Tucson Electric Power Company
Sahuarita-Nogales Transmission Line
Draft Environmental Impact Statement

July 2003

DOE/EIS - 0336
BLM Reference No. AZA 31746

SUMMARY

Office of Fossil Energy
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585

Cooperating Agencies:

U.S. Department of the Interior Bureau of Land Management

U.S. Section of the International Boundary and
Water Commission, U.S. and Mexico

U.S. Department of Agriculture Forest Service

COVER SHEET

***Responsible Agency*:** U.S. Department of Energy (DOE), Office of Fossil Energy (FE)

***Title*:** Tucson Electric Power Company (TEP) Sahuarita–Nogales Transmission Line Draft Environmental Impact Statement (EIS)

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Abstract: A DOE Presidential Permit is required before anyone can construct an electric transmission line across the U.S. border. On August 17, 2000, TEP applied to DOE/FE for a Presidential Permit to construct a double-circuit 345,000 volt (345 kV) electric transmission line that would begin south of Tucson, Arizona, in the vicinity of Sahuarita, cross the U.S.-Mexico border, and continue into the Sonoran region of northern Mexico to Santa Ana. TEP states that the proposed line would provide a redundant path for the energy that is currently transmitted over the existing 115-kV transmission line from Tucson to Nogales, Arizona. The local Nogales utility, Citizens Communications, has committed to the purchase of 100 MW of transmission capacity from TEP to allow for future load growth above Citizen's current Santa Cruz County load of approximately 65 MW. TEP anticipates using the remaining 400 MW of capability for transport of energy between the United States and Mexico.

FE has determined that the issuance of a Presidential Permit for this project would constitute a major Federal action within the meaning of the *National Environmental Policy Act of 1969* as amended. The Federal Register *Notice of Intent to Prepare an EIS and to Conduct Public Scoping Meetings and Notice of Floodplain and Wetlands Involvement* was published on July 10, 2001 (66 FR 35950). Public scoping meetings were held by DOE on July 30, 2001, at the Rancho Resort in Sahuarita, AZ, and on July 31, 2001, at the Rio Rico Resort in Rio Rico, AZ.

FE has prepared this Draft EIS to address the environmental impacts of the proposed action and reasonable alternatives, including the "No Action" alternative. In addition, because the U.S. Forest Service, the Bureau of Land Management, and the U.S. International Boundary Water Commission (USIBWC) must act, and because their actions are interrelated, they have agreed to cooperate in preparing this Draft EIS. The Final EIS will be used by DOE and the cooperating agency officials to ensure that they have the information needed for purposes of informed decision-making. The decisions themselves will be issued subsequent to the Final EIS, in the form of a Record of Decision for each agency, or as a letter of concurrence in the case of the USIBWC.

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LIST OF ACRONYMS AND ABBREVIATIONS

AAC	Arizona Administrative Code
AC	Alternating Current
ACC	Arizona Corporation Commission
ADA	Arizona Department of Agriculture
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
AEPCO	Arizona Electric Power Company
BA	Biological Assessment
BLM	Bureau of Land Management
CAA	*Clean Air Act*
CEQ	Council on Environmental Quality
CFE	Comisión Federal de Electricidad
CFR	Code of Federal Regulations
CWA	*Clean Water Act*
DOE	U.S. Department of Energy
DOE-FE	DOE Office of Fossil Energy
EIS	Environmental Impact Statement
EMA	Ecosystem Management Area
EMF	electric and magnetic field
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPNG	El Paso Natural Gas Company
ESA	*Endangered Species Act*
FLPMA	*Federal Land Policy and Management Act*
Forest Plan	*Coronado National Forest Land and Resource Management Plan*
FR	*Federal Register*
IRA	inventoried roadless area
MBTA	*Migratory Bird Treaty Act*
MIS	U.S.F.S. Management Indicator Species
NAAQS	National Ambient Air Quality Standards
NEPA	*National Environmental Policy Act*
NHPA	*National Historic Preservation Act*
NOI	Notice of Intent
NRHP	National Register of Historic Places
PNM	Public Service Company of New Mexico
Project	Sahuarita-Nogales Transmission Line & Gateway and South Substations
RA	Roads Analysis of the Coronado National Forest

RCRA	*Resource Conservation and Recovery Act*
ROD	Record of Decision
ROI	region of influence
ROS	USFS Recreation Opportunity Spectrum
ROW	right-of-way
SHPO	State Historic Preservation Officer
SMS	USFS Scenery Management System
TCP	Traditional Cultural Property
TEP	Tucson Electric Power Company
URS	Company that prepared the Roads Analysis
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFS	U.S. Department of Agriculture Forest Service
USFWS	U.S. Fish and Wildlife Service
USIBWC	U.S. Section of the International Boundary and Water Commission, U.S. and Mexico

CHEMICALS AND UNIT ABBREVIATIONS

CO	carbon monoxide
ha	hectares
km	kilometer
kV	kilovolt
m	meter
mG	milligauss
mi	miles
mtpy	metric tons, or tonnes, per year
MVA	million volt-amperes
MW	megawatts
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
O_3	ozone
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to 10 microns
Pb	lead
ppb	parts per billion
ppm	parts per million
psig	pounds per square inch gauge
SO_2	sulfur dioxide
tpy	tons per year
v	volts
yr	year

CONVERSION CHART

To Convert Into Metric			To Convert Into English		
If You Know	**Multiply By**	**To Get**	**If You Know**	**Multiply By**	**To Get**
Length					
inch	2.54	centimeter	centimeter	0.3937	inch
feet	30.48	centimeter	centimeter	0.0328	feet
feet	0.3048	meter	meter	3.281	feet
yard	0.9144	meter	meter	1.0936	yard
mile	1.60934	kilometer	kilometer	0.62414	mile (Statute)
Area					
square inches	6.4516	square centimeter	square centimeter	0.155	square inch
square feet	0.092903	square meter	square meter	10.7639	square feet
square yard	0.8361	square meter	square meter	1.196	square yard
acre	0.40469	hectare	hectare	2.471	acre
square mile	2.58999	square kilometer	square kilometer	0.3861	square mile
acre-foot	1233.48	cubic meters	cubic meters	0.00081	acre-foot
Volume					
fluid ounce	29.574	milliliter	milliliter	0.0338	fluid ounce
gallon	3.7854	liter	liter	0.26417	gallon
gallon	0.0039	cubic meter	cubic meter	256.14	gallon
cubic feet	0.028317	cubic meter	cubic meter	35.315	cubic feet
cubic yard	0.76455	cubic meter	cubic meter	1.308	cubic yard
Weight					
ounce	28.3495	gram	gram	0.03527	ounce
pound	0.45360	kilogram	kilogram	2.2046	pound
short ton	0.90718	metric ton	metric ton	1.1023	short ton
Force					
dyne	0.00001	newton	newton	100,000	dyne
Temperature					
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths, then add 32	Fahrenheit

METRIC PREFIXES

Prefix	Symbol	Multiplication Factor		
exa-	E	1 000 000 000 000 000 000	=	10^{18}
peta-	P	1 000 000 000 000 000	=	10^{15}
tera-	T	1 000 000 000 000	=	10^{12}
giga-	G	1 000 000 000	=	10^{9}
mega-	M	1 000 000	=	10^{6}
kilo-	k	1 000	=	10^{3}
hecto-	h	l00	=	10^{2}
deka-	da	l0	=	10^{1}
deci-	d	0.1	=	10^{-1}
centi-	c	0.01	=	10^{-2}
milli-	m	0.001	=	10^{-3}
micro-	µ	0.000 001	=	10^{-6}
nano-	n	0.000 000 001	=	10^{-9}
pico-	p	0.000 000 000 001	=	10^{-12}
femto-	f	0.000 000 000 000 001	=	10^{-15}
atto-	a	0.000 000 000 000 000 001	=	10^{-18}

BACKGROUND

Tucson Electric Power Company (TEP) has applied to the U.S. Department of Energy (DOE) for a Presidential Permit to construct and operate a double-circuit, 345,000-volt (345-kV) electric transmission line across the United States border with Mexico. Under Executive Order (EO) 10485 of September 3, 1953, as amended by EO 12038 of February 3, 1978, a Presidential Permit is required to construct, connect, operate, or maintain facilities at the U.S. international border for the transmission of electric energy between the United States and a foreign country. DOE has determined that the issuance of a Presidential Permit to TEP for the proposed project would constitute a major Federal action that may have a significant impact on the environment within the meaning of the *National Environmental Policy Act* of 1969 (NEPA) 42 United States Code (U.S.C.) §4321 et seq. For this reason, DOE has prepared this Draft Environmental Impact Statement (EIS) to evaluate potential environmental impacts from the proposed Federal action (granting a Presidential Permit for the proposed transmission facilities) and reasonable alternatives, including the No Action Alternative.

