foundation, installing the pieces of equipment, and stringing the transmission lines. On-site activities would occur for about six months.

Construction of an Air-Insulated Switching Station

A switching station is needed to provide operational flexibility where lines of the same voltage interconnect. The station contains steel tower structures, power circuit breakers, disconnect and interrupter switches, and a service building (28 x 40 feet).

The air insulated switching station that would be constructed by this project would be approximately 300 x 350 feet (just under 2.5 acres). The major pieces of equipment would arrive at the site already assembled. Construction-related activities would be similar to those listed above for the spreader yard. On-site construction activities would occur for about six months. Figure 4 provides a general idea regarding the type of physical equipment that can be found at a switching station, although no control building is shown. The switching station for this project would have about twice as much equipment as is shown in Figure 4.

Construction of a Gas-Insulated Switching Station

A gas-insulated switching (GIS) station serves the same function as the conventional air-insulated switching station. The equipment, although similar, is enclosed and insulated by a sulfur hexafluoride gas and is therefore more compact (Figure 5). Sulfur hexafluoride gas is an inert, nontoxic gas that is heavier than air. Under normal operating and maintenance activities this gas would never be released into the atmosphere. A smaller service building (20 x 40 feet) is required. A GIS station can be constructed within an area one-fourth the size needed for a conventional air-insulated switching station.

Artist's Concept of Spreader Yard
with Two Take-Off Structures
(NOT TO SCALE)

CENTRAL ARIZONA PROJECT

ARTIST'S CONCEPT OF
SPREADER YARD

FIGURE 3

344-330-12292

Figure 4. Example of a Two Breaker Bay Air-Insulated Switching Station

Figure 5. Example of a Gas-Insulated Switching Station

The GIS station would be 0.5 acres in size. On-site construction activities would be similar to those of the air-insulated switching station and would take six months or less to complete. Although significantly more expensive to construct, the GIS was considered necessary for Alternative 4. This was due to the restricted area within which the switching station would need to be located, and due to the proximity to Kennedy Park. None of the other alternatives had these constraints, and therefore a GIS was not included in the design for them.

Following is a brief description of the original alignment and the four alternative alignments evaluated (Figure 6). In addition, a no Federal action alternative is described (Alternative 6), to provide a base line for comparing the impacts of the other alternatives.

B. Alternative 1 - Original Los Reales Alignment

This alignment would follow the route originally described in the FEIS, as modified due to the relocation of the Black Mountain Pumping Plant (Reclamation 1988). From a switching station located southeast of the intersection of I-19 and Los Reales Road within the Tohono O'odham Nation (Nation), the overhead transmission line would go west on single wood poles along the Los Reales Road right-of-way to the CAP right-of-way. From there it would head north within the CAP right-of-way and terminate at the Ajo Way spreader yard. The total alignment would be nine miles of overhead transmission line. About one-half mile of this alignment would fall within the Nation.

The switching station to be constructed at the Western tap site would be a conventional air-insulated station and would be approximately 2.5 acres in size. This station would contain three circuit breaker bays for Reclamation's and Western's use. There would be sufficient room within the switching station yard to accommodate the future installation of up to two additional circuit breaker bays. One of these breaker bays would be constructed by the Papago Tribal Utility Authority (PTUA) should development occur that would need to be serviced. Another utility company indicated an interest in constructing a breaker bay sometime in the future. However, because construction of a switching station at this location is not the proposed action, further negotiations with the utility company did not occur.

C. Alternative 2 - Hermans Road Alignment

1. Alternative 2A (Hermans Road North)

This alternative would follow the original alignment from the switching station west to Indian Agency Road. At this point, a 75-foot by 75-foot spreader yard would be constructed, and the overhead transmission line would convert to an underground cable. The underground cable would go west along the Los Reales Road right-of-way to Cardinal Avenue, then continue south beneath the Cardinal Avenue road right-of-way to Hermans Road. At the intersection of Cardinal and Hermans Road, the underground cable would turn west and continue beneath Hermans Road to the end of the paved road. Another spreader yard would be constructed within a vacant lot west of this point.

ALTERNATIVE ROUTES

FIGURE 6

The transmission line would return to an overhead line and continue west along the north side of the Hermans Road right-of-way to the CAP right-of-way. At this intersection, the overhead transmission line would go north within the CAP right-of-way to the Ajo Way spreader yard. This alignment would consist of eight miles of overhead transmission line on single wood poles and three miles of underground cable. About one-half mile of this alignment would fall within the Nation.

2. Alternative 2B (Hermans Road South)

This alternative follows Alternative 2A from the switching station west to the second spreader yard at the western end of the paved Hermans Road. At this spreader yard, Alternative 2B would drop south into the Nation's boundary, continuing westward to the CAP right-of-way. From this point, Alternative 2B would follow the same route as 2A to the Ajo Way spreader yard. Like Alternative 2A, this alignment would consist of eight miles of overhead transmission line on single wood poles and three miles of underground cable. About three miles of the alignment would fall within the Nation, and about three-quarter mile would fall within the Pascua Yaqui Indian Reservation.

The switching station to be constructed at the Western tap site for either Alternative 2A or 2B would be identical to that described for Alternative 1, including the provision of space to accommodate the installation of two additional circuit breaker bays.

D. Alternative 3 - Southside Alignment

With this alternative, the Western tap site would be located within the Nation approximately 2.5 miles southeast of the original switching station location, but would still tap off the Western Tucson-Apache 115-kV overhead transmission line. The new Reclamation overhead transmission line would parallel the existing Western line southeast to the eastern boundary of the Nation. Still within the Nation boundary, the line would continue in a southerly direction to the southern boundary of section 1, T. 16S., R. 13E. The line would travel west to the CAP right-of-way, and then continue within the CAP right-of-way, first west and then north to the Ajo Way spreader yard. The total alignment would consist of 17 miles of overhead transmission line on single wood poles. About twelve miles of the alignment would fall within the Nation, and about three-quarter mile would fall within the Pascua Yaqui Indian Reservation.

The switching station to be constructed at Western's tap site would be identical to that described in Alternatives 1 and 2, except space for only one additional breaker bay would be provided. At some time in the future, PTUA would construct a breaker bay that would be used to provide power to a portion of its service area should development occur.

E. Alternative 4 - Ajo Way Alignment

The switching station would be constructed just north of where the Western Tucson-Apache 115-kV transmission line crosses Ajo Way, within Kennedy

Park. An underground cable would be located within the Ajo Way right-of-way wherever possible, or adjacent to it, going west to the Ajo Way spreader yard. The total alignment would be just over 5 miles of underground cable.

The switching station to be constructed at the Western tap site would be a GIS station and would be approximately 0.5 acre in size. No additional entities would use this switching station, nor would any space be provided for future use by any other entities.

F. Alternative 5 - Valencia Road Alignment (Proposed Action)

A switching station would be constructed in the northwest portion of the intersection of I-19 and Valencia Road. An overhead transmission line on single steel poles would go west along Valencia Road approximately six miles to the CAP Black Mountain Pipeline. At Valencia Road and the CAP right-of-way the line would continue north about two miles to the Ajo Way spreader yard. About one-half mile of this alignment would fall within the Nation. Along Valencia Road, this transmission line would be double circuited, combining Tucson Electric Power Company's (TEP's) existing 46-kV sub-transmission line with Reclamation's new 115-kV line. Each line would be constructed to provide 115-kV class insulators, to ensure visual symmetry of design. This would also enable TEP to upgrade its system in the future, at its own expense if and when development occurring in the area would create the need. A distribution line, currently underbuilt on the existing TEP line, would be relocated onto this new line as well. Along the segment of the line going north from Valencia Road to the Ajo Way Spreader Yard, only Reclamation's circuit would be installed initially, to complete its 115-kV line to the pumping plants. TEP would be required to comply with applicable State and local requirements prior to implementing any proposed upgrade or new installation. Also, the appropriate Federal agency would comply with applicable NEPA requirements prior to approving TEP use of federally-owned structures and/or right-of-way for installation or upgrade of power line(s).

The switching station to be constructed at the Western tap site for Alternative 5 would be identical to that described for Alternative 3.

G. Alternative 6 - No Federal Action

No switching station would be constructed, and no transmission line would be built to connect power from Western's Tucson-Apache 115-kV transmission line to the Snyder Hill and Black Mountain Pumping Plants. All six Tucson Aqueduct Phase B pumping plants would be dependent upon the Rattlesnake Switching Station and transmission line as their sole source of operating power. During the life of the CAP project, these pumping plants will provide between 175,000 to 215,450 acre-feet annually to up to 17 municipal, industrial, and agricultural water users.

It is anticipated TEP would upgrade its existing 46-kV transmission line along Valencia Road to 138-kV should TEP determine there is a need due to development in the area. TEP would be required to go through applicable State and local government approval processes for any proposed upgrade or new

installation. A public hearing would be required for an upgrade or new installation of a transmission line with a voltage of 115-kV or greater.

The County has plans to widen the Valencia Road right-of-way to 200 feet sometime in the future. Most of the Valencia Road right-of-way in the project area is currently 150 feet.

Table 1 summarizes the major features of each of these alternatives.

Table 1. Major Features - Los Reales Transmission Line Alternatives

Alternative	1	2A	2B	3	4	5
<hr/>						
Transmission Line (Miles)						
Overhead	9	8	8	17	0	8
Underground	0	3	3	0	5.3	0
Switching Station	1	1	1	1	1 (GIS) *	1
Spreader Yard (does not incl. Ajo Way SY)	0	2	2	0	0	0
Total Area Needed (Acres)	85	96	96	208	18	37
Environmental Mitigation Costs (millions)	\$.23	\$.23	\$.23	\$.50	0**	\$.05
Estimated Total Field Construction Costs (millions)	\$6.7	\$7.7	\$7.3	\$6.3	\$9.9	\$6.6
<hr/>						

* GIS - Gas-insulated switching station

** No substantive mitigation costs associated with this alternative

III. Affected Environment and Environmental Consequences

A. Background

This section includes a discussion of the affected environment and environmental consequences that would result from changing the alignment of the Los Reales 115-kV transmission line originally identified in the FEIS. Environmental consequences of the five alternatives, including the impacts from the original alignment, are described. Impacts that would likely result from taking no Federal action are also described, to provide a base line for comparison purposes. Areas or topics covered in the FEIS that would not be affected by the proposed modifications, such as air, water, and noise pollution, are not addressed in this EA.

B. General Description of the Project Area

Overall, the project area is typical south-central Arizona Sonoran desert, characterized by desert mountain ranges gently sloping down to broad alluvial basins. The climate is characterized by long hot summers, short mild winters, sparse rainfall periods that occur twice a year in winter and late summer, low relative humidity, and high rates of evaporation. Average annual precipitation is about 11 inches (Reclamation 1985).

The project area consists mostly of residential, agricultural, commercial, and undeveloped lands. There is also some recreational uses found in the area, such as hiking, picnicking, sightseeing, bow hunting, and horseback riding.

C. Biological Resources

1. Existing conditions

a. Vegetation

The Tucson Phase B FEIS described the four natural vegetation communities that are classified within the project area: desert grassland (shrub-scrub disclimax and mixed grass scrub), palo verde-mixed cacti, creosote bush-bursage, and mesquite bosque (AGFD 1983).

The palo verde-mixed cacti vegetation community occurs on and near Black Mountain, and along Ajo Way. The palo verde-mixed cacti community is best characterized by palo verde trees (Cercidium microphyllum) and many species of cacti, including cholla (Opuntia spp.), barrel (Ferocactus spp.), hedgehog (Echinocereus spp.), pincushion (Mammillaria spp.), and saguaro (Carnegiea gigantea). This vegetation community is often comprised of a diverse mixture of tree and shrub species.

On the lower slopes of the mountains, palo verde-bursage and palo verde-creosote bush associations occur as the community intersperses with the creosote bush-bursage community. This sparsely vegetated community is mainly composed of shrubs and half-shrubs. In this habitat the dominant

shrub is creosote bush (Larrea tridentata) and the dominant half shrub is triangle-leaf bursage (Ambrosia deltoidea).

The desert grassland community is normally dominated by grasses and other herbaceous plants. The disclimax state found in the project area could have resulted from long-term overgrazing by livestock. Mesquite (Prosopis juliflora) is the dominant tree or scrub species and burroweed (Isocoma tenuisecta) and broom snakeweed (Gutierrezia sarothrae) are the main shrub species. Both shrub species are indicators of heavy grazing by livestock (Parker 1972). Some yucca (Yucca elata) plants also occur in this area.

The mesquite bosque community occurs along the Santa Cruz River, where mesquite is the dominant species. In the recent past, this community occurred along the Santa Cruz River as a dense forest with trunk diameters in excess of one meter. The present bosque, however, is limited to a few medium-sized trees which are restricted to the banks of the intermittently flowing Santa Cruz River.

b. Wildlife

Intensive wildlife surveys were conducted by Arizona Game and Fish Department (AGFD 1983 and 1985) in the entire Tucson Aqueduct Phase B area. Mammals occurring in the project area include big game species such as mule deer (Odocoileus hemionus) and javelina (Tayassu tajacu), and predators such as mountain lion (Felis concolor), coyote (Canis latrans), kit fox (Vulpes macrotis), gray fox (Urocyon cinereoargenteus) and bobcat (Lynx rufus).

Based upon radio-telemetry data, all animals except kit fox showed strong preference for palo verde-mixed cacti habitat and mountainous terrain. Most preferred washes, foot of slopes, slopes, and ridge tops. Coyotes were the most prevalent predator in the study area and were common in desert grassland, palo verde-mixed cacti, and mesquite bosque habitats. Creosote bush flats were used least of all habitats, except by kit fox. All species showed strong preference for areas over one-half mile from residences and major man-made intrusions. Radio tracking of big game animals and predators in the project area documented extensive animal movements between Black Mountain and the desert grassland on the San Xavier District, and from the Tucson Mountains west towards the Roskrige Mountains.

The most common rodents trapped during the AGFD (1983) study were the white-throated woodrat (Neotoma albigula) and the kangaroo rat (Dipodomys merriami). The palo verde-mixed cacti was the preferred habitat for small mammals. The creosote bush-bursage and mesquite bosque habitats were close in species diversity indices and were second to palo verde-mixed cacti. Desert grassland habitats had the fewest numbers of small mammals caught and the lowest species diversity. Mesquite bosque habitats appeared to be important to some small mammals due to good cover, abundant annual forage, and tempered winter weather.

Game birds and songbirds commonly found throughout the study area were: Gambel's quail (Callipepla gambelii), mourning dove (Zenaida macroura), common flicker (Colaptes auratus), verdin (Auriparus flaviceps), cactus wren (Campylorhynchus brunneicapillus), northern mockingbird (Mimus polyglottos), curve-billed thrasher (Toxostoma curvirostre), black-tailed gnatcatcher (Polioptila melanura), brown-headed cowbird (Molothrus ater), house finch (Carpodacus mexicanus), and black-throated sparrow (Amphispiza bilineata) (AGFD 1983).

Areas dominated by creosote bush had the lowest species diversity index for game birds and songbirds. All other habitats surveyed were similar in species diversity and density, although species of birds varied.

The red-tailed hawk (Buteo jamaicensis) was the most common diurnal raptor (bird of prey) and the most common raptor nesting in the area (61 percent of all active nests). Golden eagles (Aquila chrysaetos), prairie falcons (Falco mexicanus), and Harris' hawks (Parabuteo unicinctus) accounted for 19 percent of the breeding activity. The most abundant owl species, in descending order, were elf owl (Micrathene whitneyi), western screech owl (Otus kennicottii), great horned owl (Bubo virginianus), and common barn-owl (Tyto alba). The mesquite bosque community had nearly three times as many diurnal raptors as the next ranked habitat. One of the main areas of breeding raptors was west of Black Mountain on the San Xavier District. The palo verde-mixed cacti habitat was the most productive habitat for diurnal raptors and owls, versus creosote bush-bursage habitats which had the fewest owls and no diurnal raptor nests (AGFD 1983).

The Sonoran desert toad (Bufo alvarius) was the most frequently observed amphibian in the project area, followed by Couch's spadefoot toad (Scaphiopus couchii), and Great Plains toad (Bufo cognatus). The most abundant lizards were western whiptail (Cnemidophorus tigris) and zebra-tail lizard (Callisaurus draconoides). Snakes most frequently observed include Sonoran gopher snake (Pituophis melanoleucus), Mojave rattlesnake (Crotalus scutulatus), and western diamondback rattlesnake (Crotalus atrox) (AGFD 1983).

The palo verde-mixed cacti habitat supported the largest diversity of reptiles and amphibians, 27 percent more than desert grassland habitats, which were the next most diverse. Creosote bush-bursage habitats supported the lowest species diversity indices for reptiles and amphibians.

c. Special Status Species

Several species of plants and animals occur on or near the project area that are of special concern because of their legal protection under State or Federal regulations or because they are listed as sensitive or unique by one or more resource agencies.

The only species in the project area that is protected under the Endangered Species Act is the Tumamoc globe-berry (Tumamoca macdougalii), a vine listed as endangered (Table 2). Although Sanborn's long-

nose bat (Leptonycteris sanborni) occurs in the Tucson area, it is not known to inhabit the project area. In addition to federally listed species, there are plant and animal species being considered for listing under the Endangered Species Act. These candidate species are grouped into categories to accurately reflect present evaluations of their status. Category 1 species are those for which sufficient information exists to support their being listed under the Act. Category 2 species are those for which the available information is not sufficient to support listing at this time.

Candidate species that occur in the project area are stout-needled mulee (Coryphantha scheeri var. robustispina), a category 1 plant (Table 2); night-blooming cereus (Peniocereus greggii) and Thornber's fishhook cactus (Mammillaria thornberi), category 2 plants; and desert tortoise (Xerobates agassizii), a category 2 animal.

Table 2. Rare Plants occurring within the Alternative Transmission Line Right-of-Ways

	A L T E R N A T I V E						
	1	2A	2B	3	4	5	6
	(No Action)						
Tumamoc Globe-berry	0	37	110	0	0	0	0
Stout-Needled Mulee	0	0	5	0	0	0	0

From Reichenbacher 1988

The State of Arizona maintains a list of Threatened Native Wildlife in Arizona (Arizona Game and Fish Department 1988). The species are categorized by the degree of threat to their continued existence. The desert tortoise is a State candidate species existing in the project area that may be impacted by project implementation.

The five transmission line alternatives were surveyed for special status plant species by F. W. Reichenbacher and Associates under contract with the Bureau of Reclamation in 1988. Target species in these surveys were Tumamoc globe-berry and stout-needled mulee.

2. Impacts/Mitigation

The effects of the construction, operation and maintenance of the transmission line alternatives would include habitat degradation and loss, impacts to rare plants, and impacts to wildlife due to the creation of developed corridors through undeveloped areas (Table 3).

Table 3. Transmission Line Alternative Impacts on Habitat*

Alternative	1	2A	2B	3	4	5	6 (No Action)
Total Acres Disturbed	85	96	96	213	18	37	0
Developed (Municipal & Agricultural)**	41	65	23	108	15	17	0
Creosote-bursage	23	10	52	2	3	0	0
Palo Verde-Mixed Cacti	0	0	0	30	0	5	0
Mixed Scrub	18	18	18	25	0	15	0
Mesquite Bosque	3	3	3	48	0	0	0
New Right-of-Way Corridors through Undeveloped Areas (Miles)	1	0	3.5	7	0	0	0

* Based upon Arizona Game & Fish Department (1983) Vegetation Map

** Includes portions of the transmission line within the Black Mountain Pipeline right-of-way

Long-term habitat loss would result from transmission line and switching station construction, and from creation of access roads to the overhead alignments where needed. With the exception of Alternative 3, most of these areas would be adjacent to roadways and other disturbed areas, where impacts would be minor. Land disturbances resulting from construction of the switching station, access roads, and haul roads would be kept to a minimum. Disturbance outside right-of-way provided by the Government would need to be surveyed for federally protected plant species. Any areas disturbed by project construction activities not needed for permanent facilities or access would be revegetated with native or xeric-adapted plant species. However, permanent habitat loss would result from construction of the switching station, spreader yards (Alternative 2 only) and any access roads required. Construction of overhead transmission lines would not require the removal of all vegetation within the right-of-way.

In addition to habitat disturbance, temporary disturbance to wildlife would occur from construction activities. Permanent disturbance would occur from the creation of developed corridors through currently undeveloped areas. These new right-of-way corridors would impact species sensitive to man-made intrusions within their habitat ranges, e.g., mule deer (Table 3).

Construction disturbed areas not needed for permanent facilities or for operation and maintenance of the transmission line would be revegetated. Clearing of areas of native vegetation outside Government provided right-of-way would be kept to a minimum, and would require Federal environmental review prior to any disturbance. Construction personnel would be prohibited from disturbing or collecting wildlife within or adjacent to the project area.

Introduction of overhead transmission lines in areas where raptors occur can increase the potential for raptor electrocution. The two main problems causing raptor electrocutions are 1) distances between phase conductors that are less than the wingspread of birds landing or perching on them; and 2) design practices that dictate the grounding of particular parts of the equipment to prevent lightning damage (Olendorff et al., 1981). In the project area, the golden eagle, with a wingspan of 7-1/2 feet, would cause the greatest concern for electrocutions. All transmission lines constructed for the CAP are designed to eliminate raptor electrocution hazards, as committed to in the FEIS (Appendix A). Therefore, there would be no electrocution hazards posed to raptors from construction of an overhead transmission line by Reclamation.

A separate biological assessment has been prepared which summarizes Reclamation's evaluation of the proposed action's effect on threatened and endangered species, consistent with provisions of the Endangered Species Act. Reclamation determined there would be no effect to federally listed wildlife or plant species as a result of implementing Alternative 1, 3, 4, or 5. The Fish and Wildlife Service (FWS) concurred with this determination (FWS, October 28, 1988 and April 25, 1989). Implementation of Alternative 2 (A or B) would require further consultation with the FWS to determine whether or not the project would jeopardize the existence of the Tumamoc globe-berry.

a. Alternative 1

The entire alignment would consist of 9 miles of overhead line, most of which would fall along an existing road and the CAP right-of-way. Approximately 2.5 miles of the alignment would be constructed through undeveloped areas, resulting in the disturbance of approximately 44 acres of native desert habitat (Table 3). Much of these undeveloped areas are adjacent to residential developments, however, and only about one mile of new right-of-way corridor would be created. No federally listed or candidate category 1 plant species were found within the right-of-way.

b. Alternative 2A

Alternative 2A would consist of eight miles of overhead transmission line and three miles of underground cable, resulting in the loss of approximately 31 acres of habitat (Table 3). The majority of the alignment would follow existing roadways. About 2.5 miles of the alignment would occur along the Hermans Road right-of-way where no development currently exists. However, for the most part this undeveloped area is adjacent to a residential development and would therefore not create the intrusion of a new right-of-way

corridor. Temporary construction disturbance in this area would be low in the developed areas and moderate along the undeveloped parts. This alignment would be within one mile of Black Mountain where a large number of nesting raptors have been reported (AGFD 1983). With raptor electrocution-proof designs, the overhead portion of this alternative would not cause a significant hazard to raptors.

Due to right-of-entry problems, 0.75 mile of this alignment was not surveyed for rare plants. However, within the areas surveyed, 37 Tumamoc globe-berries were found within the right-of-way. Additional rare plants may occur on the remaining unsurveyed portion. If this alternative is ultimately selected as the proposed action, surveys would be completed for the entire alignment, and further consultation with FWS would be initiated prior to implementation of the project, in compliance with the Endangered Species Act.

c. Alternative 2B

Alternative 2B follows the same alignment as 2A, except that at the westernmost spreader yard it would turn and traverse south of the section line within the Nation before continuing westward. This alignment would also consist of eight miles of overhead line and three miles of underground cable. Approximately 6.2 miles of this alignment would be constructed within undeveloped areas, resulting in the disturbance of approximately 73 acres of native desert habitat (Table 3). Construction of this alignment would create 3.5 miles of new right-of-way corridor along a portion of the northern boundary of the Nation.

Results of the rare plant survey indicated 110 Tumamoc globe-berry and five stout-needed mulee plants occur within Alternative 2B right-of-way. If this alternative is ultimately selected as the proposed action, further consultation with FWS would be initiated prior to project implementation, in compliance with the Endangered Species Act.

Implementation of either Hermans Road alternative would have substantially greater biological impacts than any of the other alternatives, due to the existence of endangered plant species within the alignment corridors.

d. Alternative 3

This is the longest alternative, consisting of 17 miles of overhead line. Construction within undeveloped areas would result in approximately 105 acres of native desert habitat disturbance (Table 3). Rare plant survey results indicated no federally listed or candidate category 1 plant species occur within this alignment corridor. The major impact from this alternative would be the imposition of about seven miles of new right-of-way corridor within the Nation. Black Mountain, which is immediately north of this alignment, provided one of the most densely populated raptor nesting areas within the Tucson Phase B study area (AGFD 1983). Implementation of this alternative would result in greater impacts to native habitats than any

of the other alternatives. With the use of raptor electrocution-proof designs, there would be no significant adverse effects on raptors.

e. Alternative 4 - Ajo Way

This is the shortest alternative consisting of about five miles of underground cable. Construction within undeveloped areas would result in the disturbance of three acres of habitat, if an area of native desert was needed for storage (spoil) of excess excavation from the cable trench. No federally listed or candidate category 1 plant species were found within the alignment corridor. This alternative would have the fewest biological impacts because it would follow an existing right-of-way corridor and would be buried along the entire length.

f. Alternative 5 - Valencia Road

The total length of this alignment would be about eight miles. Construction within undeveloped areas would result in the disturbance of approximately 20 acres of native desert habitat (Table 3). However, this acreage is located adjacent to a major roadway, thus intrusion of a new right-of-way corridor would not occur. No federally listed or candidate category 1 plant species were found within the right-of-way. Implementation of this alternative would not substantially affect biological resources.

g. Alternative 6 - No Federal Action

No native desert habitat would be impacted, and no federally listed or candidate category 1 plant species would be impacted as a result of Federal action. Should Pima County widen the Valencia Road right-of-way, areas of native vegetation along the existing right-of-way would be destroyed.

D. Cultural Resources

1. Existing Conditions

Cultural resources within the general project area were assessed at the class II (sample) survey level, using available archival records. No new cultural resource related fieldwork was conducted for this environmental assessment. Approximately 50 percent of the total area encompassed by the five alternative right-of-way corridors have been previously surveyed: Alternative 1 - 29 percent; Alternative 2 (A and B) - 16 percent; Alternative 3 - 86 percent; Alternative 4 - 100 percent; and Alternative 5 - 43 percent. Pertinent records were investigated, primarily those on file at the Arizona State Museum, to derive a profile of archaeological and historic properties that might be expected to occur in the southern Tucson Basin.

Previous surveys indicate that many and varied archaeological resources are present in the southern Tucson Basin. The area has been occupied since about 10,000 B.C.; however, most of the known prehistoric archaeological sites date to the Hohokam era--about 300 B.C. to A.D. 1450.

Some evidence of Archaic Period occupation (7,000 B.C. to 300 B.C.) is present along the Santa Cruz River and to the west in Avra Valley. The southern Tucson Basin is rich in archaeological sites dating from Protohistoric Period contexts (A.D. 1450 to 1692) and historic properties dating from the Spanish Colonial (1692 to 1821), Mexican (1821 to 1853) and American (1853 to 1930) Periods of influence. Historic sites include missions, mines, battle fields, forts, homesteads, ranches, and travel routes.

2. Impacts

A list of known archaeological sites that would be impacted by construction of each alternative is shown in Table 4. All of the known sites are Hohokam Era habitation or village sites. Most, if not all, are expected to be eligible for listing, or are already listed, on the National Register of Historic Places (National Register). These sites are significant because of the wealth of archaeological data they contain, as defined by criterion found at 36 CFR 60.4. Few sites have been studied in the Santa Cruz River Valley, and these would contribute a great deal to the interpretation of southern Arizona prehistory. Final National Register eligibility determination of any site would be made in consultation with the State Historic Preservation Officer. Our first priority should be preservation of the sites through avoidance rather than impacting them. However, if impacts are unavoidable, an appropriate mitigation plan will be developed and implemented in consultation with the State Historic Preservation Officer.

Table 4. Known Archaeological Properties Which
Could be Impacted by Construction

Alternative	1	2A	2B	3	4	5	6 (No Action)
Total Acres	143	411	411	229	15	72	0
Acres Surveyed (%)	42 (29%)	64 (16%)	64 (16%)	197 (86%)	15.5 (100%)	31 (43%)	0 (0%)
No. of Known Sites Impacted & Site #	4	4	4	7	0	2	0
	AA:16:58 (ASM) BB:13:19 (ASM) BB:13:48 (ASM) BB:13:106 (ASM)	(Same as 1)	(Same as 1)	BB:13:126 (ASM) BB:13:126C (ASM) BB:13:126H (ASM) BB:13:166 (ASM) BB:13:173 (ASM) BB:13:215A (ASM) BB:13:215B (ASM)	0	BB:13:15 (ASM) BB:13:136 (ASM)	0

* A larger corridor (than the permanent easement to be acquired) was surveyed

Alternatives 1, 2, 3, and 5 contain cultural resources that could be impacted. Generally, transmission poles can be placed with some discretion to help reduce the seriousness of the impacts. It is anticipated

that impacts to known sites for Alternative 1 or 2 could be avoided or minimized in this manner. Because the archaeological sites within the Alternative 3 alignment cover such an extensive area, it would not be possible to avoid substantial impacts to portions of these sites. These sites are part of a lengthy and continuous Hohokam occupation zone along the banks of the Santa Cruz River. A major mitigation effort would be required should Alternative 3 be implemented.

The switching station associated with Alternative 5 could impact a portion of the Valencia Site (BB:13:15(ASM)), a National Register listed site. Avoidance of this archaeological site would be more difficult because there would be less flexibility in locating the station than is the case with pole placement. Reclamation will conduct a subsurface trenching program to determine if the site is present at the switching station location. Surface artifact density is very low in that locality of the property and the trenching program will help determine the nature of the site in that area. If the Valencia Site will be impacted, a specific mitigation plan will be developed to reduce the level of these impacts.

Construction and operation of transmission lines can also impact cultural resources indirectly by creating new public access to areas containing archaeological sites (Reclamation 1985). However, there is adequate existing access to the majority of all the alternative alignments considered. It is not anticipated that any additional access that would need to be developed for this project would increase the threat of damage to any of these sites.

Visual impacts to the San Xavier Mission (Mission), a National Historic Landmark, from Alternative 1, 2, or 3 would be similar to those described in the FEIS for the originally proposed Los Reales transmission line. Reclamation had determined the originally described impacts would not be adverse, and received concurrence from the State Historic Preservation Officer (Reclamation 1985). However, additional consultation with the SHPO may be necessary if Alternative 1, 2, or 3 is chosen because of changes in structure height and route from the original alignment. There would be no visual impacts to the Mission from Alternative 4 or 5.

3. Mitigation

As required by the National Historic Preservation Act of 1966 (Public Law 89-665), as amended in 1980 (Public Law 96-515), Reclamation will identify all significant cultural resources and consult with the State Historic Preservation Officer and the Advisory Council on Historic Preservation regarding appropriate treatment or mitigation to significant properties. A Class III (total inventory) survey will be completed for the alternative ultimately chosen for the transmission line alignment and switching station. All cultural resource related mitigation measures would be implemented prior to construction.

E. Visual Resources

1. Existing Conditions

The FEIS provided an in-depth explanation of the Visual Resource Management System (VRM) that was used to rate the visual quality of the Tucson Aqueduct Phase B project area. An interdisciplinary team inventoried the Phase B study area in June-August 1982. Scenic quality of the area was evaluated using VRM, in terms of land form, vegetation, color, presence or scarcity of water, adjacent scenery, and existing cultural modifications. Areas were categorized by classes from 1 to 5, with Class 1 indicating an area having the greatest amount of scenic resources. The majority of Alternatives 1, 2, 3, and 5 fall within areas rated Class 3. A minor portion of Alternative 3 borders a Class 2 area. The majority of Alternative 4 lies within a Class 2 area, with a small portion of the alignment and the GIS falling within a Class 3 area (Reclamation 1985).