This EIS was prepared in accordance with Section 102(2)(c) of NEPA, Council of Environmental Quality (CEQ) regulations (40 *Code of Federal Regulations* [CFR] 1500-1508), and DOE NEPA Implementing Procedures (10 CFR 1021). DOE is the lead Federal Agency, as defined by 40 CFR 1501.5. The U.S. Department of Agriculture Forest Service (USFS), the Bureau of Land Management (BLM) of the U.S. Department of the Interior, and the U.S. Section of the International Boundary and Water Commission, U.S. and Mexico (USIBWC), are cooperating agencies. Each of these organizations will use the EIS for its own NEPA purposes, as described in the Federal Agencies' Purpose and Need and Authorizing Actions section of this summary.

NEPA requires Federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. To meet this requirement, Federal agencies prepare a detailed statement known as an EIS for actions that may have a significant impact on the environment. As part of the NEPA process, the preparation of an EIS includes two formal opportunities for public input: (1) the public scoping period, and (2) the Draft EIS review period, both of which are described further in the Public Participation section of this summary. Following the Draft EIS review period of at least 45 days (that must include at least one public hearing), a lead agency, in coordination with any cooperating agencies, will prepare a Final EIS that will respond to oral and written comments received during public review of the Draft EIS. Other environmental review requirements may also be implemented through the NEPA process. In the case of the proposed project, other environmental review requirements implemented through NEPA include a Floodplains and Wetlands Assessment, in accordance with EO 11988, *Floodplain Managemen*t and EO 11990, *Protection of Wetland*s; *Clean Air Act* Conformity requirements, threatened and endangered species consultation required under the *Endangered Species Act* (ESA), and consultation under the *National Historic Preservation Act* (NHPA).

PROPOSED ACTION AND ALTERNATIVES

The 345-kV double-circuit transmission line would consist of twelve transmission line wires, or conductors, and two neutral ground wires that would provide both lightning protection and fiber optic communications, on a single set of support structures. The transmission line would originate at TEP's existing South Substation (which TEP would expand), in the vicinity of Sahuarita, Arizona, and interconnect with the Citizens Communications (Citizens) system at a Gateway Substation that TEP would construct west of Nogales, Arizona. The double-circuit transmission line would continue from the Gateway Substation south to cross the U.S.-Mexico border and extend approximately 60 miles (mi) (98 kilometers [km]) into the Sonoran region of Mexico, connecting with the Comisión Federal de Electricidad (CFE, the national electric utility of Mexico) at CFE's Santa Ana Substation.

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Figure S–1 shows the overall proposed project location, and Figure S–2 shows the three alternative proposed project study corridors (the Western Corridor, Central Corridor, and Crossover Corridor) under analysis.

The alternatives developed for the proposed project focus on alternative routes to interconnect TEP's South Substation with the proposed Gateway Substation. TEP's evaluation of interconnection schemes, scoping comments, and discussions with DOE resulted in three potentially viable alternative corridors for transmission interconnection in southern Arizona: the Western Corridor (the applicant's Preferred Alternative), the Central Corridor, and the Crossover Corridor. The three corridors overlap each other in certain segments, as shown in Figure S–2. The Crossover Corridor was included for analysis in this EIS based on public and tribal input received during the public scoping period and tribal consultations. To facilitate a thorough, specific evaluation of the existing environment and potential environmental impacts of the proposed project, TEP agreed to define a 0.25-mi (0.40-km) wide study corridor for each alternative, within which the 125-ft (38-m) wide transmission line right-of-way (ROW) would be sited. Another alternative, the Eastern Corridor, originally proposed by TEP, was eliminated from further analysis as a reasonable alternative in this EIS at TEP's request, for reasons of reliability, constructability, existing encroachment into the ROW, and visual impacts.

Following the issuance of a Record of Decision (ROD) by the lead and cooperating agencies, the precise siting of the transmission line ROW within the selected study corridor would be based on further engineering evaluation and mitigation of potential impacts on cultural, paleontological, visual, and ecological resources, including provisions of mitigation agreements with Federal, state, and local agencies (with tribal input on Federal mitigation agreements).

NEPA requires the identification of the agency's preferred alternative or alternatives in a Draft EIS if one or more exists, or, if one does not yet exist at the draft stage, in the Final EIS (40 CFR Part 1502.14[e]). On July 10, 2001, DOE reported that TEP's Preferred Alternative is the Western Corridor (66 FR 35950). In light of TEP's preference and the Arizona Corporation Commission's (ACC) decision to site TEP's proposed line along the Western Corridor, DOE has decided to identify the Western Corridor as DOE's preferred alternative at this time. DOE welcomes comments on this designation. The cooperating agencies have not designated their preferred alternatives at this draft stage of the EIS review, but each will do so in the Final EIS. Each agency is authorized to select its own preferred alternative.

The expansion to the existing South Substation, and the construction of the Gateway Substation and fiber-optic regeneration site would be the same for each of the three proposed corridors. The South Substation in Sahuarita would be upgraded and expanded to provide interconnection between a new TEP 345-kV transmission line and the new Gateway Substation west of Nogales. The South Substation would be expanded by an estimated 1.3 acres (0.53 hectares [ha]) by moving the fenceline 100 ft (30 m) to the east to add a switching device that would connect to the proposed transmission line.

The new Gateway Substation would include a 345-kV to 115-kV power transformer to provide power to the local area. The new Gateway Substation would be constructed within a developed industrial park north of Mariposa Road (State Route 189), an estimated 0.5 mi (0.8 km) east of the Coronado National Forest boundary (Northeast ¼ Section 12, Township 24 South, Range 13 East). The TEP portion of the site (the area that would be graded) is an estimated 18 acres (7.3 ha) and is within the City of Nogales, Arizona. TEP has purchased the substation site and preliminary construction activities have been completed.

The proposed project may include the siting of a fiber-optic regeneration station, if required to amplify and condition the signal. The precise location of this facility has not been determined. However, it would likely be located in the area of Township 18 South, Range 12 East, approximately 10 mi (16 km)