A Class 2 rating indicates fairly high scenic quality with medium to high user interest. The level of change should be low, and human activities should retain the existing character of the landscape. Contrasts may be seen but should not attract attention.

A Class 3 rating indicates the area has interesting and distinctive features, but is somewhat similar to other areas in the region. Changes should repeat the basic natural elements of the characteristic landscape as much as possible, resulting in partial retention of the existing landscape character.

Residential and commercial structures are found in varying degrees of density along the corridors of Alternatives 1, 2, 4, and 5. The majority of the alignment of Alternative 4 can be seen from Tucson Mountain Park. Ajo Way is a designated State scenic route. The majority of Alternative 3 falls within vacant land of the Nation.

Overhead transmission and distribution lines and/or overhead telephone cables presently exist along the majority of the alignments for Alternatives 1, 2, 4, 5, and along a minor portion of Alternative 3. These overhead lines are generally supported by single wood poles approximately 35 to 40 feet in height. Along the Valencia Road portion of Alternative 5, in addition to these shorter wood poles there are taller single wood poles (50 to 70 feet tall). There are also single steel poles (60 to 70 feet tall) along a mile-long portion of Valencia Road near the switching station site. Steel lattice towers 80 feet high can be found in the immediate vicinity of the switching station locations evaluated for Alternatives 1, 2, 3, and 5. Double and triple wood pole structures 55 feet tall can be found at Alternative 4's switching station location.

2. Impacts

The FEIS described two types of visual changes that would occur due to the Phase B project--short term disturbances due to construction, and long term changes caused by the presence of new permanent structures.

Although construction-related activities would contribute to the degradation of visual quality, the FEIS determined that because of their temporary nature, these activities would not result in a significant adverse effect on visual resources within the project area.

Each alternative would result in the construction of at least one permanent structure, a switching station. All four switching station locations evaluated are located within Class 3 areas. Alternative 2 (A or B) would result in two additional permanent structures (spreader yards) (see Figure 3). The spreader yards would also be located within Class 3 areas.

Overhead transmission line alternatives would result in permanent structures (single wood or steel poles) ranging in height between 60 to 80 feet. The poles for Alternative 1, 2 (A or B), or 3 would be wood, placed approximately 400 feet apart along the alignment, supporting a three-phase (three-wire) transmission line. The poles for Alternative 5 would be steel painted a Mojave sage color, placed approximately 450 feet apart along the alignment. These poles would support a double circuit (two three-phase lines, or six wires) and an underbuilt distribution line along Valencia Road. Along the CAP right-of-way the poles would initially support only one three-phase line, although they would have the capability of supporting a double-circuit as well. The wires for all overhead lines would be non-reflective.

It is anticipated that underground cable would result in no permanent visible structures. Although pull boxes may be required if open trench excavation is not possible crossing Ajo Way or at existing culverts, these would be buried.

Following is a brief summary of impacts to visual resources that would result from each alternative.

a. Alternative 1

Implementation of this alternative would result in the placement of a three-phase 115-kV transmission line strung from 55- to 80-foot high single wood poles alongside Los Reales Road west from I-19 to Spencer Road (the CAP right-of-way), and north on Spencer Road to the Ajo Way spreader yard. There are currently existing overhead power lines using 35- to 40-foot high single wood poles along Los Reales and a portion of Spencer Road. A switching station would be constructed within the Nation east of I-19 and south of Los Reales Road, just south of an existing subdivision (Figure 4). The tallest structures within the switching station would be the line-terminating towers. There would be three 45-foot towers for Reclamation's and Western's use. Another 45-foot tower would be constructed by PTUA in the future, and possibly one other tower would be constructed by another utility company. Although none are currently located in this specific area, electrical switching stations and substations are commonly found within and around metropolitan areas.

Although not highly obtrusive, the height of the transmission poles would make this overhead 115-kV line visible from the San Xavier Mission, which is about three-quarters of a mile south of the

alignment. The San Xavier Mission sits on the terrace above the Santa Cruz River, approximately one-half mile west of the river. The Mission has an unobstructed view toward the north and northeast following the slope which treads downward to the river. The visual scene is impacted by existing agricultural fields, housing developments and transmission lines located about three-quarters of a mile north of the Mission.

b. Alternative 2 (A or B)

Implementation of this alternative would result in the placement of a three-phase transmission line strung from 55- to 80-foot high single wood poles alongside a portion of Los Reales Road between I-19 and Indian Agency Road. The overhead portion of this alignment would begin again west of the paved portion of Hermans Road, going west along the Hermans Road right-of-way to Spencer Road, and then north along Spencer Road to the Ajo Way spreader yard. There are existing overhead transmission lines using 40-foot high single wood poles along Los Reales, Hermans Road, and a portion of Spencer Road. The switching station would be identical to that described in Alternative 1.

Alternative 2 would result in two permanent structures in addition to the structures identified in the original plan. These would be identical spreader yards, which are needed where overhead lines are converted to underground cables. Each spreader yard would be approximately 75 feet by 75 feet in size, and would house one 45-foot high steel A-frame structure (Figure 3). One spreader yard would be located at the intersection of Indian Agency and Los Reales Roads. The other spreader yard would be located just west of the end of the paved portion of Hermans Road. There are currently no similar looking structures in these two locations.

Impacts to the San Xavier Mission would be similar to that described in Alternative 1.

c. Alternative 3

Implementation of this alternative would result in the placement of a three-phase transmission line strung from 55- to 80-foot high single wood poles within the Nation. A portion of this overhead line would parallel a shorter overhead transmission line for approximately two miles south from the switching station, near the eastern boundary of the Nation. The overhead line would continue west, roughly across the middle of the Nation, passing south of Black Mountain. At Spencer Road, the overhead line would continue north along the Black Mountain Pipeline to the Ajo Way spreader yard. There are currently smaller overhead power lines along a short portion of Spencer Road.

A switching station would be constructed within the Tohono O'Odham Nation, just under one-quarter mile west of several residential structures located along the Nogales Highway. This switching station would be identical to that described for Alternative 1.

This alternative would result in visual impacts similar to those of the original plan. Although the transmission line would be longer, it would be relocated from a frequently traveled roadway to a relatively untraveled area.

d. Alternative 4

Construction of the transmission line beneath the Ajo Way right-of-way would be consistent with visual restrictions for designated scenic routes. There would be no permanent above-ground structures, with the possible exception of low profile pull boxes that could be required. Most, if not all construction would occur within the Ajo Way right-of-way that is already graded or disturbed.

Because Alternative 4's switching station would be located within a city park, a GIS station--which is smaller and more compact--would be constructed instead of the conventional air-insulated switching station that would be constructed with the other alternatives. There would be two 45-foot tall line terminating towers similar to those of a conventional air-insulated station; however, the additional structures would be encased in gas insulated pipes and would maintain a lower profile.

This alternative would result in less permanent structures than the original plan, as well as the fewest number of new structures of all the alternatives.

e. Alternative 5

Implementation of this alternative would result in the replacement of an existing sub-transmission line on 50- to 70-foot high single wood poles along Valencia Road, with 60- to 70-foot high single steel poles painted a Mojave sage color. The existing line is single circuited with an underbuilt distribution line. The steel poles would be double-circuited with an underbuilt distribution line. This line would look essentially the same as an existing transmission line that goes west for about a mile west of the Santa Cruz River on the north side of Valencia Road. At Spencer Road, the CAP 115-kV transmission line would continue north within the CAP right-of-way to the Ajo Way spreader yard. This portion of the transmission line would be new, and would also use single steel poles. Although it would be a single-circuited line, the poles would be sized to allow for the future installation of a second circuit by TEP at its own expense, should development occur that would require such installation. The presence of steel poles would result in a slightly different visual impact than wood pole structures originally described in the FEIS. However, this alternative would eliminate the need to create a new transmission line corridor for the majority of the alignment.

Valencia Road has been designated by the County as a gateway route. According to Pima County Planning and Development Services, the proposed transmission line would be in compliance with currently proposed regulations regarding visual impacts along this corridor (Lori Woods, pers. comm. 1989).

A switching station would be constructed alongside Interstate 19, at Valencia Road. This station would be easily viewed from traffic going south on the Interstate. This switching station would be identical to that described in Alternative 3. Neither the switching station or the transmission line would be visible from the San Xavier Mission.

f. Alternative 6

No transmission line would be constructed by the Federal government. However, it is anticipated TEP would upgrade the existing 46-kV sub-transmission line along Valencia Road to 138-kV should development in the area occur that would require such an upgrade.

3. Mitigation

As committed to in the FEIS, non-specular (non-reflective) conductors would be used along overhead portions of the transmission line to reduce visual impacts.

The switching station for Alternatives 1, 2, 3, and 5 would be surrounded by an eight-foot high solid wall. This wall would be painted in a color complementary to the surrounding area. With Alternative 2 (A or B), a similar wall would surround each spreader yard to mitigate for visual impacts.

The GIS station for Alternative 4 would also be surrounded by a solid wall--this wall would be designed to blend in with existing park structures in the vicinity.

Steel poles would be painted a mojave sage color to blend with the surrounding landscape.

For all alternatives, existing vegetated areas impacted by construction that would not be needed to provide access to project facilities would be revegetated after construction was completed. With Alternative 4, any revegetation needed along Ajo Way--a designated scenic route--would be coordinated with Pima County and the Arizona Department of Transportation (ADOT). Any revegetation required within Kennedy Park would be coordinated with the City of Tucson. Any revegetation within the Nation or Pascua Yaqui Indian Reservation needed for alternatives 1, 2, 3, or 5 would be coordinated with the appropriate Tribal Council. No mitigation for visual impacts would be required with Alternative 6.

F. Land Use and Land Ownership

1. Existing Conditions

The project area is made up mostly of residential, agricultural, commercial, and undeveloped lands. The agricultural lands are found within the Nation. Two recreational areas--Kennedy Park and Tucson Mountain Park--are found nearby. The quality of the undeveloped areas range from native desert to highly disturbed lands resulting from extensive refuse dumping that has occurred. The majority of native desert areas are found

within the Pascua Yaqui Reservation and the Nation. Small parcels of native desert are also interspersed among developed areas along portions of the various alignments.

2. Impacts/Mitigation

Permanent easements would be needed for the construction and operation of either the overhead transmission line or the underground cable. For overhead transmission line alternatives, a graded dirt maintenance road would be constructed within the transmission line easement where access was not readily available adjacent to the alignment. The land needed for the switching station (all alternatives except #6) and spreader yards (Alternative 2) would be purchased and maintained by the Federal government. Alternative 4's GIS station would be substantially constructed within an existing disturbed area located in the southwest corner of Kennedy Park; an additional minor amount of land (about 0.1 acre) could be needed from the City of Tucson for the GIS station.

Consistent with Reclamation land acquisition contracts, existing permanent structures within the transmission line's easement (either overhead or underground) that pose a fire or safety threat would need to be relocated outside the easement. Reclamation would reimburse landowners and/or utilities for any relocations required, in compliance with Department of Interior regulations.

The estimated number of acres needed for the overhead transmission line portions of all alternatives is based upon a maximum right-of-way width requirement of 100 feet in undeveloped areas, and 40 feet in densely populated areas. The right-of-way width of the underground cable would be 24 feet. Just under 2.5 acres would be needed for the conventional air insulated switching station and about 0.5 acres would be needed for the GIS station.

Landowners in the area would experience short term, construction-related inconveniences such as dust, noise, temporary disruptions to utilities, and traffic delays/detours. Construction-related impacts would occur for a relatively short duration in any given area. Overhead construction in any given area would be staged over about a four month period; underground construction along any given stretch would be limited to about 10 to 14 days. Construction of the entire project is scheduled to be completed within one year.

a. Alternative 1

Within the Los Reales Road right-of-way corridor there are space and existing easement limitations. Therefore, portions of the overhead transmission line would need to be constructed within areas currently occupied by residential and commercial facilities adjacent to the road right-of-way. Permanent structures considered by Reclamation to be a fire or safety threat would need to be removed or relocated outside the right-of-way. This could also result in the placement of poles within some occupied residential and

commercial properties. Approximately 6.5 miles of this alignment would fall within developed areas.

Approximately 35 percent of this alignment would fall within lands already acquired by Reclamation for its Black Mountain Pipeline. However, additional easements would need to be acquired for the transmission line.

b. Alternative 2 (A or B)

This alternative avoids placement of poles within most presently occupied private lands, by transitioning to underground cable along the alignment within densely populated areas. Relocation of underground utilities may be required within the portions of the alignment that are buried cable. This would result in minimal service disruptions to adjacent neighborhoods. There are permanent structures that would fall within Reclamation's easement (either overhead or underground) that would need to be relocated outside the right-of-way. Approximately 4.7 miles of this alignment would fall within developed areas.

Approximately 35 percent of this alignment would fall within lands already acquired by Reclamation for its Black Mountain Pipeline. However, additional easements would need to be acquired for the transmission line. Because of the large number of landowners involved, it is possible land acquisition would delay construction of this project.

c. Alternative 3

The majority of this alignment would fall within the Nation. This alternative would impact the greatest number of landowners (or allottees). However, the majority of the alignment does not fall near or within occupied permanent structures, therefore construction-related impacts would affect the least amount of residents, and would require little or no relocations.

Approximately 20 percent of this alignment would fall within lands already acquired by Reclamation for its Black Mountain Pipeline. However, additional easements would need to be acquired for the transmission line. Because of the large number of landowners involved, it is possible land acquisition would delay construction of this project.

d. Alternative 4

Because most, if not all, of this alignment would fall within the Ajo Way right-of-way, this alternative would impact the least number of landowners. Construction-related impacts would affect only a small number of residents, since the least amount of permanent residential structures occur along this alignment, with the exception of Alternative 3. Avoidance or relocation of over 80 utilities, drainage structures or access points off Ajo Way would be needed. This would result in additional temporary inconveniences to residents. None of this alignment would fall within lands already being acquired for Reclamation purposes.

f. Alternative 5 - Valencia Road

Six miles of this eight-mile alignment would follow an existing sub-transmission line corridor along Valencia Road. Therefore, it is likely no existing permanent facilities would need to be relocated for the transmission line. Reclamation would acquire existing County right-of-way wherever possible. However, due to County plans to widen the Valencia Road right-of-way some time in the future, Reclamation would consider acquiring additional right-of-way adjacent to the existing road right-of-way along portions of Valencia Road where no development currently exists. The remaining two miles of the alignment would follow the CAP right-of-way. Approximately 3.5 miles of this alignment would fall within developed areas.

Approximately 25 percent of this alignment would fall within lands already acquired by Reclamation for its Black Mountain Pipeline. However, additional easement for the transmission line would need to be acquired within Reclamation's existing easement.

g. Alternative 6 - No Federal Action

No landowners would be affected as a result of a Federal action. The County has plans to widen the Valencia Road right-of-way to 200 feet sometime in the future. Most of the Valencia Road right-of-way between Spencer Road and I-19 is currently 150 feet. No change of land use would occur from the implementation of the No Federal action alternative.

Table 5 indicates the total number of acres needed for each alternative, and the number of landowners that would be affected. Where alternatives include Indian allotted lands, the number of landowners is an estimate of the minimum number of landowners/allottees believed to be involved.

Table 5. Acres Needed/Landowners Impacted by Alternative

Alternative	1	2A	2B	3	4	5	6 (No Action)
Total Acres Needed	85	96	96	213	18	37	0
Landowners Impacted	109	62	193	241	2	71	0

G. Social and Economic Resources

1. Existing Conditions

Tucson is the second largest city in Arizona and is the economic center of the Tucson Aqueduct Phase B service area. It is a rapidly growing metropolitan area. The FEIS indicated the 1982 population of Tucson

was 354,400. In 1986, the population had increased 12 percent, to 395,634 (Reclamation 1988).

Ajo Way is a major roadway into and out of the metropolitan Tucson area. Arizona Department of Transportation (ADOT) estimated the 1987 average daily traffic on Ajo Way was 20,000 cars at the junction of La Cholla Boulevard. About 3.5 miles west, at the junction of Kinney Road, the average daily traffic was 5,500 cars (ADOT 1988). Average daily traffic counts were not available for roads within any other alternative alignment corridors.

2. Impacts/Mitigation

With any of the alternatives there would be similar temporary inconveniences resulting from construction activities. These would include temporary traffic delays and/or detours, additional noise and dust generated by excavation and backfill operations, and possible temporary disruptions of utility services. Additionally, blasting would be needed with Alternative 4 to excavate portions of the trench that are in solid rock which would create noise disturbance and minor vibrations in the immediate area. These disturbances would be kept to a minimum as much as possible. Construction contractors would be required to implement a dust abatement program. Construction operations in populated areas would be limited to daylight working hours.

Impacts to traffic would be greater with construction of underground cable than with an overhead line. Alternative 4 would substantially affect the traffic along Ajo Way during construction. The majority of the construction would occur within the divided median, and adjacent to or crossing the roadway in two places. An exemption from Arizona Department of Transportation's policy against open cutting across State routes would be needed to construct this alternative. It is anticipated each lane bordering the median where construction would occur would need to be closed off. Because of the large number of utilities and access points associated with Alternative 4 (over 80), there would be additional temporary traffic detours and disruptions during their relocation.

Construction of the underground portion of Alternative 2 (A or B) would impact traffic to a lesser degree, along Los Reales and Hermans Roads, and Cardinal Avenue. The cable would be buried adjacent to the paved road, but within the right-of-way. Construction of overhead lines would require only minor lane detours along the road during placement of pole structures.

Construction within any road right-of-way would comply with the appropriate transportation department's safety requirements.

Alternative 4's switching station would be located at the outskirts of a City park, just inside the park boundary. Based upon initial consultation with City park personnel, construction should not affect nearby recreational activities. Construction activities would be coordinated with the City. Selection of the GIS design for Alternative 4 was due in large part to the close proximity to the Park.

Long-term electrical effects associated with transmission lines, such as radio and television interference, would be negligible. Electrical interference is caused by corona, the electrical breakdown of air into charged particles; however, these effects are generally associated with transmission lines operating at voltages much higher than a 115-kV transmission line (e.g., 345-kV). Corona effects from the proposed 115-kV transmission line should be negligible. There would be no corona effects from an underground cable (Western 1988).

Much research is presently being conducted to determine the effects of exposure to power frequency electric and magnetic (EM) fields. The results of these studies have been inconclusive and conflicting. Although EM fields have been shown to produce a variety of biological effects, it is unclear whether or not any of these changes may lead to health risks (Morgan 1989, p. 10). It is also unknown whether or not weaker fields would be safer than stronger fields (Morgan 1989, p. 21-23). There are even questions regarding how to measure the "dose" of EM fields that produce effects. Common household items, such as electric blankets and shavers, can produce an exposure to EM fields that is equal to or greater than a 500-kV transmission line, depending upon how exposure is measured (Morgan 1989, p. 22). Based upon the results of studies conducted to date, Reclamation cannot conclude there would be any adverse impacts to nearby residents from either the overhead transmission line or underground cable.

Impacts from implementation of Alternative 6, the No Federal Action alternative would result in a greater risk of outages with the Tucson Aqueduct Phase B system. This part of the Aqueduct serves all the CAP customers from just north of the Tucson metropolitan area to the end of the system (up to 17 entities receiving a total of 215,450 acre-feet/year by the year 2034). Unscheduled outages could result in temporary disruption in water deliveries and additional water costs to customers. Outages due to transmission line power loss to the pumping plants could be caused by floods, lightning, collisions by objects with pole structures, or vandalism. Maintenance and repair of the transmission system would be more difficult if a second source of power was not available to allow the line to be repaired while de-energized.

Without a loop feed transmission system to supply electrical power to the Tucson area CAP pumping plants, there would be excessive power system voltage reductions during pump starting. This problem was identified during earlier power system studies conducted during the planning stages of the Tucson Aqueduct. Voltage reduction during starting of large loads is observed as flickering lights. Other problems that can occur as a result of this situation are general electrical system disturbances due to undervoltage, and the upset of various types of electronic equipment--such as computers--in adjacent areas.

Should TEP determine there is a need to upgrade its existing 46-kV sub-transmission line or install a new line, State regulations would require TEP to conduct a public hearing for any proposed upgrade to or installation of a transmission line with a voltage of 115-kV or greater.

The County has plans to expand the existing right-of-way along Valencia Road to 200 feet sometime in the future. The majority of the Valencia Road right-of-way in the project area is currently 150 feet, although some portions are 105 feet; therefore the County would need to acquire an additional 50 to 95 feet from landowners adjacent to the existing right-of-way.

H. Floodplains Management

Western has determined that the Department of Energy Environmental Review Requirements (CFR 1022) will not require a Floodplains/Wetland Assessment for Alternative 5. Spanning, temporary activities within or the construction of temporary structures within these areas will be addressed in the Western NEPA process. The existing TEP line spans the Santa Cruz River and all washes along the corridor; therefore, no permanent structures will be located in an active floodplain. Alternatives 4 and 5 both will not significantly affect floodplain areas and will be covered under NEPA. There will be no impacts to floodplains nor to the line as a result of it being located in floodplains.

I. Summary

Reclamation has determined that Alternative 5 is the Agency-proposed action. This is based upon an evaluation of each alternative considered to be viable by Reclamation. This evaluation included project costs, including the likely environmental mitigation and construction-related expenses, and long- and short-term impacts to environmental resources, landowners/residents, and the general public.

Alternative 5 would result in the second lowest impacts to biological resources, and would not impact any federally protected species. It is anticipated the switching station could be located in such a way as to avoid a major cultural resource site. If this cannot be done, implementation of Alternative 5 would significantly affect this site. Data collection and recordation would be required to mitigate construction-related impacts to an acceptable level. Although this alternative would result in the construction of a switching station that would be easily viewed from an Interstate highway, a wide variety of man-made structures are currently found along this travelway. This alternative results in the least amount of new visible transmission line being constructed, with the exception of Alternative 4. This is because seventy-five percent of Alternative 5's alignment would replace an existing sub-transmission line. Although the single-circuit sub-transmission line would be replaced with a double-circuit line, Reclamation considers this to be an overall reduction in visual impacts from the original plan. Alternative 5 impacts the third least number of landowners, and would require little or no relocation of permanent residential or commercial facilities (except utilities).

Alternative 5 represents an overall reduction in the quantity and quality of impacts that would have resulted from the original plan, Alternative 1. Although Alternative 4 would result in the least amount of

environmental impacts, it would require a Federal capital outlay of over \$3 million more than Alternative 5. For these reasons, Reclamation believes Alternative 5 is the most cost-effective alternative and has chosen it as its proposed action.

A summary of environmental impacts from the alternative alignments is provided in Table 6.

Table 6. Summary of Environmental Impacts
Los Reales Transmission Line Alternatives

Resource/Alternative	1	2A	2B	3	4	5	6 (No Action)
Biological	44 acres of habitat disturbed; 1 mile of new right-of-way created	31 acres of habitat disturbed	73 acres of habitat disturbed; 3.5 miles of new right-of-way created	105 acres of habitat disturbed; 7 miles of new right-of-way created	3 acres or less of habitat disturbed	20 acres of habitat	No impacts
Endangered Species	No impacts	37 Tumamoca found	110 Tumamoca and 5 Stout-necked mules found	No impacts	No impacts	No impacts	No impacts
Cultural	4 sites impacted	Same as 1	Same as 1	7 sites impacted	No sites impacted	2 sites impacted	No impacts
Visual	Switching station behind subdivision; new transmission line with 60- to 80-foot tall wood poles visible along Los Reales Road and Spencer Avenue	Switching station behind subdivision; new transmission line with 60- to 80-foot tall wood poles visible along Spencer Avenue; spreader yards near two residential areas	Same as 2A	Switching station 1/4 mile from residents; new transmission line with 60- to 80-foot tall wood poles visible along Spencer Avenue	Low profile switching station on outskirts of Kennedy Park next to Ajo Way	Switching station visible to southbound I-19 traffic. Replaces single circuit 46-kV line on single wood poles with a double circuit line on single steel poles along Valencia Road; new transmission with 60- to 70-foot tall steel poles visible along Spencer Avenue	Anticipated upgrade of existing sub-transmission line by private utility resulting from increased urbanization
Land Ownership/Use and Social	109 landowners impacted (85 acres); structure & utility relocations required; temporary traffic disruptions	62 landowners impacted (96 acres); structure & utility relocations required; temporary traffic disruptions	193 landowners impacted (96 acres); utility relocations; temporary traffic disruptions; land acquisition could delay construction	241 landowners impacted (213 acres); little to no construction-related impacts; land acquisition could delay construction	2 landowners impacted (18 acres); utility relocations; temporary traffic disruptions along a State highway	71 landowners impacted (37 acres); utility relocations; temporary traffic disruptions	Periodic water delivery disruption to up to 17 municipal/private water service areas; increased water costs; excessive power system voltage reductions with normal plant operations; general electrical system disturbances in adjacent areas

IV. MITIGATION COMMITMENTS

The FEIS identified mitigation commitments for the entire Tucson Aqueduct Phase B. Appendix A to this EA provides a listing of FEIS commitments that pertain to the construction of this transmission line. Following is a summary of the mitigation commitments made in this EA that are in addition to those already identified in the FEIS, or that provide additional clarification. Where commitments overlap, the commitment in the EA takes precedence.

BIOLOGICAL RESOURCES

1. Construction access roads, haul roads, spoil areas, and other activities which require land surface disturbance outside of the construction right-of-way would be kept to a minimum, and would require the approval of the Contracting Officer, including environmental review, before any disturbance occurs.

2. Mitigation for destroyed habitat would consist of revegetation of all construction disturbed areas not required for operation and maintenance of the transmission line.

3. All overhead transmission lines will be designed to prevent accidental electrocution to raptors.

4. Construction personnel will be prohibited from disturbing or collecting wildlife within or adjacent to the project area.

SPECIAL STATUS SPECIES

If Alternative 2 (A or B) is implemented, further consultation with FWS would be initiated in compliance with the Endangered Species Act.

CULTURAL RESOURCES

As required by the National Historic Preservation Act (Public Law 89-665) of 1966, as amended in 1980 (Public Law 96-515), Reclamation will identify all significant cultural resources and consult with the State Historic Preservation Officer and the Advisory Council on Historic Preservation regarding appropriate treatment or mitigation to significant properties. Where significant archaeological sites will be impacted, mitigation would consist of locating construction impacts away from site areas or, if that is not possible, conducting data recovery excavations which address archaeological research issues appropriate for the resource. All mitigation measures will occur prior to construction.

VISUAL RESOURCES

1. As stated in the FEIS, non-specular conductors will be used along overhead portions of the transmission line to reduce visual impacts.

2. An eight-foot high solid wall would surround each spreader yard. The switching station for Alternatives 1, 2 and 3 would also be surrounded by

an eight-foot high solid wall fence. The walls would be painted in a color complementary to the surrounding area.

3. The GIS station for Alternative 4 would also be surrounded by a solid wall, which would be designed and colored to blend in with existing park structures in the vicinity.

4. Vegetated areas impacted by construction would be revegetated after construction was completed. With Alternative 4, any revegetation needed along Ajo Way, a scenic route, would be coordinated with Pima County and ADOT. Any revegetation required within Kennedy Park would be coordinated with the City of Tucson. Any revegetation required within the Nation or Pascua Yaqui Indian Reservation would be coordinated with the appropriate Tribal Council.

5. Excavation outside of the Ajo Way road right-of-way would be avoided if possible. Should excavation of rocky outcroppings be required with Alternative 4, rock staining would be used if determined viable, to make newly cut slopes less noticeable.

LAND USE AND LAND OWNERSHIP

Reclamation would reimburse landowners and/or utilities for any relocations required, consistent with Department of Interior regulations.

SOCIAL AND ECONOMIC RESOURCES

1. Construction contractors would be required to implement a dust abatement program.

2. Construction operations in populated areas would be limited to daylight working hours.

3. Temporary construction-related disturbances such as utility disruptions would be kept to a minimum as much as possible.

4. Construction within any road right-of-way would comply with the appropriate transportation department's safety requirements.

GENERAL

The appropriate Federal agency would comply with applicable NEPA requirements prior to approving TEP use of federally-owned structures and/or rights-of-way for installation or upgrade of TEP's power line(s).

V. APPLICABLE ENVIRONMENTAL QUALITY STATUTES

A. National Environmental Policy Act

This environmental assessment has been prepared in compliance with NEPA. The draft will be distributed for public review and comment.

B. Clean Water Act, as amended

Section 404 of this Act identifies conditions under which a permit is required for construction projects that result in the placement of fill or dredged material into a water of the United States. Construction of a transmission line, either overhead or underground is permitted under a nationwide permit, section 330.5 (a) (12) concerning discharge of material for backfill or bedding of utility lines.

C. Clean Air Act, as amended

This Act requires that any Federal entity engaged in an activity that may result in the discharge of air pollutants must comply with all applicable air pollution control laws and regulations (Federal, State or local). Measures would be incorporated into contractor specifications to ensure compliance with these laws and regulations is achieved.

D. National Historic Preservation Act of 1966, as amended

This Act requires Reclamation to identify significant cultural resources that may be impacted by a project and consult with the Advisory Council on Historic Preservation and the State Historic Preservation Officer concerning significant cultural resources.

Reclamation has coordinated Tucson Aqueduct-Phase B impacts to cultural resources with the Advisory Council on Historic Preservation and the State Historic Preservation Officer as required by this Act. The Nation was also consulted regarding impacts within the Nation's boundaries. All have agreed to the mitigation program developed for this CAP feature. Should an alternative be implemented that would impact any additional significant cultural resources, Reclamation will consult with each group regarding appropriate treatment or mitigation of these significant properties. All mitigation will occur prior to construction. If Alternative 3 is selected, the Nation would be specifically consulted.

E. Wild and Scenic Rivers Act of 1968

There are no portions of rivers either designated or under study as a wild and scenic river in the project area.

F. Wilderness Act of 1964, as amended

There are no portions of land either designated or under study as a wilderness area in the project area.

G. Fish and Wildlife Coordination Act

A Fish and Wildlife Coordination Act Report (FWCAR) was prepared for the Tucson Aqueduct-Phase B feature of the CAP by the Fish and Wildlife Service (1984). This FWCAR was amended to address the changes to the project that would occur with construction of an alternative to the original Agency-Proposed Action (FWS, October 28, 1988, and April 25, 1989). This report concludes that the proposed alternative would not cause greater environmental impacts than the original design, and that no additional mitigation measures would be needed (Appendix B). The FWS, however, prefers Alternative 4 for environmental reasons (FWS, June 27, 1989, Appendix D).

H. Endangered Species Act of 1973

Extensive section 7 consultation with the FWS was conducted in conjunction with the Tucson Aqueduct-Phase B EIS. Additional consultation was requested on May 18, 1988, specific to the proposed alignment change. Reclamation has determined there would be no effect to any federally endangered or threatened species with the proposed action, Alternative 4, or Alternatives 1 and 3. FWS has concurred with this determination (FWS, December 1, 1988). Should Alternative 2 (either A or B) be implemented, further consultation with the FWS would be needed to determine whether or not the project would jeopardize the further existence of the Tumamoc globeberry.

I. Executive Order 11988, Floodplain Management, May 24, 1977

Construction activities that would occur within a designated floodplain with Alternative 1, 2, or 3 would be limited to placement of poles within the Santa Cruz floodplain. With Alternative 2, 3, or 4, excavation and backfill of a trench within a few minor washes would occur. The bottom elevation of the floodplain would be restored to pre-construction conditions upon completion of the project. If flows occur during construction, there may be short-term increased turbidity levels, but these are not expected to have a significant effect on surface water quality. Reclamation will ensure all measures are taken to achieve compliance with this Order.

J. Executive Order 11990, Protection of Wetlands, May 24, 1977

No construction activities would have an impact upon any wetlands.