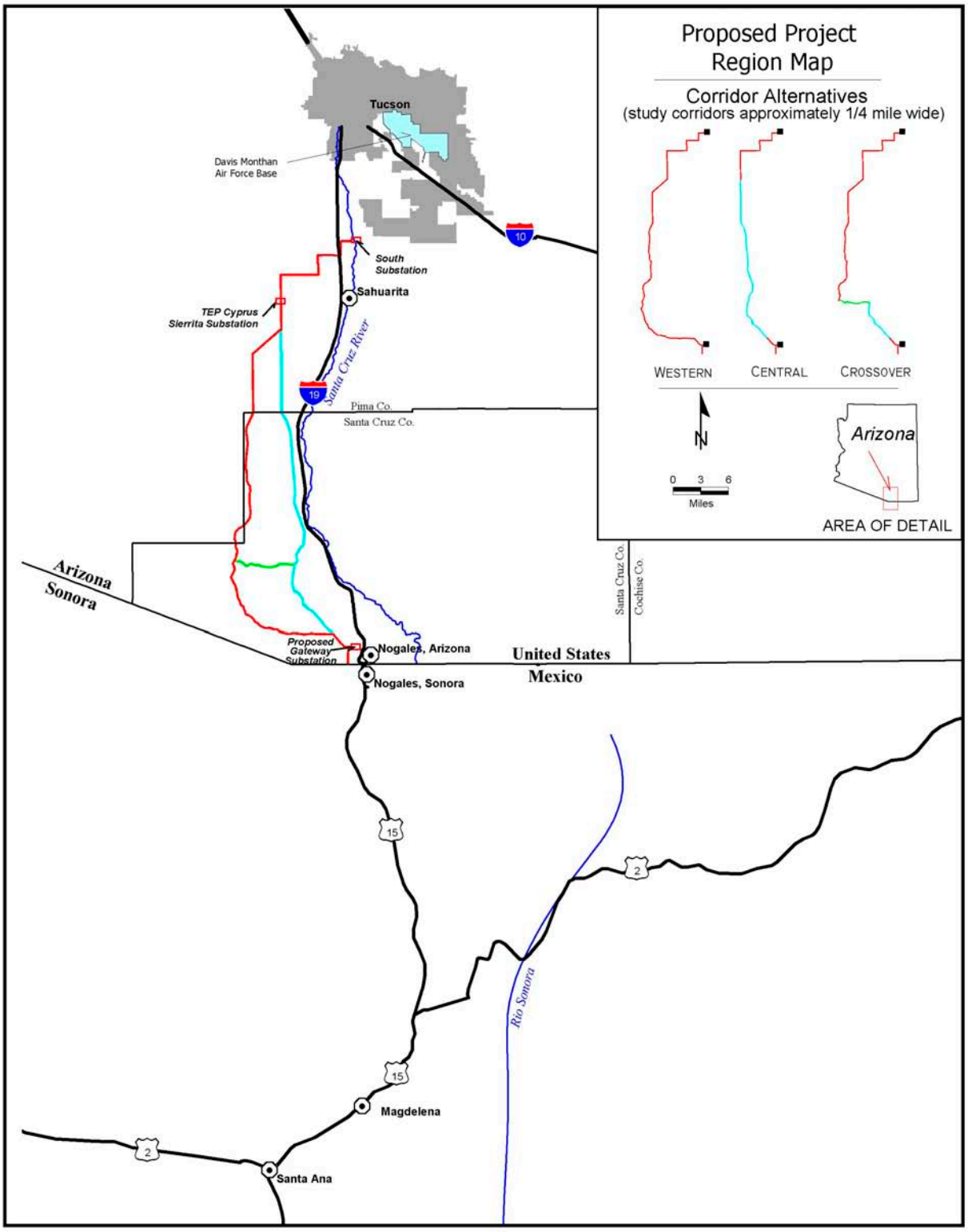

Figure S–1. Proposed Project Region Map.

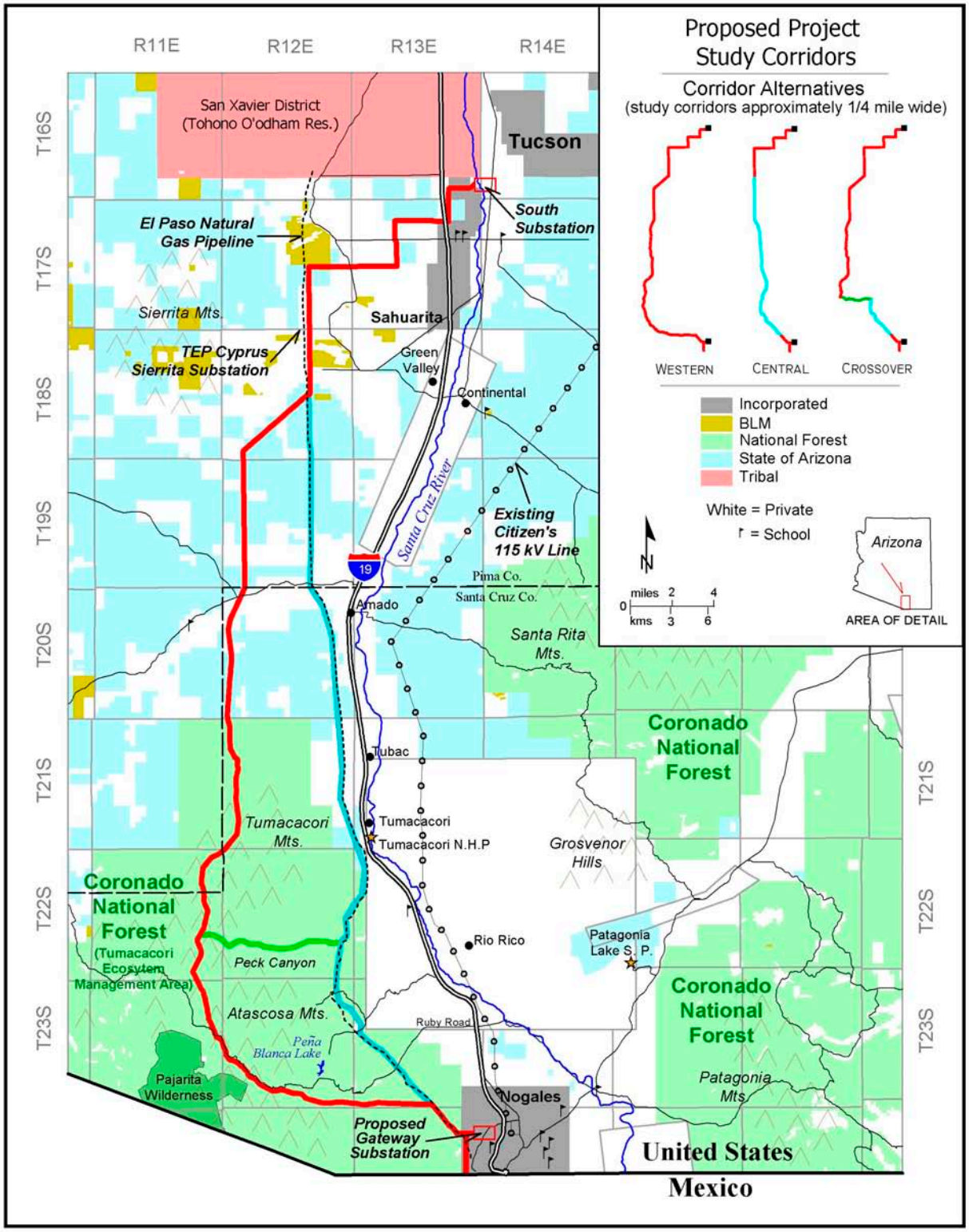

Figure S–2. Proposed Project Study Corridors.

southwest of Sahuarita on private land. The fiber-optic regeneration site would consist of an approximately 0.5-acre (0.2-ha) fenced yard, containing a 10 by 20 ft (3 by 6 m) concrete pad with an equipment house. The cleared area for the equipment house would be an estimated 20 by 30 ft (6 by 9 m). The proposed fiber optic wires would contain at least 48 fibers each.

Three 3-acre (1.2-ha) construction staging areas (located near the South and Gateway Substations, and the Interstate 19 [I-19]/Arivaca Road interchange) and an 80-acre (32-ha) temporary laydown yard (also near the I-19/Arivaca Road interchange) would be the same for each of the three proposed corridors.

The primary support structures to be used for the transmission line would be self-weathering steel single poles, or monopoles, depicted in Figure S–3. Dulled, galvanized steel lattice towers depicted in Figure S–4 would be used in specific locations for engineering reasons or to minimize overall environmental impacts (for example, impacts to soils or potential archaeological sites) in accordance with ACC Decision No. 64356.

There is an existing El Paso Natural Gas Company (EPNG) buried pipeline within the project area, and segments of each of TEP's three proposed corridors either cross the pipeline ROW, run immediately adjacent to the pipeline ROW, or are roughly parallel to the pipeline ROW within a distance of approximately 0.5 mi (0.8 km). This EIS uses the term "follows or crosses" to describe the relationship between each corridor and the EPNG pipeline ROW.

The following is a description of each proposed corridor. A comparison of the proposed alternatives is presented in Table S-1 at the end of this summary.

Western Corridor. The Western Corridor, DOE's and TEP's Preferred Alternative, is the western-most alternative connecting Sahuarita to the U.S.-Mexico border. The Western Corridor extends for an estimated 65.7 mi (105 km), including an estimated 9.3 mi (15.0 km) that follows or crosses the EPNG pipeline ROW. The estimated length of the Western Corridor within the Coronado National Forest is 29.5 mi (47.5 km). The estimated length of the Western Corridor on lands managed by BLM is 1.25 mi (2.01 km).

The Western Corridor would require an estimated 429 support structures (monopoles or lattice towers), including 191 within the Coronado National Forest and 8 on BLM land. Table S-1 lists the estimated areas of land that would be occupied by structures and structure construction sites. TEP would use existing utility maintenance roads, ranch access roads, and, where no access currently exist, new access ways. Approximately 20 mi (32 km) of new temporary roads would be built for construction of the Western Corridor on the Coronado National Forest; spur roads off existing access roads to adjacent TEP transmission lines would provide project access on BLM land.

Transmission line tensioning and pulling and fiber-optic splicing sites would also temporarily disturb land. These sites would range from 0.5 to 1.5 acres (0.2 to 0.6 ha). There would be an estimated 12 sites outside of national forest lands occupying a total of 18 acres (7 ha), and an estimated 14 sites on the Coronado National Forest occupying a total of 10.5 acres (4.2 ha). The total new temporary area of disturbance on the Coronado National Forest during construction of the Western Corridor would be an estimated 197 acres (79.7 ha).

Following construction, TEP would close roads not required for project maintenance and would limit access to maintenance roads, in accordance with agreements with land owners or managers (for example, BLM or USFS). On national forest land, the proposed project would not affect the existing road density because TEP is currently working with USFS to identify existing roads for closure, such that 1.0 mi (1.6 km) of existing road would be closed for every 1.0 mi (1.6 km) of proposed road to be used for project maintenance. The maintenance access required by TEP would be limited to roads leading to

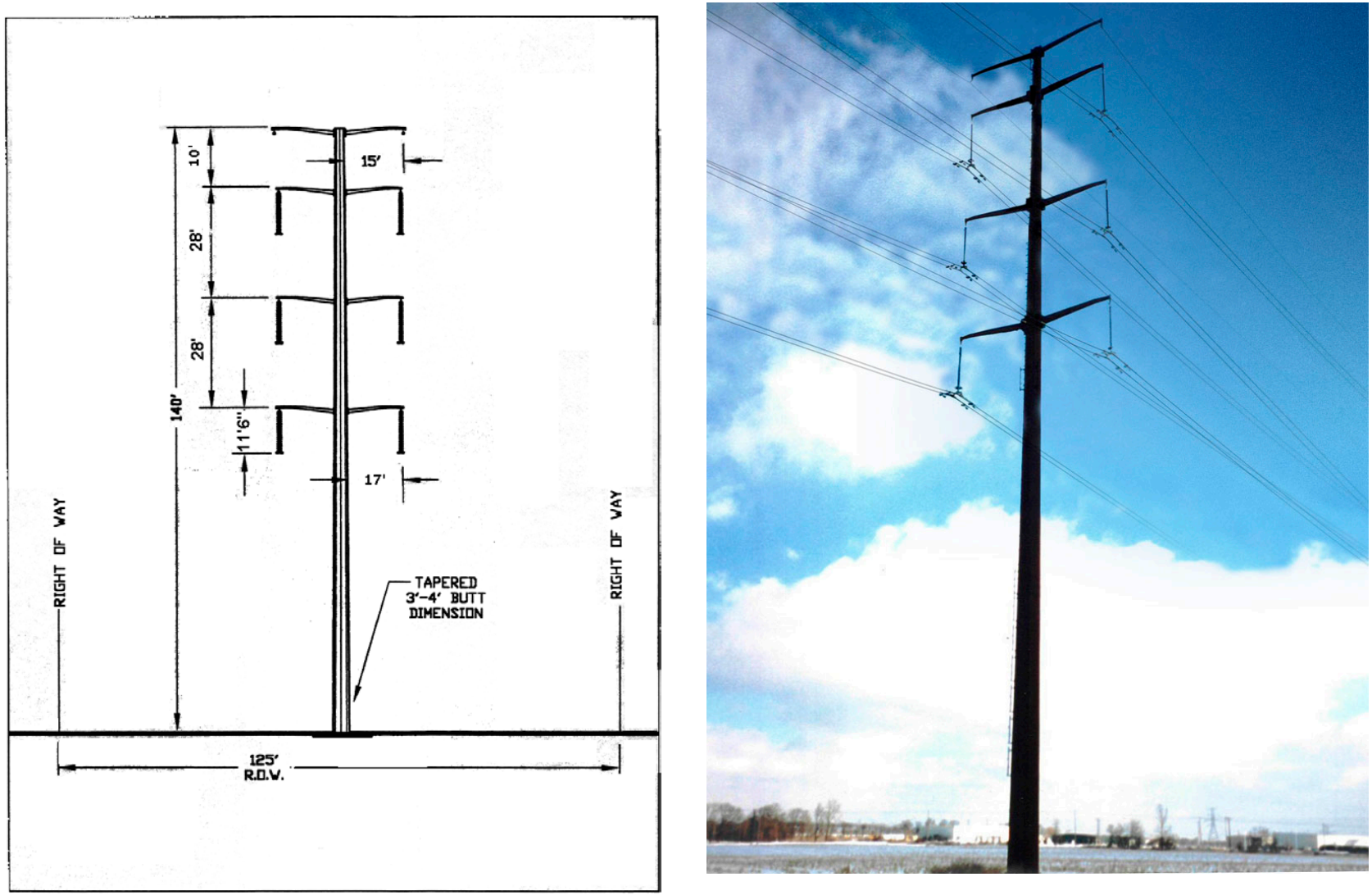

Figure S–3. Monopole Transmission Line Structure Drawing and Photo.