VI. CONSULTATION AND COORDINATION

Several agencies were consulted in assessing the effects of the proposed alignment modification. Following is a list of agencies that were consulted in the preparation of this assessment:

- Arizona Game and Fish Department
- Arizona State Historic Preservation Officer
- City of Tucson
- Pima County Planning and Development Department
- Pima County Transportation and Flood Control District
- Tucson Electric Power Company
- U.S. Fish and Wildlife Service
- Western Area Power Administration

Notices regarding the project and the availability of the draft EA for public comment were sent to 12,026 households in the project area. Copies were sent to those responding to this mailer, in addition to affected public agencies. Reclamation received 16 comment letters on this draft EA. These comments, and Reclamation's responses, are provided in Appendix D. Reclamation has determined an environmental impact statement is not required, and will prepare a Finding of No Significant Impact for this project.

VII. LIST OF PREPARERS

The following individuals prepared this environmental assessment:

- Sheryl Barrett, Biologist
- Sandy Eto, Environmental Protection Specialist
- Thomas Lincoln, Archaeologist

The following individuals provided technical input to and/or reviewed this environmental assessment:

- Kevin Adams, Civil Engineer
- Lynn Almer, Environmental Protection Specialist, Denver Office
- H. Duane Bock, Tucson Electric Power Company
- Bruce D. Ellis, Chief, Environmental Division
- Dan Fritz, Environmental Protection Specialist
- Lesley Fitzpatrick, Biologist; FWS
- Thomas A. Gatz, Supervisory Biologist
- George Hammer, Electrical Engineer
- Ralph Hart, Realty Specialist
- Hong Nguyen, Electrical Engineer
- Mike Robbeloth, Section Head, Drafting
- Charles Saylor, Western Area Power Administration
- James Thirkell, Chief, Electrical Branch, Power Division
- Christine Vinay, Drafting Technician

BIBLIOGRAPHY

- Arizona Department of Transportation. 1988. Traffic on the Arizona State Highway System - 1987, July 1988. Phoenix, Arizona.
- Arizona Game and Fish Department. 1983. Biological Resource Inventory, Tucson Division-Phase B, Central Arizona Project. Prepared for USDI-Bureau of Reclamation Contract #32-VO151. Phoenix, Arizona.
- _____. 1985. Final Report - Biological Resources Inventory Movement Study, Tucson Division Phase B-Central Arizona Project. Prepared for USDI-Bureau of Reclamation Contract #1-07-32-VO151. Phoenix, Arizona.
- _____. 1988. Threatened Native Wildlife in Arizona. Arizona Game and Fish Department Publication. Phoenix, Arizona.
- Morgan, Dr. M. Granger. 1989. Electric and Magnetic Fields from 60 Hertz Electric Power: What do we know about possible health risks? Department of Engineering and Public Policy, Carnegie Mellon University. Pittsburgh, Pennsylvania.
- Olendorff, R. R., A. D. Miller, and R. N. Lehman. 1981. Suggested Practices for Raptor Protection on Power Lines. Report Prepared for the Edison Electric Institute by the Raptor Research Foundation. Department of Veterinary Biology, University of Minnesota. St. Paul, Minnesota.
- U.S. Department of the Interior. 1972. Bureau of Reclamation, Lower Colorado Region, Final Environmental Impact Statement, Central Arizona Project, September 26, 1972. Boulder City, Nevada.
- _____. 1985. Bureau of Reclamation, Lower Colorado Region, Final Environmental Impact Statement, Tucson Aqueduct-Phase B, Central Arizona Project, August 14, 1985. Boulder City, Nevada.
- _____. 1988. Final Environmental Assessment, Tucson Aqueduct-Phase B Modifications, Central Arizona Project, May 1988. Phoenix, Arizona.
- U.S. Department of the Interior, Fish and Wildlife Service. 1988. Letter from Mr. Sam Spiller, Field Supervisor, Ecological Services, Phoenix, Arizona, to the Project Manager, Arizona Projects Office, Bureau of Reclamation, October 28, 1988.
- _____. 1988. Letter from Mr. Gilbert D. Metz, Acting Field Supervisor, Ecological Services, Phoenix, Arizona, to the Project Manager, Arizona Projects Office, Bureau of Reclamation, December 1, 1988.
- _____. 1989. Letter from Mr. Sam Spiller, Field Supervisor, Ecological Services, Phoenix, Arizona, to the Project Manager, Arizona Projects Office, Bureau of Reclamation, April 25, 1989.
- Western Area Power Administration. 1988. Letter from Mr. Gary J. Giles, Assistant Area Manager for Management Services, Boulder City Area Office, to Mr. Bruce D. Ellis, Bureau of Reclamation, August 31, 1988. Boulder City, Nevada.

APPENDIX A

**TUCSON AQUEDUCT - PHASE B MITIGATION COMMITMENTS
RELATED TO THE PROPOSED ALIGNMENT CHANGE**

APPENDIX A
APPLICABLE ENVIRONMENTAL COMMITMENTS
FINAL ENVIRONMENTAL IMPACT STATEMENT
TUCSON AQUEDUCT - PHASE B

1. Construction Considerations

a. Construction Materials

Reclamation will perform environmental analyses of any areas outside the right-of-way where construction material are obtained or disposed if those areas are used solely for project purposes.

b. Erosion Control

All excavated slopes will be benched, terraced, or furrowed to prevent erosion and aid revegetation after construction. Deep cut slopes would be benched or terraced and protected from cross drainage by diking. To prevent erosion of the cut slope, surface drain would be used at the toe of each bench or terrace.

c. Access During Construction

Construction access roads, haul roads, spoil areas, and other activities which require land surface disturbance outside of the construction right-of-way will require approval of the Contracting Officer including environmental review.

d. Water Resources

All intercepted floodflows would be bypassed in a manner that no damage will result to either public or private property.

Specifications would require the Contractor to prevent construction-related pollution of the underground aquifers, surface washes, and rivers. The contractor would comply with applicable Federal and State laws and regulations concerning control and abatement of water pollution.

If Santa Cruz River surface flows are proposed as construction water supply, a specific environmental analysis would be required to assess impacts of diversion and permission from the Contracting Officer would be required.

e. Waste Disposal

The Contractor will be required to remove all unused construction materials and other rubbish from the work area after construction.

The Contractor will be required to dispose of solid waste and/or hazardous waste in accordance with Federal and State of Arizona law and regulations.

After construction, storage yards will be returned as nearly as practicable to their preconstruction appearance. This will include removal of all surplus buildings and equipment, lumber, refuse, fencing, and all other items not at the site prior to construction. The area will be seeded with native plants species to replace vegetation.

Any excess excavated soil around transmission line structures will be spread and blended with existing soil around the structure.

f. Sound

Reclamation will review and evaluate the blasting plan submitted by the contractor before blasting is authorized.

Reclamation will maintain a construction noise monitoring program to insure normal noise levels do not exceed 75 decibels at night or 80 decibels during the day, as measured from points considered to be sound sensitive.

g. Air Quality

Dust from Contractor operations will be controlled by maintaining proper soil moisture conditions. The Contractor will establish a watering program and will maintain speed limits to reduce dust. Construction equipment use of State and county roads is to be regulated by those agencies.

Vehicles will be maintained by Contractor in proper condition to reduce emission problems. Vehicles producing excessive emissions will not be operated.

Local pollution and fire authorities will be consulted before waste material is burned.

h. Landscape Preservation

Prior to ... construction, right-of-way fence will be erected and vegetation clearing limits will be delineated in the construction specifications. Construction activities would be confined to these delineated areas within the right-of-way to reduce vegetation clearing and visual impact.

Construction specifications will specify designated use areas for contractor construction yards and other needed construction areas. These use areas would be selected based in part on their visibility from sensitive areas and other environmental considerations. Other construction use areas would require specific approval of the contracting officer.

i. Safety

Reclamation will monitor safety conditions during construction to avoid accidents.

During construction, signs, flagmen, and barricades will be used to warn of hazards (as appropriate).

2. Biological Resources

a. Vegetation

Mitigation for destroyed habitat would consist of revegetation of all construction disturbed areas not required for operation and maintenance of the aqueduct.

Western Area Power Administration will supervise the clearing of transmission line corridors to insure environmental protection measures are carried out. To enhance esthetics and control erosion, as much low growth vegetation will be preserved within the right-of-way as possible. Only the minimum amount of vegetation required by permanent facilities will be cleared.

Before being abandoned, the side of borrow pits would be stabilized, scarified, and left in a condition to facilitate revegetation. Reclamation will coordinate with other interested agencies the use of any borrow areas outside the right-of-way.

Advance notice will be given to the Arizona Commission of Agriculture and Horticulture in accordance with the Arizona Native Plant Law regarding disposition of protected native plants.

Vegetation monitoring will be established and baseline data recorded to determine seeding success and whether or not additional efforts are needed.

Any riparian vegetation that is lost during construction will be re-established through suitable revegetation techniques.

If borrow areas are selected along the Santa Cruz River, they will be confined to the river bed and will not impact adjacent bankline riparian habitat.

All reasonable and prudent alternatives identified by FWS to avoid jeopardizing the existence of any federally listed, proposed or candidate plant species will be implemented.

b. Wildlife

Construction disturbance would be minimized from January 1, to June 1, within one-half mile of Harris' hawk nests. No new haul roads, equipment yards or other related impacts would be permitted off the right-of-way within one-half mile from any nest.

Contractor crews will be discouraged from collecting or unnecessarily disturbing desert tortoise or Gila monsters during construction. Tortoises found in the construction area should be given to the Reclamation Inspectors, along with their location, for removal from the area.

All powerline poles will be of a design that will prevent electrocution of raptors.

Transmission lines will be monitored for the electrocution of raptors. If adverse effects are discovered, appropriate spacing and/or insulation modification will be made.

Additional mitigation recommended by the FWS, AGFD, BLM and others would be implemented as appropriate.

3. Cultural Resources

If evidence of previously unrecorded cultural resources is discovered during construction, operations in the vicinity of the discovery will cease until an assessment of significance is made and appropriate mitigation measures, if necessary, are completed.

4. Social Resources

Persons that must relocate their residence are eligible for relocation assistance and benefits in accordance with the Uniform Assistance and Real Property Acquisition Policies Act of 1970. Relocation benefits are separate from and in addition to money paid as compensation for property acquired. Persons who are displaced will be offered assistance in relocating on to suitable replacement property and in applying for monetary benefits for which they may be eligible.

5. Visual Resource

Dikes and cut slopes will be benched, terraced or furrowed to reduce erosion and aid in revegetation.

Construction-disturbed areas will be seeded with native and/or xeric adapted perennial plants and grasses. Revegetation efforts will be coordinated with interested local agencies and input will be sought in developing final revegetation plans.

The use of cobble or gravel cover or placement of landscape stone on cut slopes of dike side slopes will be considered as a means to reduce erosion, and enhance revegetation success.

Non-specular conductors will be used along the entire length of the (overhead) transmission line in order to reduce visual impacts.

6. Compliance With Other Environmental Laws and Regulations

In addition to meeting all of the above environmental commitments, the Contractor(s) is/are responsible for compliance with applicable Federal, State, and local laws and regulations concerning the environment. Examples include the Arizona Groundwater Management Act of 1980 and Pima County air quality regulations regarding travel on Pima County roads.

7. Changes in the Plan

Should changes in the plan or refinements in design result in environmental impacts which are significantly different from those described in the EIS (or any subsequent environmental assessment prepared), an environmental evaluation will be made and documented in accordance with the National Environmental Policy Act.

APPENDIX B

**U.S. FISH AND WILDLIFE SERVICE AMENDMENTS TO THE
FISH AND WILDLIFE COORDINATION ACT REPORT**

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

ECOLOGICAL SERVICES
3616 W. Thoman, Suite 6
Phoenix, Arizona 85019

October 28, 1988

NOV - 1 1988	
11/2	155
11/3	150
T.C.	

MEMORANDUM

TO: Project Manager, Arizona Project Office, Bureau of Reclamation,
Phoenix, Arizona

FROM: Field Supervisor

SUBJECT: Amendment to Fish and Wildlife Coordination Act (FWCA) Report,
Tucson Aqueduct Phase B, Central Arizona Project, Pima County,
Arizona (BR)

This document constitutes an amendment to the subject FWCA report dated March 16, 1984 and is necessitated by recent changes in project design. A previous amendment to the subject FWCA report was dated October 19, 1987 and was concerned with the relocations of the Black Mountain pumping plant and City of Tucson pipeline. This amendment concerns changes to the Los Reales 115-kV transmission line described in your memorandum to us dated October 11, 1988 and subsequent changes in environmental impacts resulting from the realigned feature. Information on the existing environment, original project design, impacts of the project and proposed mitigation is available in the March 16, 1984 report and incorporated herein by reference. The information and recommendations contained in this amendment have been coordinated with the Arizona Game and Fish Department.

Changes to the Project

The final environmental impact statement (FEIS) for Tucson Aqueduct Phase B was filed on August 14, 1985 and contained provisions for a 115-kV overhead transmission line from the Western Area Power Administrations's (WAPA) Tucson-Apache 115-kV line to the Black Mountain pumping plant. With the relocation of the pumping plant north to near Ajo Way adjacent to Snyder Hill pumping plant and the proliferation of residential and commercial areas along Los Reales Road, an evaluation of alternative routes for the transmission line was undertaken by the Bureau of Reclamation (Reclamation).

Alternatives Evaluated

Reclamation developed four alternative routes for the proposed transmission line. These are described below and shown on Figure 1.

Alternative 1 would follow the alignment described in the FEIS with a few changes. The line would begin at the WAPA line and proceed west along Los Reales Road until it intersected with the Tucson Aqueduct Reach 6 pipeline. From there it would proceed north along the pipeline alignment to the Ajo

Way spreader yard which is located at the intersection of Ajo Way and the pipeline. A conventional air insulated substation would be constructed at the WAPA tap. This line would be entirely overhead.

Alternative 2 has two scenarios available. Both would begin at the same WAPA tap location as Alternative 1 and proceed as overhead lines to Indian Agency Road where a small spreader yard would be constructed and the line converted to a buried cable. From there, the lines would continue along Los Reales Road to Cardinal Avenue, turn south along Cardinal to Hermans Road and turn west again. Another spreader yard would be constructed near the end of the paved portion of Hermans Road. The lines would convert to overhead facilities at this western spreader yard and one option would parallel Hermans Road west to the Tucson Aqueduct pipeline. The other option would drop into the San Xavier district and parallel the northern boundary to the Tucson Aqueduct pipeline. Both lines would then parallel the pipeline north and terminate at the Ajo Way spreader yard. A conventional air insulated substation would be located at the WAPA tap.

Alternative 3 would tap off the WAPA Tucson-Apache line south of the Alternative 1 and 2 tap location. The new line would parallel the WAPA line south to the eastern boundary of the San Xavier District, then turn due south and parallel the border for approximately 1.5 miles, remaining within the District. The line would turn west and intersect the Tucson Aqueduct pipeline south of Black Mountain, then parallel the pipeline north to the Ajo Way spreader yard. An air insulated substation would be located at the WAPA line tap. This line would be entirely overhead.

The preferred alternative of Reclamation, Alternative 4, would tap the WAPA line at a point just north of where that line crosses Ajo Way. An underground cable would cross under Ajo Way then parallel the road west to terminate in the Ajo Way spreader yard. The substation at the WAPA tap site would be a gas insulated type. This line would be entirely underground.

Impacts of the Changes

Table 1 shows the miles of line and acres of habitat disturbed by the alternatives to the action. Since Alternative 1 approximates the original route for the transmission line contained in the FEIS, it can be used to compare changes in project impacts.

It is clearly evident that the preferred alternative, alternative 4, would have considerably fewer impacts than any of the other alternatives. It has the shortest length and would be entirely underground in a narrow right of way. Short term losses of habitat would be reduced, and impacts to birds from overhead transmission lines would be eliminated.