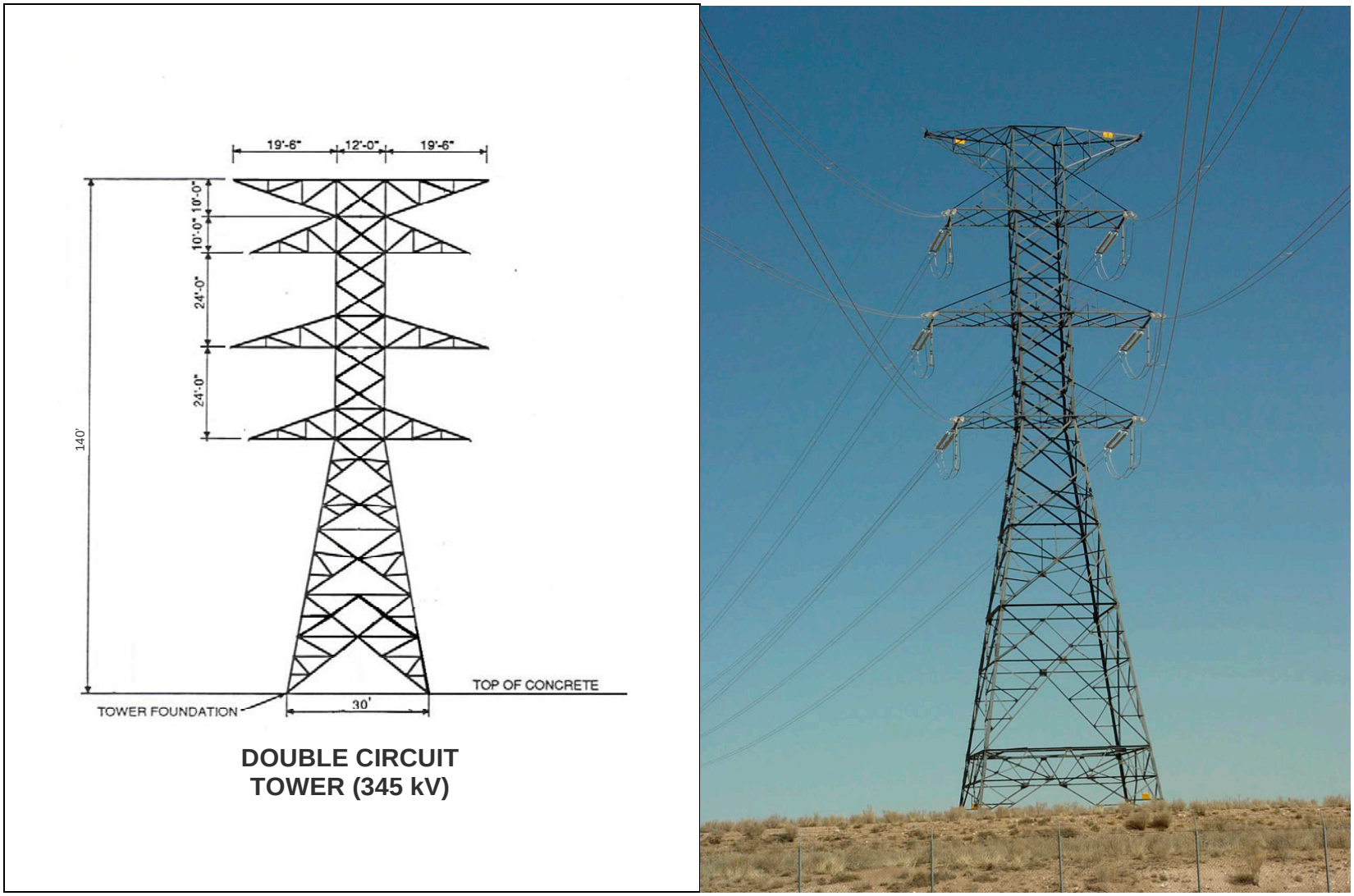

Figure S–4. Lattice Tower Transmission Line Structure Drawing and Photo.

selected structures. There would not be a single cleared ROW leading to the U.S.-Mexico border. Transmission line tensioning and pulling sites, fiber-optic splicing sites, and construction yard areas would be cleared within 6 months of the project becoming fully operational and the areas would be restored in accordance with agreements with land owners or managers.

The Western Corridor, together with the Central and Crossover Corridors, exits the TEP South Substation located within the incorporated area of the Town of Sahuarita and proceeds westerly for 1.0 mi (1.6 km) before turning south for 1.5 mi (2.4 km). The corridor turns west across I-19 and continues through Pima County to the southwest, crossing an estimated 1.25 mi (2.01 km) of Federal lands managed by BLM parallel to two existing TEP transmission lines (138-kV and 345-kV). All corridors turn south and follow on the east side of the EPNG pipeline ROW for an estimated 5.8 mi (9.3 km), passing just east of the existing TEP Cyprus Sierrita Substation.

The Western and Crossover Corridors continue south past the Cyprus Sierrita Substation, then separate from the Central Corridor, continuing southwest and south and enter Santa Cruz County after approximately 10 mi (16 km). The Western and Crossover Corridors enter the Coronado National Forest 6.0 mi (9.7 km) south of the Santa Cruz County line. Where the Crossover Corridor turns east at Peck Canyon, the Western Corridor continues south along the west side of the Tumacacori and Atascosa Mountains, then meets and runs along the south side of Ruby Road as it turns gradually east, north of the Pajarita Wilderness. The Western Corridor continues south of Ruby Road then meets the EPNG gas pipeline ROW and the Central and Crossover Corridors.

The Western Corridor, together with the Central and Crossover Corridors, continues through the national forest land, paralleling the EPNG pipeline ROW to the southeast for several miles to the Coronado National Forest boundary. The proposed corridors exit the national forest land onto private land and proceed 0.5 mi (0.8 km) east to the proposed Gateway Substation. From the Gateway Substation, the proposed corridors return to the west through private land then turn south to parallel the Coronado National Forest boundary. The proposed corridors meet the U.S.-Mexico border approximately 3,300 ft (1,006 m) west of Arizona State Highway 189 in Nogales, Arizona.

Central Corridor. The Central Corridor overlaps the northern portion of the Western Corridor from Sahuarita for approximately 18 mi (29 km), then continues south parallel to the EPNG pipeline ROW, connecting Sahuarita to the U.S.-Mexico border. The Central Corridor extends for an estimated 57.1 mi (91.9 km), including an estimated 43.2 mi (69.5 km) that follows or crosses the EPNG pipeline ROW. The estimated length of the Central Corridor within the Coronado National Forest is 15.1 mi (24.8 km). The estimated length of the Central Corridor on lands managed by BLM is 1.25 mi (2.01 km).

The Central Corridor would require an estimated 373 support structures, including 102 within the Coronado National Forest and 8 on BLM land. Table S–1 lists the estimated areas of land that would be displaced by structures and structure construction sites. TEP would use existing access where feasible as described for the Western Corridor. An estimated 13.8 mi (22.2 km) of temporary new roads would be built for construction of the Central Corridor on the Coronado National Forest; spur roads off existing access roads to adjacent TEP transmission lines would provide project access on BLM land. Transmission line tensioning and pulling and fiber-optic splicing sites would also temporarily disturb land. These sites would range from 0.5 to 1.5 acres (0.2 to 0.6 ha). There would be an estimated 14 sites outside of national forest lands occupying a total of 21 acres (8.5 ha), and an estimated 7 sites on the Coronado National Forest occupying a total of 3.3 acres (1.3 ha). The total new temporary area of disturbance on the Coronado National Forest during construction of the Central Corridor would be an estimated 105 acres (42.5 ha).

Following construction, TEP would close new roads, construction areas, and existing roads not required for project maintenance, in accordance with agreements with land owners or managers, as described for the Western Corridor. Transmission line tensioning and pulling sites, fiber-optic splicing sites, and construction yard areas would be cleared within 6 months of the project becoming fully operational and the areas would be restored in accordance with agreements with land owners or managers.

The Central Corridor follows the same route as the Western and Crossover Corridors from the South Substation in Sahuarita to approximately 3 mi (4.8 km) south of the existing TEP Cyprus Sierrita Substation. Refer to the previous discussion of the Western Corridor for a description of this common segment. The Central Corridor separates from the Western and Crossover Corridors south of the TEP Cyprus Sierrita Substation, continuing to follow or cross the EPNG pipeline ROW to the south.

The Central Corridor approaches to within approximately 1.0 mi (1.6 km) west of I-19, passing Amado, Tubac, and Tumacacori. The Central Corridor continues approximately 2.0 mi (3.2 km) south of Tumacacori then enters the Coronado National Forest, following the EPNG pipeline ROW. The Central Corridor centerline is an estimated 0.5 mi (0.8 km) from the EPNG pipeline ROW for an estimated 1.9 mi (3.1 km) and avoids the USFS inventoried roadless area (IRA). The Central Corridor passes along the eastern edge of the Tumacacori and Atascosa Mountains, crosses Ruby Road, and reaches a point northwest of the proposed Gateway Substation where it rejoins the Western Corridor (see Figure S–2).

The Central Corridor is identical to the Western Corridor from the point where they join in the Coronado National Forest to the Gateway Substation and the U.S.-Mexico border. Refer to the previous discussion of the Western Corridor for a description of this common segment.

Crossover Corridor. The Crossover Corridor overlaps the northern portion of the Western Corridor from Sahuarita into the Coronado National Forest, then turns east through Peck Canyon for an estimated 7 mi (11.3 km) to meet up with the Central Corridor. The Crossover Corridor is identical to the Central Corridor from the point they rejoin in the Coronado National Forest to the proposed Gateway Substation and the U.S.-Mexico border. Refer to previous discussion of the Western Corridor for a discussion of this common segment. The Crossover Corridor extends for an estimated 65.2 mi (105 km), from the South Substation to the U.S.-Mexico border, including an estimated 17 mi (27.4 km) that follows or crosses the EPNG pipeline ROW. The estimated length of the Crossover Corridor within the Coronado National Forest is 29.3 mi (47.2 km). The estimated length of the Crossover Corridor on lands managed by BLM is 1.25 mi (2.01 km).

The Crossover Corridor would require an estimated 431 support structures, including 196 within the Coronado National Forest and 8 on BLM land. Table S–1 lists the estimated areas of land that would be displaced by structures and structure construction sites. TEP would use existing access where feasible as described for the Western Corridor. An estimated 20.7 mi (33.3 km) of temporary new roads would be built for construction of the Crossover Corridor on the Coronado National Forest; spur roads off existing access roads to adjacent TEP transmission lines would provide project access on BLM land. These sites and fiber-optic splicing sites would also temporarily disturb land. These sites would range from 0.5 to 1.5 acres (0.2 to 0.6 ha). There would be an estimated 12 sites outside of national forest lands occupying a total of 18 acres (7 ha), and an estimated 12 sites on the Coronado National Forest occupying a total of 7.6 acres (3.1 ha). The total new temporary area of disturbance on the Coronado National Forest during construction of the Crossover Corridor would be an estimated 238 acres (96.3 ha).

Following construction, TEP would close new roads, construction areas, and existing roads not required for project maintenance, in accordance with agreements with land owners or managers, as described for the Western Corridor. Transmission line tensioning and pulling sites, fiber-optic splicing sites, and construction yard areas would be cleared within 6 months of the project becoming fully operational and the areas would be restored in accordance with agreements with land owners or managers.

No Action Alternative. CEQ regulations require that an agency "include the alternative of no action" as one of the alternatives it considers (40 CFR 1502.14[d]). In the context of this EIS, "no action" means that TEP's proposed transmission line is not built. For DOE and the cooperating agencies, "no action" would be achieved by any one of the Federal agencies declining to grant TEP permission to build in the agency's respective jurisdiction. Thus, in the case of DOE, "no action" means denying the Presidential Permit; for USFS, "no action" means denying the special use permit; for BLM, "no action" means denying access to BLM-managed Federal lands; and for USIBWC, "no action" means not approving construction plans. Each agency makes its own decision independently, so that it is possible that one or more agencies could grant permission for the proposal while another could deny permission. Thus, if any agency denied permission for the proposed transmission line, it would not be built.

APPLICANT'S PURPOSE AND NEED

TEP has provided the following purpose and need for the proposed project:

> TEP believes that the proposed project would have the potential to benefit both southern Arizona and northern Mexico with regard to the availability of electric power. TEP is responding to the need to improve transmission of electric power into the southern Arizona region and to assist Citizens (Communications Company) in meeting an ACC mandate that Citizens build a second transmission line to serve its customers in Santa Cruz County by December 31, 2003 (ACC Decision No. 62011). Citizens is a community-based telecommunications provider serving nearly one million customers across the nation.
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> TEP signed a contractual agreement with Citizens to assist in responding to the ACC mandate that Citizens build a second transmission line to serve its customers in Santa Cruz County. Following this, TEP and Citizens applied jointly to the ACC for a Certificate of Environmental Compatibility (CEC) on March 1, 2001. On January 15, 2002, the ACC granted a CEC to TEP and Citizens to construct the proposed project in the Western Corridor, in accordance with listed mitigation provisions (ACC Decision No. 64356). TEP and Citizens will, if necessary, return to the ACC to request an extension of the original December 2003 in-service deadline. If TEP and Citizens do not meet the deadline, and the ACC does not grant an extension, TEP and Citizens would be in violation of an ACC order, and there may be monetary penalties associated with violating that order.
>
> While each circuit is thermally capable of transmitting 1,000 MW, the double circuit system has been designed and would be operated to transmit 500 MW total, for operational and reliability considerations. TEP reached agreement with Citizens to provide up to 100 MW of transmission capacity from Tucson to Nogales, Arizona. This would allow Citizens to improve reliability of electric service to its customers in Santa Cruz County. The proposed TEP 345-kV transmission line would provide a redundant path for the energy that is currently transmitted over the Citizens 115-kV transmission line from Tucson to Nogales, Arizona. Citizens committed to the purchase of 100 MW of transmission capacity from TEP to allow for future load growth above Citizen's current Santa Cruz County load of approximately 65 MW. Once TEP's proposed 345-kV transmission line is in-service, Citizens would be able to make some needed upgrades to its existing 115-kV transmission line that would allow it to achieve a capacity of 100 MW, thus allowing either line to serve Citizens' load for the foreseeable future.
>
> TEP anticipates using the remaining 400 MW of capability for transport of energy between the United States and Mexico. Typically an electricity producer like TEP generates and sells its own electricity using its own transmission system. However, if DOE should decide to grant a Presidential Permit to TEP, it would include a condition in the permit requiring TEP to provide non-discriminatory open access transmission service on the subject international facilities. Open

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access is a regulatory policy which requires transmission owners to make their transmission facilities available for the transmission of electric energy by third parties. Therefore, while the TEP international facilities could be utilized for potential future electricity exports to Mexico, the source of those future electric energy exports might not necessarily be TEP.

TEP would initially use the two proposed fiber optic cables contained within the two neutral ground wires for supervision and operation of the transmission line and connected substations.

FEDERAL AGENCIES' PURPOSE AND NEED AND AUTHORIZING ACTIONS

TEP needs approvals from DOE, USFS, BLM, USIBWC, and other Federal, state, and local agencies to implement various aspects of the proposed project. Because DOE, USFS, BLM, and USIBWC must all act and, because their actions are interrelated, they have agreed to cooperate in preparing this EIS. The Final EIS will be used by DOE and cooperating agency officials to ensure that they have the information needed for purposes of informed decisionmaking. The decisions themselves are issued subsequent to the Final EIS, in the form of a ROD, or a letter of concurrence in the case of USIBWC.

DOE. The purpose and need for DOE action is to determine whether it is in the public interest to grant or deny a Presidential Permit to TEP for the construction, operation, maintenance, and connection of the proposed 345-kV transmission line that would cross the U.S. international border. Notice of receipt of the Application for a Presidential Permit was published in the *Federal Register* (FR) on September 20, 2000 (65 FR 56875). DOE's action is in response to the applicant's request for a Presidential Permit. Like all Federal agencies, DOE must comply with NEPA and, in this instance, has agreed to be the lead Federal agency for NEPA compliance.

In determining whether a proposed action is in the public interest, DOE considers the impact of the proposed project on the environment and on the reliability of the U.S. electric power supply system. DOE also must obtain the concurrence of the Departments of State and Defense before it may grant a Presidential Permit. If DOE determines that granting a Presidential Permit is in the public interest, the information contained in the EIS will provide a basis upon which DOE decides which alternative(s) and mitigation measures are appropriate for inclusion as conditions of the permit. In a process that is separate from NEPA, DOE will determine whether the proposed project will adversely impact the reliability of the U.S. electric system. Also, before authorizing exports to Mexico over the proposed 345-kV facilities, DOE must ensure that the export will not impair sufficiency of supply within the United States and will not impede, or tend to impede, the coordinated use of the regional transmission system. Issuance of a Presidential Permit only indicates that DOE has no objection to the project, but does not mandate that the project be completed.

USFS. USFS has provided its purpose and need as follows:

> The purpose and need for USFS action is to determine whether the proposed 345-kV transmission line development is appropriate within the Tumacacori Ecosystem Management Area (EMA) of the Coronado National Forest, and thus whether to issue a special use permit. If line development is appropriate, USFS would work with TEP to decide the site-specific location for the line and support structures, mitigation measures and best management practices to be implemented to reduce environmental effects, permit issuance terms and conditions, and pre- and post-construction reporting and monitoring.
>
> USFS has received from TEP an application to cross certain Federal lands managed by USFS with a 345-kV transmission line. The NEPA analysis (EIS) must be adequate for use by the Forest Supervisor in issuing a special use permit for the project. The *Federal Land Policy and Management Act* of 1976 (FLPMA) is the appropriate authority for the authorization (FSM

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2701.1-15[a][4]). The first step in the permit process was accomplished on April 20, 2000, when TEP submitted an application to USFS. A separate special-use permit would be required for any fiber optic line use that is not internal to TEP operations.