Table 1. Land Losses Associated with Transmission Line Alternatives

Alternative	Miles	Alignment Corridor Width (in Feet)	Acres	Substation Acres	Total Acres
1	9	100	109	4	113
2a	7	100	94	4	97
	3	24	94	4	97
2b	7	100	94	4	97
	3	24	94	4	97
3	17	100	206	4	210
4	5.3	24	15	.5	15.5

All routes were surveyed under a Reclamation contract for the presence of the endangered Tumamoc globeberry (*Tumamoca macdougalii*). No globeberry plants were found along alternatives 1, 3 or 4; however a population of 110 globeberries was discovered along Hermans Road and could probably not be avoided by construction of either alternative 2a or 2b.

Conclusions

The new proposed transmission line alignment to provide power to the Black Mountain pumping plant would not cause greater environmental impacts than the original routing. In fact, the new route would have significantly fewer impacts. The mitigation measures detailed in our March 16, 1984 FWCA report would still be appropriate for the project in light of these changes. No additional mitigation measures would be needed.

Thank you for your continued coordination on this project. If we may be of further assistance, please contact Ms. Lesley Fitzpatrick or me (Telephone: 602/261-4720 or FTS 261-4720).

Sincerely,

for

Sam F. Spiller
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, New Mexico
(Fish and Wildlife Enhancement)
Director, Arizona Game and Fish Department, Phoenix, Arizona

Impacts of the Changes

Alternative 5 would require approximately 28 acres in easement along Valencia Road and would be contained within the Black Mountain pipeline. This route would affect 32 acres of vegetation. Because this line is entirely overhead, impacts to birds from the transmission lines would be anticipated.

Surveys for the endangered Tumamoc globeberry (Tumamoca macdougalii) were conducted on the Alternative 5 route and none were found. We do not anticipate any effect to the species from this action.

Conclusions

Alternative 5 will not result in greater environmental impacts than the original route proposed in the Final Environmental Impact Statement for Phase B of the Tucson Aqueduct. However, of the alternative routes, Alternative 4 would be less disruptive to vegetation and being underground would have no long term impact on birds.

The mitigation measure detailed in our March 16, 1984 FWCA report would still be appropriate for the project in light of these changes. No additional mitigation measures would be needed.

Thank you for your continued coordination on this project. If we may be of further assistance, please contact Ms. Lesley Fitzpatrick or me (Telephone: 602/261-4720 or FTS 261-4720).

Sam F. Spiller

cc: Regional Director, Fish and Wildlife Service, Albuquerque, New Mexico
(Fish and Wildlife Enhancement)
Director, Arizona Game and Fish Department, Phoenix, Arizona

APPENDIX C

U.S. FISH AND WILDLIFE SERVICE PLANNING AID LETTER/SPECIES LIST

**UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE**

ECOLOGICAL SERVICES
3616 W. Thomas, Suite 6
Phoenix, Arizona 85019

December 1, 1988

OFFICE OF THE ATTORNEY GENERAL
RECEIVED DEC 5 1968

100-227-94-1-056

(210) 115
1218 150

Initials
AN
RUE

Department of Reclamation,

MEMORANDUM

TO: Project Manager, Arizona Projects Office, Bureau of Reclamation,
Phoenix, Arizona

FROM: Acting Field Supervisor

SUBJECT: Los Reales 115-kV Transmission Line, Endangered Species Clearance

The Fish and Wildlife Service (Service) has reviewed your survey report and assessment of impacts for the subject project and concurs with your finding of no effect to listed or proposed threatened or endangered species from the Bureau of Reclamation's proposed action, Alternative 4.

If we may be of further assistance, please contact Ms. Lesley A. Fitzpatrick or me (Telephone: 602/261-4720).

Gilbert D. Metz

cc: Regional Director, Fish and Wildlife Service, Albuquerque, New Mexico
(Fish and Wildlife Enhancement)
Director, Arizona Game and Fish Department, Phoenix, Arizona

APPENDIX D

RESPONSES TO PUBLIC LETTERS OF COMMENT

ADMINISTRATIVE

FRANCES W. WERNER, Tucson, Chair
 THOMAS G. WOODS, JR., Phoenix
 PHILLIP W. ASHCROFT, Eagar
 GORDON K. WHITING, Klondyke
 LARRY TAYLOR, Yuma

Director

DUANE L. SHROUFE

Deputy Director

THOMAS W. SPALDING

ARIZONA GAME & FISH DEPARTMENT

2222 West Greenway Road Phoenix, Arizona 85027-1052-1000

ORIGINAL FILE COPY.

RECEIVED JUN 28 1989

Date	To	Initials
	100	
	1052-1000	
June 27, 1989		

Mr. Robert J. Towles
 Project Manager
 Bureau of Reclamation
 Arizona Projects Office
 23636 N. 7th Street
 P.O. Box 9980
 Phoenix, AZ 85068

Dear Mr. Towles:

Re: Draft Environmental Assessment (EA) for the construction of
 the Los Reales 115 kilovolt (kV) Transmission Line

The Arizona Game and Fish Department has reviewed the above-referenced draft EA and we provide the following for your consideration.

We believe that the draft adequately describes the various alternatives, including the proposed action, and that the environmental consequences of the transmission line construction are accurately and fully described. Provided that the environmental mitigation commitments described in the text of the draft EA are implemented, we have no objection to the construction activities described in the proposed action (Alternate 5).

We do wish to provide one comment, of an editorial nature, regarding the reference to the list of Threatened Native Wildlife in Arizona, on page 19. In July, 1988, the Arizona Game and Fish Commission approved a revision of this list which resulted in changes in the listing categories so that they more closely approximate the Federal threatened and endangered species categories. In addition, several species were either removed from or added to the list in response to the modified listing criteria. As a result, the Sonoran green toad (Bufo retiformis) is no longer a listed species in Arizona, and the Desert tortoise (Xerobates agassizii) is listed as a state candidate species rather than Group 3. Citation of this list should read as: Arizona Game and Fish Department. 1988. We recommend that the text on page 19 be modified to reflect these changes.

1-1

ert J. Towles

We appreciate the opportunity to review and comment on this draft.

Sincerely,

Robert K. Weaver
Habitat Evaluation Coordinator
Planning and Evaluation Branch

RKW:RAG:CS

cc: Gerry Perry, Supervisor, Tucson Regional Office
Sam Spiller, Field Supervisor, USFWS, Phoenix ES Office
Arizona State Clearinghouse, AZ 89-80-0016

RESPONSE TO COMMENTS
ARIZONA GAME AND FISH DEPARTMENT

1-1. The text has been revised to reflect these changes (see page 13).

June 28, 1989

RE: Los Reales 115 kV Transmission Line, Draft Environmental Assessment
(EA), DOI-BR

Thank you for sending us a copy of the draft Environmental Assessment (EA) for the above project. I have reviewed the portion of this document that deals with cultural resources and it is my opinion that the document adequately addresses any concerns that our office might have regarding cultural resources in the area.

Your continued cooperation with this office in considering the impacts of projects on historic preservation is appreciated. If you have any questions, please do not hesitate to contact me.

Sincerely,

Robert E. Gasser
Archaeologist & Compliance Coordinator

for Shereen Lerner, Ph.D.
State Historic Preservation Officer

[illegible]

COURTLAND NELSON
DEPUTY DIRECTOR

JUN 27 1939

TUCSON, ARIZONA 85746

June 21, 1989

PHONE (602) 883-5490

Robert Towles, Project ^{PHONE (602)} Manager
Bureau of Reclamation
23636 N. 7th Street
Phoenix, AZ 85608

attn: APO-150

Dear Sir:

I have studied the draft of the environmental assessment of the Los Reales 115kV Transmission Line alternatives. I am writing to express my opinion regarding the significance of possible harmful human biological impact of Reclamation's proposed action alignment, Alternative 5 (Valencia Road).

Studies have demonstrated potential adverse health effects of electromagnetic fields in recent years. (1-3) While studies are not totally conclusive, they do raise concern regarding the safety of overhead transmission lines. Alternative 5 would place high voltage power lines in close proximity to residential dwellings. Given current knowledge of potential adverse health effects of the electromagnetic fields generated by such lines, I believe that the potential risk to the community justifies the additional expenditure that would be required to place the cable underground. Apart from the disadvantage of additional cost, Alternative 4 (Ajo Way) would avoid potential adverse health effects of overhead lines and would be advantageous in other ways outlined in the EA (eg. least number of acres needed, least number of landowners impacted, shortest route, etc).

I believe that cost may have been weighted too heavily in leading to the decision that Alternative 5 be recommended. Cost is always a concern, and that is understandable. It is also necessary to consider the cost that would be involved if currently ongoing studies conclusively demonstrate serious adverse health effects from overhead transmission lines. The cost of removing the overhead line and replacing it with underground cable would be high, as could be the cost of any litigation involving adverse health effects.

Thank you for inviting my opinion on your EA. I hope that it may be helpful in leading to the best decision about the route for the transmission line.

Sincerely,

W. L. Bartholomew
William L. Bartholomew, M.D.

References

1. Power Frequency Magnetic Fields and Illness in Multistory Blocks. Public Health 1988; 102:11-18.
2. Do Power Line Generated Electromagnetic Fields Have Any Association with Certain Disorders? JAMA 1988; 259(8):1132-3.
3. The Effect of Ambient Levels of Power-Line-Frequency Electric Fields on Developing Vertebrae. Bioelectromagnetics 1988; 9(2):129-40.

RESPONSE TO COMMENTS
WILLIAM L. BARTHOLOMEW, M.D.

- 3-1. Much research is presently being conducted to determine the effects of exposure to power frequency electric and magnetic (EM) fields. The Electric Power Research Institute (EPRI), a utility-funded research facility located in Palo Alto, California, reports spending \$15 million on such research in the past decade, and is continuing to fund additional studies. These and other studies regarding the effects of electric and magnetic fields on human health have resulted in conflicting and inconclusive conclusions. This confusion over study results is reflected in the articles cited by the commentor.

A recently published brochure explains how electric and magnetic fields are created, describes the types of studies that have been conducted, and sorts through the conflicting conclusions resulting from those studies. The name of the brochure is "Electric and Magnetic Fields from 60 Hertz Electric Power: What do we know about possible health risks?", by Professor M. Granger Morgan, Head of the Department of Engineering and Public Policy and a Professor of Electrical and Computer Engineering at Carnegie Mellon University. This is an excellent publication that discusses complex technical topics in a way that can be understood by the average person.

Dr. Morgan tries to explain why studies have produced seemingly conflicting results.

Scientists have found that fields can produce a variety of biological effects, like changes in the levels of specific chemicals the body makes and changes in the functioning of individual nerve cells and the nervous system. Whether any of these changes can lead to health risks is less clear....

Some careful responsible scientists examine all the scientific evidence and remain unconvinced that there are any significant health risks from 60 Hz fields. Others, equally careful and responsible, look at the same evidence and conclude that there may be risks.

The disagreements result because the available scientific evidence is complex. Current knowledge is fragmentary and insufficient to explain everything that is observed. Responsible scientists can have legitimate disagreements about how the available evidence should be interpreted. Until more scientific studies are done, these disagreements will remain and simple yes or no answers to questions about possible health risks will not be possible. (Morgan 1989, p. 10-13)

Reclamation does not agree with the commentor's position that the potential risk to the community from the proposed transmission line justifies the technical risk and additional expenditure that would be

incurred by burying the cable. Reclamation believes associated health risks are uncertain. At this time, potential health impacts from buried cables cannot be ruled out either.

Dr. Morgan's brochure defines "prudent avoidance" as "limiting exposures which can be avoided with small investments of money and effort." Reclamation has determined this is the appropriate approach to take with regard to this project. EM field strengths under transmission lines and at the edge of the right-of-way can be reduced by using wider rights-of-way, taller structures, or by arranging lines to enhance cancellation of fields. Reclamation and Western will investigate all feasible methods for reducing field strengths. In addition, the presence of the distribution line to be underbuilt along the Valencia Road portion of the transmission line will serve as a neutral grounding circuit that could further reduce the EM field.

- 3-2. Again, Reclamation does not believe there is sufficient evidence of a health risk to justify the additional expenditure associated with Alternative 4. Dr. Morgan's brochure describes an approach to dealing with the potential health risk, in the absence of more conclusive evidence, that Dr. Morgan calls "aggressive regulation:"

...conclude we have a real problem and spend some serious time and money on an aggressive program of limiting field exposures now, while recognizing that we may eventually learn that some or all of this effort and money has been wasted, either because it wasn't needed or we spent it the wrong way because we didn't understand the science well enough to spend it effectively. (Morgan 1989, p. 24)

Dr. Morgan points out cancer deaths have been occurring in significant numbers long before 60 Hz fields became prevalent. Deaths due to cancer have not shown a dramatic increase as transmission and distribution lines have expanded throughout the country. Dr. Morgan concludes it would appear unlikely that EM fields could be a major contributor to cancer today (Morgan 1989, p. 20). He does state, however, that

...with the evidence now available we cannot rule out the possibility that 60 Hz fields are a significant factor in cancer risks. Frustrating as the uncertainty may be, we also cannot rule out the possibility that fields have **nothing to do with cancer**. (Emphasis in the original.) (Morgan 1989, p. 20)

If fields do pose a health risk, Dr. Morgan speculates only a small fraction of all the people exposed would develop adverse health consequences (perhaps less than one in many thousands). He argues if the risk of death from exposure to EM fields is less than one in several thousands, implementing the "aggressive regulation" approach would result in society spending more to protect its members against possible deaths from this uncertain risk than it does to protect its members against deaths from other known risks (Morgan 1989, p. 31). And, without a better understanding of the cause/effect relationship,

there remains the risk that monies and precautions taken would be ineffective.

First Interstate Bank
of Arizona, N.A.
Home Office
First Interstate Bank Plaza
P.O. Box 53456
Phoenix, AZ 85072-3456
602 271-6000

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8910001547

June 8, 1989

UNITED STATES DEPARTMENT OF THE INTERIOR
Bureau of Reclamation, Arizona Projects Office
Post Office Box 9980
Phoenix, Arizona 85068

Attention: Ms. Sandy Eto, Environmental Division

Re: Environmental Assessment (EA) dated May 1989 for the Los
Reales 115KV Transmission Line Alternatives for CAP Tucson
Aqueduct-Phase B (ref. APO-150)

Dear Ms. Eto:

I sincerely appreciate the opportunity for reviewing the EA. My comments do not reflect an official position of the Bank, but are solely my personal response to matters set forth in the EA.

My study of the EA was hampered by ignorance of the contents of the 1985 Environmental Impact Statement (FEIS). For that reason I found the comment on page 14 of the EA ("Areas or topics covered in the FEIS that would not be affected by the proposed modifications, such as air, water and noise pollution, are not addressed in this EA.") to be somewhat troublesome. Lack of information about actual or potential pollution could have a bearing on route selection; and I was forced to assume that such concerns had already been ruled out by earlier studies. The reader of an EA should not have to make assumptions.

4-1

The foregoing concern was amplified by the very brief and non-specific discussion of developed and agricultural areas. I would like to have known where such areas are located with respect to each alternative route, and uses or prior uses of property that any potential for claims or remediation, or undue exposure of project construction workers, or cross-contamination during or as a result of construction. I would also like to have known what kind of crops were grown, something about residual pesticides in the soils in or near construction areas, use of aerial crop dusting and the potential for dumping of pesticides, and whether project construction workers might be adversely affected by present or past agricultural practices.

4-2

I thought the discussion of cultural resources would have been strengthened by some comments as to whether any of the alternative routes would affect areas about which the Pasqua Yaqui Tribe or the Tohono O'odham Nation are particularly sensitive. While the likelihood would appear negligible, I think the EA should specifically rule it not as a consideration, since it would be an important factor if such areas did exist.

4-3

The discussion of rights-of-way for roads in the project area was imprecise in that the EA gave no description of the extent to which existing rights-of-way are improved. If any portion of an existing right-of-way has not been used or improved, then it seems to me that Table 3 would be slightly understated. In addition I would like to have had a clearer picture of the location of new right-of-way required for each of the alternative routes.

4-4

The analysis of alternatives 2A and 3 under "Biological Resources" states that use of raptor electrocution - proof designs would eliminate adverse effects on raptors. These statements should be revised so as not to be absolute; there will still be some danger due to raptors flying into the wires.

4-5

Greater use of illustrations would make the EA much easier to assimilate. Specifically, I would like to have seen a map of each alternative route by itself depicting some of the information to which I have referred.

4-6

Finally, I was not able to get a feeling for those portions of the assessment that were based on direct observation (field reconnaissance) and those based on review of records. I would like to have known more about the extent of site reconnaissance, because the EA could then indicate whether any significant changes from record conditions were observed.

4-7

To sum up, I am inclined to agree with your conclusion for alternative 5; but I would be much more comfortable making a decision based on the EA if I had the supplemental information discussed herein.

Please feel free to call me at 271-6521, if you would like to discuss any of the matters I have presented herein.

Sincerely,

EDWARD W. GRAEFF
Assistant Vice President
Bank Property Management

EWG/lao

RESPONSE TO COMMENTS
EDWARD W. GRAEFF

- 4-1. The implementing regulations of the National Environmental Policy Act identify the need to discuss only briefly issues other than significant ones, and incorporating information by reference when possible (40 CFR Part 1500.4, Reducing paperwork). In the interest of reducing the amount of extraneous information included in the EA, discussion of air, water quality and noise impacts were omitted. These impacts would not change from what were described in the FEIS, and are not considered to be significant issues in the proposed relocation of the transmission line alignment. The EA does reference the FEIS, where these impacts are discussed in greater detail. This document is readily available in both our Phoenix and Tucson offices for inspection by any interested party.
- 4-2. State regulations require that application of agriculturally related chemicals shall not jeopardize public health or safety. Therefore, we do not believe there would be any impact to construction workers for this project above levels allowed by the State that are deemed safe. For this same reason, we have no reason to believe that placement of a transmission pole or buried cable within areas under cultivation, or that were previously cultivated, would pose a significant health threat.
- 4-3. Reclamation is required by law to consult with Native American groups regarding impacts to areas that hold religious or social significance. During the preparation of the EIS in the 1980's, numerous consultations were held with the Tohono O'Odham Nation and Pascua Yaqui Tribe regarding this issue for the CAP Tucson Aqueduct Phase B Project and the Southern Arizona Water Rights Settlement Act. In this same general time frame, additional consultations were held among these same entities and the Bureau of Indian Affairs regarding a proposed Santa Cruz Properties Development project. The areas covered by these consultations encompass the project area covered in this EA. None of the alignment alternatives considered for the Los Reales transmission line were identified as significant during these previous consultations.

While the alternatives displayed in this EA may affect significant archaeological properties, none appear to affect sacred sites. During the earliest planning phase for this transmission line in preparation of the EIS, one alternative crossed Black Mountain, an O'Odham sacred area. After discussions with the Nation, this alternative was removed from consideration.

- 4-4. The discussion on impacts to vegetative communities serves more to provide a means to compare the relative impacts among the alternatives, rather than to quantify the actual number of acres of each vegetative community that would be impacted. More precise quantification of impacts would require a resource intensive and time consuming effort that was considered not to be necessary for the purpose of comparing alternatives. Likewise, the identification of new rights-of-way needed

for each of the alternative routes would require expensive and time-consuming surveys that were considered not be necessary for our purposes. Such surveys are generally only performed as part of the design of the alternative ultimately selected for the project.

- 4-5. The text has been revised (see page 16 and 17).
- 4-6. Unfortunately, addition of these maps cannot be included in the final EA, due to time constraints. However, we will consider doing this in future documents.
- 4-7. This assessment is based upon a combination of field reconnaissance and review of records. Our description of the affected environment incorporates any updated information gathered during field studies that may differ from data gathered during our review of existing records. We believe we have accurately described the existing environment at a level of detail sufficient to provide a relative comparison of the impacts from each alternative. There should be no significant difference between what is described and what exists within the project area as of May 1989.

[illegible]

ATTN: APO 150
Project Manager
USD1, Bureau of Reclamation
Arizona Projects Office
P.O.Box 9980
Phoenix, Arizona 85068

Following are my comments on the Draft Environmental Assessment: Los Reales 115kV Transmission Line Alternatives for the CAP:

5-1

5-2

5-3

Lynn Jacobs

Lynn Jacobs
2945 W. Barrel Drive
Tucson, Arizona 85746
578-3173

RESPONSE TO COMMENTS
LYNN JACOBS

5-1. It is true this alternative would damage the least amount of desert. However, very little of this desert, if any, is of high quality or has not already been disturbed. Alternative 6 would not satisfy Reclamation policy regarding reliability requirements for municipal water deliveries. Without this transmission line, normal pumping plant operations would cause momentary excessive power system voltage reductions during pump starting. This could cause electrical system disturbances due to undervoltage and the upset of various types of electronic equipment being used in the adjacent areas. In addition, without this second power source for the Tucson area pumping plants, repairs and maintenance to the power system would have to be conducted while the line was energized, which is not as desirable as working on a de-energized line.

5-2. We believe there is a significant portion of the population that believes the CAP will be beneficial to Arizona. The Colorado River would likely continue to be impacted in the absence of the CAP, since California could continue to divert Arizona's allotment of Colorado River water.

We believe the water quality of the CAP, while perhaps not as good as current Avra Valley well water, is within acceptable drinking water limits.

5-3. Various alternatives were investigated as part of the original CAP study in the early 1970's. Several sources of water, and ways of conserving present supplies of water, were evaluated as alternative sources of water to the CAP. However, Reclamation determined the impacts from utilizing those sources of water would be similar to those of the proposed action, and the resulting supplies would be less than the quantities made available by the proposed project. Impacts from a no Federal action were also evaluated. These included, but are not limited to, economic losses, increased threats from flooding, possible loss of riparian habitat due to declining water tables, elimination of recreational opportunities, increased consumer water costs, eventual decline in water quality, and increased land subsidence. The no Federal action was determined to be not acceptable.

6

JUNE 7, 1989

OFFICIAL FILE COPY	
RECEIVED JUN 13 1989	
Date	100 105
6000 W. HOPDOWN LANE TUCSON, AZ 85746	

Bureau of Reclamation
Arizona Projects Office
23836 N. 7th Street
P.O. Box 9980
Phoenix, Az 85068

Dear Robert Towles,

After reviewing the draft on the Environmental Assessment Los Reales 115 KV Transmission Line Alternatives, I favor alternative 4 over alternative 5. As indicated in the report, alternative 4 will have the least amount of impact on the environment, which I strongly support. I realize that the one deterrent to this alternative is the higher cost of the project. However, considering future cost of the other alternatives, this may not seem so costly since it is indicated that there will be a minimum of maintenance with underground lines, and therefore lower costs. It would seem, that even though cost should be a consideration, it should not override the other issues in the environmental assessment.

6-1

In regards to alternative 5, I have reservations of numerous utility poles and high voltage wires in a growing populated community, in which I live, both for safety and esthetics.

6-2

I hope you reconsider alternate 4 for the proposed transmission line, keeping the future of the environment in mind.

Sincerely,

Karen Lowery
Karen Lowery

RESPONSE TO COMMENTS
KAREN LOWERY

- 6-1. Although operation and maintenance costs would be minimal with an underground cable, costs associated with repairing the cable would be considerably greater for a buried cable than with an overhead line. Because the cable cannot be easily examined, it is difficult to isolate the damaged portion of the cable. Expensive and time-consuming excavation is required to locate and repair damaged cable, resulting in longer periods of power outages while repairs are being made. There would be additional disruptions to traffic that would occur during re-excitation.

Based upon the analysis provided in the EA, Reclamation feels the magnitude of all the impacts that are anticipated to result from implementation of Alternative 5 over those from Alternative 4 does not justify the increased cost of Alternative 4.

- 6-2. With Alternative 5, the existing poles would be removed and replaced along Valencia Road; there would be no additional poles installed. Because steel poles can generally be placed apart at greater distances, there might actually be a reduction in the total number of poles along Valencia Road. Although numerous studies on the effects of electric and magnetic fields have been conducted, the results have been inconclusive or conflicting (see also response to comment letter #3). Without a better understanding of the cause and effect relationships between power lines and health effects, we do not know if any of the actions or precautions we might choose to take today would be effective or even necessary.

7

Mr. Robert E. Towles, Project Manager
Bureau of Reclamation
Arizona Projects Office
P.O. Box 9980
Phoenix, Arizona 85068

June 21, 1989

Dear Mr. Towles,

Reference your memorandum dated May 26, 1989 and the Draft Environmental Assessment for the Los Reales 115-kv Transmission Line Alternative Routes sent under the same cover.

As Chairman of the Pascua Yaqui Tribe, I am recommending that Alternative 4, Ajo Way, be selected as the preferred alternative of the Bureau of Reclamation. Upon reviewing the draft Environmental Assessment, it seems clear that Alternative 4, the underground transmission line along Ajo Way, presents the least impact of any of the alternatives except for cost. Although Alternative 5 is the most expensive of the proposed alternatives, it has the least impact in the areas of disturbed acres, cultural sites, visual impact, or landowners impacted.

While cost is certainly an important consideration in reaching a decision, the minimal negative externalities presented by Alternative 4 should be given more serious consideration.

If you have any questions regarding my comments, please contact me.

Sincerely,

Arcadio Gastelum
Tribal Chairman

cc: Pascua Yaqui Tribal Council

[illegible]

RESPONSE TO COMMENTS
PASCUA YAQUI TRIBE

- 7-1. We assume the reference to Alternative 5 in the seventh line of your second paragraph is a typographical error, and that you meant to refer to Alternative 4.

As noted in our response to comment 6-1, we believe the difference in environmental impacts between Alternatives 4 and 5 are not significant enough to justify the additional expenditure of funds that would be required with Alternative 4. Most of the lands upon which easements would need to be acquired fall within existing or future County rights-of-way; therefore, landowners should be only minimally affected. Most of these lands are already disturbed and have little wildlife value. Reclamation would merely replace an existing power line for the majority of the proposed route. Only one known cultural resource site would be potentially impacted and, should surveys determine this site would be impacted, the site would be mitigated prior to any construction. The EA process considers numerous factors that are evaluated prior to recommendation of the preferred alternative. Cultural Resources were considered by the planning team, which included an archaeologist as a member.

6-26-89

DEAR SIR:

Thank you for sending me the
 EA Pertaining to the Los Rios
 115 KV Transmission line. The draft
 was very informative and interesting
 Alternative #4 is the choice I
 would like BUREAU of Reclamation
 to make. Please don't ruin our
 beautiful desert with ugly highline
 and steel poles, it destroys our
 sunsets and scenic routes along
 with our National Historic Landmarks
 just about everything southern Arizona
 stands for. The shortest distance between
 two points is a straight line, so put
 it underground within the Ajo way
 R.O.W. you already have. When I built my
 house, I had to pay Trico electric co.
 one thousand dollars just to bring primary
 underground electric 211 ft. to my property line
 so I know it cost money, but to preserve
 the beauty of the desert land it is
 well worth it. Our Tucson mountains
 and Saguaro National monument are priceless,
 don't let urban sprawl ruin what we
 have left. Please allow me to keep
 on enjoying my beautiful sunsets
 from my back porch.

8-1

8-2

8-3

P.S. let me know
 what you decide.

Thank you
 Sincerely,
 Leonardo. Lopez.
 Home owner

RESPONSE TO COMMENTS
FERNANDO PEREZ

- 8-1. There will be new permanent structures (power poles) introduced along the Black Mountain Pipeline alignment, which is considered to be a negative impact. However, the impacts to your neighborhood from the Central Arizona Project are actually less overall than what were originally approved in the Secretary of the Interior's Record of Decision on the Tucson Aqueduct Phase B project dated September 24, 1985. The original project design would have resulted in a 30-foot wide canal in this part of the Phase B project area, access roads and chainlink security fencing on either side of the canal, a protective dike on the upslope side of the canal between three to eight feet high, and a 115-kV transmission line along the canal right-of-way. Reclamation has greatly reduced the amount of visual impacts to the area from the originally approved plan. The introduction of the power line will result in a relatively minor impact when compared with the original plan.
- 8-2. In addition to the added expense of Alternative 4, which Reclamation does not believe is justified, there are several technical difficulties that complicate this alternative's implementation. The median area of Ajo Way is narrow, making excavation of a trench for the cable difficult and dangerous for ongoing traffic. Traffic would need to be detoured during construction. If the Arizona Department of Transportation (ADOT) would not allow Reclamation to cut open Ajo Way in order to lay the portions of the cable that must cross Ajo Way, it would be extremely difficult to install this portion of the cable. Once installed, these portions of the cable would not be properly insulated to protect against overheating. There are over 80 utilities or structures already within and along the Ajo Way right-of-way that would need to be relocated or avoided. Traffic would be detoured and disrupted during these relocations. Several concrete box culverts would need to be reconstructed, which would also cause major detours and disruptions. As stated in the EA, the reliability and performance of buried transmission cable over five miles in length is not well known. We are somewhat hesitant to utilize this technology without further proof of its reliability and more knowledge of its operational record.
- 8-3. There is nothing under Reclamation's jurisdiction which would allow it to control urban sprawl. Although the 115-kV transmission line will provide for expansion flexibility in the future, TEP would still be required to go through normal State and local approval and public notification processes before being allowed to construct a new line or upgrade an existing line to a voltage of 115-kV or greater.

This transmission line will not be noticeable from the San Xavier Mission, the Tucson Mountains or the Saguaro National Monument.

9

8900319

PIMA COUNTY
TRANSPORTATION AND FLOOD CONTROL DISTRICT
PLANNING DIVISION
32 N. STONE, SUITE 300
TUCSON ARIZONA 85701

FRANK G. CASTRO, DIRECTOR
1313 S. MISSION ROAD
TUCSON ARIZONA 85713-1398

June 28, 1989

Mr. Robert J. Towles
Project Manager
Bureau of Reclamation
Arizona Projects Office
P.O. Box 9980
Phoenix, AZ 85068
ATTN: APO-150

RE: Draft Environmental Assessment for Los Reales 115kV Transmission Line Alternatives

Dear Mr. Towles:

Representatives of the Transportation Planning and Floodplain Management Sections of the Planning Division, Pima County Department of Transportation and Flood Control District have reviewed the subject document. Staff comments are summarized below with page number references:

1. We believe consideration of routes other than Alternative 1, the Los Reales alignment, to be a positive step reducing the visual impact of the proposed transmission line. A portion of this alignment lies within the San Xavier Historic Zone (Pima County Code, Chapter 18.63). Although the State Historic Preservation Officer has concurred that visual impact from the original Los Reales alignment would not be adverse, it is in keeping with goals of Pima County with respect to development in the historic zone that the transmission line be relocated (pages 8, 27 and 28).
2. Regulated public utilities, such as Tucson Electric Power, do not have the authority to construct high voltage transmission lines (115kV or greater) without public hearing and approval before state and county agencies. It is not a foregone conclusion that the existing 46kV TEP sub-transmission line on Valencia Road would be upgraded to 138kV in the future (pages 12, 34 and 42).
3. The document refers to permanent easements being needed for construction of overhead utility lines (pages 36 and 39). To the best of our knowledge the TEP facilities on Valencia Road are constructed within the county right-of-way under the terms and conditions of the franchise agreement between the utility company and Pima County. This department would oppose the establishment of any easement right by Western Area Power Authority or the Bureau of Reclamation within the

9-1

9-2

Mr. Robert J. Towles
June 28, 1989
Page 2

Valencia Road right-of-way. Valencia Road (State Route 910) has been designated a key feature of the Regional Transportation Plan with a proposed right-of-way width of 200 feet and a 60-foot building setback (County Ordinance 1986-189). While this would not preclude the development of Valencia Road as a joint transportation and utility corridor, we would want the construction of the transmission line to be subject to normal utility company requirements if it is to occupy the right-of-way. If the Bureau proposes to place the transmission line in an easement adjacent to but separate from Valencia Road, then our principal concerns would be clearance and ability to shift the location of the constructed roadway within the right-of-way.