When an adequate analysis within the EIS is complete, USFS will issue a ROD disclosing its decision with regard to approval or denial of the special use permit application. The ROD will contain administrative appeal rights for exercise by those who believe the decision in the ROD is somehow in violation of law, regulation, or policy. USFS must complete the administrative review process prior to implementing the decision documented in the ROD.

A *Coronado National Forest Land and Resource Management Plan* (Forest Plan) amendment would be needed for any of the three action alternatives. The amendment process would have to be complete before implementation of the proposed project.

BLM. BLM has provided its purpose and need as follows:

The purpose and need for BLM action is to determine whether to approve an electrical transmission line ROW and a fiber optic ROW in accordance with the FLPMA. Because each of the corridor alternatives cross Federal lands managed by BLM, development of the proposed transmission line would require BLM approving two separate ROW grants, one for the transmission line and one for the fiber optics line. TEP applied to BLM on March 20, 2001, for approval to construct a double circuit 345-kV transmission line across 1.25 mi (2.01 km) of Federal lands approximately 5 mi (8 km) west of Sahuarita, and submitted its application to BLM for the proposed fiber optic facilities on April 14, 2003. The fiber optic permit application is for undefined use outside of TEP internal use, and would be renegotiated if the use changes. In processing the applications, BLM must consider land status, affected resources, resource values, environmental conditions, and the concerns of various interested parties. Complete guidance for implementing the NEPA process within BLM can be found in the BLM *Manual and Handbook 1790-1* (published October 25, 1988) and Departmental guidance (516 DM 1-7). BLM has an existing Resource Management Plan for all bureau properties that designates utility corridors and other uses. TEP's proposed alignment on BLM lands, which is the same for the Western, Central, and Crossover Corridors, is parallel to two existing TEP transmission line ROWs. TEP's proposed 125-ft (38-m) wide ROW is in an area not currently designated as a BLM utility corridor, but is within an area generally opened to ROW development on a case-by-case basis in the existing Phoenix Resource Management Plan. A formal designation as a BLM utility corridor (which would require a Land Use Plan Amendment) is not necessary for approving a ROW for TEP. The lands crossed by the proposed project would need to be designated as a BLM utility corridor at a future date. Currently, there are no plans to take on the action of writing a Plan Amendment. The BLM parcels of land crossed by TEP's proposed alignment are currently identified as suitable for disposal (that is, lands that may be sold) through the state indemnity selection programs or state or private exchange.

In addition to the NEPA process, BLM is required to comply with the FLPMA, and must have the following items completed, which are underway concurrently with the EIS, before issuing a ROD:

- A detailed "Plan of Development" which outlines how the project will be constructed and the impacts to endangered species, cultural sites, and other affected management plans.

- An investigation, with recommendations for mitigation actions, relating to endangered species, cultural sites, and Resource Management Plans.

USIBWC. USIBWC has provided its purpose and need as follows:

> The purpose and need for USIBWC action is to review plans for construction of the proposed project where it would cross the border between the United States and Mexico and assess whether the effects of the proposed project would be consistent with existing bilateral arrangements between the two countries or would obscure or otherwise impact the international border. Specific USIBWC concerns about the proposed project include evaluating whether there would be adverse impacts on the visibility and permanent placement of the international boundary monuments and markers, whether project-associated structures could limit access to the international boundary monuments and markers, whether the present drainage patterns to and from Mexico would be affected, and whether potential transboundary pollution problems associated with the proposed project are properly addressed to insure that none occur in either country. USIBWC will not approve any construction in the United States that increases, concentrates, or relocates overland drainage flows into either the United States or Mexico. Surface drainage must be handled so that there is no increase of volume, peak runoffs, or flow concentration across the border in either direction. Prior to construction of the selected corridor, TEP would provide to USIBWC, for its approval, copies of any hydrological or hydraulic studies and site-specific drawings for work proposed in the vicinity of the U.S.-Mexico border. This would include review of any structures proposed to be constructed in any drainage courses that cross the border. USIBWC is a cooperating agency in preparation of this EIS, and typically will use information in an EIS in conjunction with review of project studies and plans to prepare a letter of concurrence, if appropriate, to the project proponents (in this case, TEP).

PUBLIC PARTICIPATION

Public participation in the EIS process includes two formal opportunities for input: (1) public scoping period, where interested or potentially affected agencies, organizations, tribes, and members of the public are invited to comment on the appropriate scope or content of the EIS, through comment submittal and public meetings; and (2) Draft EIS comment period, where interested or potentially affected agencies, tribes, organizations, and members of the public are invited to comment on the document and participate in public meetings. Comments received outside of these two formal comment periods are still considered, to the extent practicable. A summary of the public participation process to date for the TEP EIS, including the issues raised and the cooperating agencies' review of these issues follows.

The "Notice of Intent to Prepare an Environmental Impact Statement (EIS) and to Conduct Public Scoping Meetings and Notice of Floodplain and Wetlands Involvement" for the proposed project was published in the *Federal Register* (66 FR 35950) on July 10, 2001. Announcements were also placed in local newspapers. A factsheet translated into Spanish is provided on the proposed project website maintained for DOE (www.ttclient.com/TEP). Public scoping meetings were held by DOE on July 30, 2001, at the Rancho Resort in Sahuarita, Arizona, and on July 31, 2001, at the Rio Rico Resort in Rio Rico, Arizona. Both oral and written comments were invited and received at these meetings. A total of 65 individuals presented formal oral comments at the two public scoping meetings. Written scoping comments were also solicited in the announcements. The public comment period was initially to have closed on August 9, 2001, but, in response to requests from the public, it was extended until August 31, 2001. From November 27 to 29, 2001, USFS, BLM, and USIBWC met with DOE to review all scoping comments received to date. As of November 27, 2001, approximately 200 people had submitted formal written scoping comments by letter, email, and postcard campaign. DOE and the cooperating agencies have continued to receive public comments up to the printing of this Draft EIS; the "interested party" mailing list for the project last totaled about 1,500 addresses. In addition to the public participation process, consultations are ongoing with Federal, state, and local resource management and regulatory agencies as well as interested tribal governments. The Crossover Corridor was added for analysis in the EIS based on public and tribal input received during the public scoping period and tribal consultations.

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The issues raised that are within the scope of the EIS are summarized first below; then, issues raised that are not within the scope of the EIS are discussed.

Issues Within Scope of the EIS

Three commentors made suggestions on combining portions of TEP's proposed routes to make a new alternative. The Crossover Corridor, a combination of the northern portion of the Western Corridor and the southern portion of the Central Corridor, connected with a new segment through Peck Canyon, was added to this EIS as a reasonable alternative for analysis based on these comments and tribal consultations.

Other comments received that were addressed in the EIS are briefly summarized below:

Eleven commentors questioned TEP's purpose and need for the project, and the role of the public in the decision-making process.

One hundred and eleven commentors raised issues regarding the biodiversity and visual beauty of the region. Particular areas highlighted included the Coronado National Forest, Pajarita Wilderness, Goodding Research Natural Area, Sycamore Canyon, Peña Blanca Lake Recreation Area, Juan Bautista de Anza Trail, and Chiltipene Botanical Area. Thirty-two commentors stated concerns about threatened and endangered species, invasive species, protection for wild raptors and birds of prey, and potential effects on tourism, hiking, photography, and birding in the area. Potential impacts to the Sonoran Desert Conservation Plan were also questioned.

Thirty-three commentors raised issues regarding effects on the local community, including the rural character of the area, socioeconomic issues, and historical and cultural resources. Concerns included the historic value of the Santa Cruz Valley, Tohono O'Odham Rancherias, historic mining properties, and Tubac Presidio State Historic Park.

Thirteen commentors raised issues regarding the potential impact of the proposed project on property values in the area.

Two commentors requested that environmental justice issues be examined in the EIS.