9-2
cont'd

4. Construction within road right-of-way under the jurisdiction of the County is normally regulated through the issuance of right-of-way use permits (pages 41 and 47). The purpose of these permits is to insure the safety of the traveling public and the protection of the work site. Depending on the scope of work involved, a detailed traffic control plan may be a condition of the permit. These plans are reviewed and approved by the County Traffic Engineer. Right-of-way use permits are issued by the Field Engineering Division. This division also issues permits for oversize vehicles or loads. Contact Mr. Richard Perez at 740-2615 for additional information.

9-3

5. Although it is noted in the report that no permanent structure will be located in an active floodplain (page 42), the Flood Control District recommends that floodplain use permits be obtained for any construction activities occurring within the regulatory floodplain. Acquisition of these permits would enable the District to inform the Bureau of potential problems as well as allowing the Floodplain Management Office to keep track of construction activities occurring in washes under their jurisdiction. Contact Floodplain Management at 740-5496 for additional information.

9-4

6. It is unclear from the document if in fact all activities associated with the construction of transmission lines across drainageways would be covered under the nationwide permit provisions of Section 404 of the Clean Water Act (pages 42 and 48). The construction of vehicle access ramps across drainageways is an example of the type of activity for which a permit may be invoked.

9-5

7. The stated benefits to the visual environment from the proposed action appear reasonable (Alternative 5, page 43). The replacement of the existing 46kV sub-transmission line with a double circuit transmission line carrying both the TE and Bureau facilities could allow for a net reduction in the number of poles along Valencia Road. However, this reduction will only be realized if the existing poles may be removed or if additional poles will not have to be installed to support the existing local distribution system that is already in place along Valencia Road. If the existing pole line must be retained, even if the poles are cut shorter, while additional poles are put in to support the transmission line, the visual clutter along Valencia would be substantially increased. The feasibility of removing the distribution system from Valencia or placing it underground should be addressed as part of the design for the transmission line to achieve the goal of minimizing the aesthetic impact.

9-6

Mr. Robert J. Towles
June 28, 1989
Page 3

8. The statement that Alternative 4 would cost the taxpayers \$1.5 to \$2 million more than Alternative 5 is not true (page 43). The actual increment of cost borne by the taxpayers depends on distribution of costs for the project which is divided among a variety of beneficiaries and revenue sources. 9-7
9. The environmental impact assessed for Alternative 6, the No-Action Alternative, raises doubts as to the viability of the entire proposed action. If abandonment of the Los Reales transmission line would result in only "slightly greater frequency of power outage disruption", is the benefit from the project worth the \$6 to \$8 million construction cost? While the need and purpose statements regarding the project address the number of water users and the amount of water that could be delivered (pages 3, 41 and 42), the actual consequences of power outage or the actual need for redundant power delivery system are not addressed. 9-8

Thank you for the opportunity to review this Environmental Assessment. If you have any questions on these comments please contact me at 740-5491.

Sincerely yours,

Benjamin H. Goff, P.E., Manager
Transportation Planning Section

BHG/bl

xc: Dave Smutzer
Jim Barry

RESPONSE TO COMMENTS
PIMA COUNTY TRANSPORTATION & FLOOD CONTROL DISTRICT

- 9-1. Reclamation did not intend to imply that TEP would be exempt from normal State or local requirements regarding any upgrade or new installations. A statement to this effect has been added to the text (see page 8-9).
- 9-2. Reclamation's policy is to acquire permanent rights-of-way for all project facilities. This ensures the Federal government will not incur relocation costs as a result of future developments. Reclamation recently became aware the County plans to develop Valencia Road into a six-lane roadway sometime in the future. Reclamation believes the majority of this roadway can be constructed within a 150-foot right-of-way. However, Reclamation and Western will consult with the Pima County Transportation and Flood Control District during the design phase of this project, to determine where design changes can be made to accommodate the County's future plans without adding significantly to the cost to the project in terms of both money and environmental/social impacts. Nevertheless, Reclamation cannot consider acquisition of right-of-way wider than that currently existing where the adjacent land has been developed. It would be difficult to justify incurring significant costs and/or impacts today, based upon County improvements that may or may not be constructed at some as yet unknown point in time.
- 9-3. Construction specifications will require the Contractor to obtain all necessary State and local permits required to construct this project.
- 9-4. Western will oversee the transmission line's construction. Reclamation will recommend to Western that it consult with the County to determine whether or not construction activities will occur within the regulatory floodplain, and to obtain a permit if indicated. It will be that agency's responsibility to obtain any permits required to complete the project.
- 9-5. Current plans are to utilize existing roads to access pole locations and associated construction areas. We currently do not foresee any activities that would require a section 404 permit. However, it will be the responsibility of Western to obtain a section 404 permit, should subsequent design indicate the need for one.
- 9-6. The existing single wood poles will be removed and replaced by single steel poles capable of carrying a double circuit. There may be an overall reduction in the total number of poles required for this relocated line, due to the longer spans generally allowed by steel poles. We anticipate the distribution line will be replaced "in-kind," thus remaining overhead. The presence of this line may incidentally function to offset the EM fields created by the transmission lines.
- 9-7. It is true the actual incremental cost for this project that will be borne by the Pima County taxpayers may vary. The term "taxpayers" was used in its broadest sense, as the Federal government will provide the

initial capital outlay for this construction project. The text has been revised to remove this ambiguity (see page 30-31).

- 9-8. The need for the project was established and described in greater detail in the Tucson Aqueduct Phase B EIS. Reclamation is merely proposing to change the route of this transmission line. However, the text of the EA has been revised to better reflect the reasons why the project is needed (see page 2).

10
CITY OF TUCSON

June 28, 1989

JUN 30 1989
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION
(602) 791-4251

115
152

8900321

U.S. Dept. of Interior
Bureau of Reclamation
Arizona Projects Office
P.O. Box 9980
Phoenix, Arizona 85068

Subject: Los Reales K V Transmission Line
Draft Environmental Assessment
Central Arizona Project

Dear Project Manager:

The City Engineer's Office of the City of Tucson has reviewed the subject draft document and has the following comments:

1. Whichever alternative is eventually selected should have a statement requiring any placement of underground cable or of a pole line to be outside of future roadway improvements. 10-1
2. Whenever construction of the selected alternative is finished the revegetation of the disturbed areas should be of a density greater than what existed prior to the disturbance. In addition, any trees with a trunk of greater than 2 inches, or a height of 10 feet, or having a spread of ten feet or more, shall be saved and transplanted as part of the mitigation. 10-2
3. On page 12 the second paragraph under G appears to be a policy statement of TEP and not a part of the Environmental Assessment. 10-3
4. On page 28, the last sentence under mitigation states all mitigation is implemented prior to construction. All of the revegetative efforts, which are mitigation, will be after construction. 10-4
5. Both alternatives 4 and 5 are acceptable to this office.
6. We recommend alternative 4 because:
 - a) Alternative 5 has a much stronger visual impact.
 - b) Alternative 4 requires fewer property owners to be affected and lesser area required.
 - c) Alternative 4 has a lower environmental mitigation cost. 10-5
 - d) Alternative 5 (potentially) has impacts to archeological properties.

If there are questions please call me at (602) 791-4321.

Very truly yours,

James A. Turner

James A. Turner, P.E., R.L.S.
Deputy City Engineer
Private Improvements

JAT/sn

xc: Jim Ronstadt
Michael Tubbs
Bill Ealy

RESPONSE TO COMMENTS
CITY OF TUCSON

- 10-1. Where future roadway improvements are planned, Reclamation will consult with the appropriate State or local agency during its design phase to determine where design changes could be made that would not add significantly to the cost of the project, both in terms of money and impacts. See also response to Comment 9-2.
- 10-2. Reclamation notifies the Agricultural and Horticultural Commission regarding salvage of State protected species prior to any clearing. The Contractor will be directed to avoid any unnecessary removal of trees; however, due to the excessive cost, no tree salvage is anticipated. Reseeding of cleared areas not needed for permanent facilities will be conducted consistent with revegetation practices followed for the entire Tucson Aqueduct which consist of hydroseeding a seed mix of native plant species.
- 10-3. This is Reclamation's assumption of what would occur without the Federal action. The sentence has been revised to better indicate this (see page 8-9).
- 10-4. The mitigation referred to in this paragraph refers to cultural resource related mitigation, which must be completed prior to any ground disturbance.
- 10-5. Based upon the analysis provided in the EA, Reclamation feels the magnitude of impacts that would result from implementation of Alternative 5 over those from Alternative 4 does not justify the increased cost of Alternative 4.

11

TUCSON UNIFIED SCHOOL DISTRICT

P.O. BOX 40400
1010 EAST TENTH STREET
TUCSON, ARIZONA 85717-0400

8901059

DEPARTMENT OF PLANNING SERVICES
June 12, 1989

5 1989

6/16/89 1/5 JDN/de

Bureau of Reclamation
Arizona Projects Office
23036 N. 7th Street
P.O. Box 9980
Phoenix, Arizona 85068

SUBJECT: Environmental Assessment for CAP Transmission Line

Tucson Unified School District supports Alternative 5 as the proposed action. Alternative 1 is not acceptable due to the location of one elementary school and one middle school located near Los Reales.

11-1

Sincerely,

Valerie B. Feuer

Valerie B. Feuer
District Planner

RESPONSE TO COMMENTS
TUCSON UNIFIED SCHOOL DISTRICT

- 11-1. Although the presence of schools along an alignment would make it less desirable, we do not necessarily agree that locating a power line near a school would make it an unacceptable alternative.

12

**UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE**

ECOLOGICAL SERVICES
3616 W. Thomas, Suite 6
Phoenix, Arizona 85019

June 27, 1989

8900313

JULY 29 1935

[illegible]

MEMORANDUM

TO: Project Manager, Arizona Projects Office, Bureau of Reclamation,
Phoenix, Arizona

FROM: Field Supervisor

SUBJECT: Review of Draft Environmental Assessment - Los Reales Transmission
Line, Tucson Aqueduct Phase B, Central Arizona Project, Pima
County, Arizona

The Fish and Wildlife Service (Service) has reviewed the subject draft document and offer the following comments for your consideration.

Overall, the document adequately describes the impacts of the various alternative routes to biological, cultural and visual resources. We would like to clarify a few specific points.

The list of special status species on page 18 needs to be updated in light of the new Animal Notice of Review published January 6, 1989. The Gila monster and Sonoran green toad have been reclassified as category 3c (taxa more abundant or widespread) from category 2. Also, mention should be made of the listing of Sanborn's long-nosed bat (Leptonycteris sanborni), since it is found in the Tucson area.

12-1

In our October 28, 1988 amendment to our Fish and Wildlife Coordination Act (FWCA) report for the Tucson Aqueduct Phase B, only Alternatives 1 through 4 were presented. At that time, Alternative 4 was the Bureau of Reclamation's (Reclamation) proposed action. Because of the minimal environmental impact associated with Alternative 4, the Service supported that selection. In our amendment to the FWCA report of April 25, 1989, that addressed Alternative 5, we stated that although Alternative 5 would not have greater impacts than the alternative originally presented in the final Environmental Impact Statement. We still believed that Alternative 4 was preferable for environmental reasons. In this regard, the Service requests that Reclamation add to the discussion on page 49, Section G, that the Service has not approved of the current proposed action and still prefers Alternative 4.

12-2

The Service appreciates the opportunity to comment on this draft document. If we may be of further assistance, please contact Lesley Fitzpatrick or me (Telephone: 602/261-4720).

Sincerely,

Sam F. Spiller
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, New Mexico
(FWE/HC)
Director, Arizona Game and Fish Department, Phoenix, Arizona
Project Manager, Bureau of Reclamation, Tucson Projects Office
(Attention: Sherry Barrett)

RESPONSE TO COMMENTS
FISH AND WILDLIFE SERVICE

- 12-1. These revisions have been made (see pages 12-13).
- 12-2. The text has been revised to indicate that FWS prefers Alternative 4 (see page 36).

13

9400122

U.S. HOME CORPORATION
TUCSON LAND DEVELOPMENT DIVISION

5501 North Swan

Suite 125

Tucson, Arizona 85718

June 15, 1989

JUN 19 1989

(602) 577-8640

Mr. Robert Towles
Project Manager/Code 100
Arizona Bureau of Reclamation
Department of the Interior
United States of America
23636 N. Seventh Street
P.O. Box 9980
Phoenix, AZ 85068

Re: Environmental Assessment of Los Reales 115-kv Transmission
Line Alternatives

Dear Mr. Towles:

On behalf of our company's operations in Arizona, please be advised that we recommend your utilization of Alternative Number 6 i.e. no transmission lines from Western Tucson's - Apache 115-kv transmission line to the Synder and Black Mountain Pumping Plants. This alternative is recommended because it costs the taxpayers nothing and is the least environmentally impacting. Tucson Electric Power can upgrade their service facilities if and when necessary at their own expense.

13-1

We hope you concur with this recommendation. ~~We would appreciate being~~
~~advised if such is not the case, and having the opportunity to provide~~
additional input into this process.

Very truly yours,

U.S. HOME CORPORATION

Gary W. Aalen
President
Tucson Land Development Division

GWA/man

cc: Tim Walsh, P.E., Osborn, Petterson, Walbert & Assoc.

RESPONSE TO COMMENTS
U.S. HOME CORPORATION

- 13-1. Implementation of Alternative 6, the No Federal Action alternative, would not provide the Tucson Phase B pumping plants with the power system upon which they have been designed and constructed to operate. This would cause excessive power system voltage reductions during pump starting. It would also result in electrical system disturbances and the upset of various types of electronic equipment in adjacent areas. Operation of the plants without the electrical loop system would not satisfy Reclamation policy regarding reliability requirements for municipal water deliveries.

Reclamation will not be upgrading TEP's facilities. Reclamation will replace TEP's existing power line with a double circuit that will accommodate both TEP's 46-kV sub-transmission line and Reclamation's new 115-kV transmission line. Any upgrades or new installations that TEP would initiate would be at TEP's own expense. In addition, TEP would need to comply with all State and local requirements for upgrades or new installations and would need to obtain its own rights-of-way.

U S WEST, Inc.
9785 Maroon Canyon Suite 200
Englewood Colorado 80111
303 643 3500

14

9400260

Facsimile 303 649-4590

Richard A. Schwerer
Manager - Environmental
Audits and Assessments

USWEST

June 22, 1989

United States Department of the Interior
Bureau of Reclamation
Arizona Projects Office
Attention: Project Manager
23636 N. 7th Street
P. O. Box 9980
Phoenix, AZ 85068

Subject: Environmental Assessment for the Construction of a
115K volt Transmission Line, Pima County Arizona

Dear Sir or Madam:

Thank you for the opportunity to review and submit comments
on the subject environmental assessment. Upon reviewing the
subject information for the recommended alternative five, we
do not find any significant negative environmental impacts
resulting from this project.

In the future please direct any Environmental Assessment
issues to my attention as indicated on this letterhead.

Sincerely,

Richard A. Schwerer

RS/lg

26 1989

6/27 11:50 AM
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PIMA ASSOCIATION OF GOVERNMENTS

405 TRANSAMERICA BUILDING
TUCSON, ARIZONA 85701
792-1093

8900541

July 26, 1989

Ms. Sandy Eto
US Department of Interior
Bureau of Reclamation
Arizona Projects Office
Post Office Box 9980
Phoenix, Arizona 85068

RE: Grant Application #89-7-9: Environmental Assessment for the Construction
of a 115-kilovolt Transmission Line, Pima County, Arizona

Dear Ms Eto:

This letter will serve as formal notice that you have complied with the provisions of Executive Order 12372, provided you have also submitted your proposal to the State Clearinghouse, and that the Regional Council of Pima Association of Governments, on July 26, 1989 unanimously endorsed your project.

The action of the Regional Council approving the above grant application is done to comply with Federal and State timing requirements and in no way precommits a PAG member jurisdiction to any future local share funding.

At this time, the PAG Regional Council encourages you, if you have not already done so, to formally apply to the Federal Funding Agency to secure the funding for your project.

PAG did not receive any comments prior to the Regional Council meeting on your application.

Sincerely,

Thomas L. Swanson
Executive Director

TLS:cn

1621
JUL 27 1989
7/31 45:2N
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END

DATE FILMED

02 / 11 / 91