Twenty-four commentors questioned the potential effects on human health, including electric and magnetic field (EMF) effects, interference with specially designated flight airspace, the potential for sabotage by terrorists, and safety issues of co-locating a transmission line and a natural gas pipeline.

Fourteen commentors raised issues regarding the potential for erosion during construction, and floodplains and wetlands involvement, specifically the expansion of the South Substation within a floodplain.

Issues Out of Scope of the EIS

The following is a summary of issues raised by the public that are beyond the scope of the EIS.

Five commentors stated that the cumulative impacts of the proposed project and other potential future projects, such as a power plant proposed under development in Nogales, Arizona, by Maestros Group or other power plants, should be evaluated. As required by CEQ guidance, cumulative impacts have been addressed in this EIS to the extent that the future projects are reasonably foreseeable, the potential resource area impacts overlap, and inclusion of the potential future projects would not be arbitrary. Neither the Arizona Department of Environmental Quality (ADEQ) nor the Pima County Department of

Environmental Quality (PDEQ) has received any permit applications for new power plants in the project vicinity of southern Arizona.

Three commentors suggested that Mexico may build power plants to sell electricity to the United States. DOE is not aware of any proposals by Mexico to build power plants to sell electricity to the United States in the area covered by this EIS. Thus, DOE considers this assertion to be speculative.

One commentor raised issues regarding the potential for development in southern Arizona along the central portion of the project due to increased availability of electricity. Whether or in what manner this proposed project may lead to additional development in southern Arizona is too speculative to be analyzed in this EIS.

Thirty-one commentors suggested additional alternatives to be considered in lieu of TEP's proposed project. These alternatives included TEP building a power plant in Mexico or in Nogales, Arizona; exploring alternative sources of energy; and promoting energy conservation. These suggested alternatives would not fulfill TEP's purpose and need, and are therefore not within the scope of this EIS.

Six commentors suggested that there might be negative effects on the reliability of the U.S. electricity grid due to the proposed connection to Mexico. While examining reliability of the U.S. electricity grid is part of DOE's Presidential Permit application review process, such an examination does not involve a study of environmental impacts and does not require assessment in the EIS. Note that the reliability of local electricity service in Nogales, Arizona, was among the factors considered in screening alternatives.

Two commentors suggested coordinating routes and review processes with the Public Service of New Mexico's (PNM's) proposed transmission line project in the area. The NEPA process of the proposed PNM and TEP projects are being coordinated by DOE and cooperating agencies to the extent practicable. The consideration of impacts from the PNM proposal in this EIS is limited to potential cumulative impacts because the TEP and PNM proposals are at different stages of decisionmaking.

COMPARISON OF POTENTIAL ENVIRONMENTAL IMPACTS AMONG ALTERNATIVES

The resource areas evaluated for potential impacts are:

- Land use
- Recreation
- Visual resources
- Biological resources
- Cultural resources
- Socioeconomics
- Geology and soils
- Water resources
- Air quality
- Noise
- Human health and safety
- Infrastructure
- Transportation

Environmental Quality (PDEQ) has received any permit applications for new power plants in the project vicinity of southern Arizona.

Three commentors suggested that Mexico may build power plants to sell electricity to the United States. DOE is not aware of any proposals by Mexico to build power plants to sell electricity to the United States in the area covered by this EIS. Thus, DOE considers this assertion to be speculative.

One commentor raised issues regarding the potential for development in southern Arizona along the central portion of the project due to increased availability of electricity. Whether or in what manner this proposed project may lead to additional development in southern Arizona is too speculative to be analyzed in this EIS.

Thirty-one commentors suggested additional alternatives to be considered in lieu of TEP's proposed project. These alternatives included TEP building a power plant in Mexico or in Nogales, Arizona; exploring alternative sources of energy; and promoting energy conservation. These suggested alternatives would not fulfill TEP's purpose and need, and are therefore not within the scope of this EIS.

Six commentors suggested that there might be negative effects on the reliability of the U.S. electricity grid due to the proposed connection to Mexico. While examining reliability of the U.S. electricity grid is part of DOE's Presidential Permit application review process, such an examination does not involve a study of environmental impacts and does not require assessment in the EIS. Note that the reliability of local electricity service in Nogales, Arizona, was among the factors considered in screening alternatives.

Two commentors suggested coordinating routes and review processes with the Public Service of New Mexico's (PNM's) proposed transmission line project in the area. The NEPA process of the proposed PNM and TEP projects are being coordinated by DOE and cooperating agencies to the extent practicable. The consideration of impacts from the PNM proposal in this EIS is limited to potential cumulative impacts because the TEP and PNM proposals are at different stages of decisionmaking.

COMPARISON OF POTENTIAL ENVIRONMENTAL IMPACTS AMONG ALTERNATIVES

The resource areas evaluated for potential impacts are:

- Land use
- Recreation
- Visual resources
- Biological resources
- Cultural resources
- Socioeconomics
- Geology and soils
- Water resources
- Air quality
- Noise
- Human health and safety
- Infrastructure
- Transportation

- Minority and low-income populations (environmental justice)
- Cumulative impacts

The following discussion emphasizes the environmental implications of choosing among alternatives, organized by resource area. Where impacts are similar among the Western, Central, and Crossover Corridors, these alternatives are referred to collectively as the action alternatives (as compared to the No Action Alternative). Both temporary impacts during construction (approximately 12 to 18 months) and long-term impacts during operation of the project are considered. This discussion is followed by Table S–1, which provides a more quantitative look at the differences among alternatives. In general, the No Action Alternative has the least impact on the environment as it does not involve ground disturbing activities or introduction of a transmission line into the visual landscape. Each action alternative impacts different resources in different ways, as described below.

Land Use. The Central Corridor is shorter than the Western and Crossover Corridors. The Western and Crossover Corridors each have a longer segment on the Coronado National Forest than the Central Corridor. All three corridors are identical with respect to BLM land and cross the U.S.-Mexico border in the same location.

Temporary land use impacts would occur as a result of support structure construction areas, staging areas, and temporary access roads that would be re-vegetated in accordance with agreements with land owners and managers, and closed following construction. Besides physically changing the use of the land either temporarily or permanently, land use changes can impact all other resource areas as described below. Monopoles, which would be the primary support structure used by TEP, require a smaller area of disturbance (25 ft^2 [2.3 m^2]) than lattice tower structures (3,600 ft^2 [334 m^2]), and lattice towers require more ongoing access for maintenance. The temporary area of new disturbance on the Coronado National Forest would be greatest for the Crossover Corridor, followed by the Western Corridor and the Central Corridor. The total land area occupied by the final footprint of the towers for the entire corridor is less than 0.3 acres (0.12 ha) for each action alternative. In addition, access roads would be required to some support structures.

A Forest Plan amendment would be required to implement any of the three proposed corridors on national forest land. Because the Central Corridor has the longest segment that follows or crosses an existing EPNG pipeline ROW, fewer new access roads would be required than for the other alternatives, although considerable upgrade would be required for some existing pipeline ROW access roads. On BLM land, the project is adjacent to existing transmission lines within a utility corridor. Outside the Coronado National Forest, each proposed corridor is compatible with current land use and land use plans.

Recreation. Activities in the project area include hiking, biking, birding, photography, rock climbing, horseback riding and off-road vehicle use. These activities are mostly concentrated within portions of the Coronado National Forest, and along the east side of the Tumacacori Mountains where the Central Corridor follows outside of the Coronado National Forest boundary. Off-road vehicle use occurs more broadly throughout the project area. The primary impact to these activities would be a change in the visual setting where recreation occurs. None of the three corridors are visible from Peña Blanca Lake on the Coronado National Forest, a popular location for recreation.

In addition, DOE, in consultation with USFS performed a USFS Recreation Opportunity Spectrum (ROS) analysis for the proposed project on national forest land evaluating the project's impact on seven setting indicators (characteristics) established by USFS that contribute to a recreation experience. USFS provided the following language in summary of this analysis:

The Central Corridor would minimize the total mileage on national forest land and would impact three setting indicators (Remoteness, Naturalness, and Facilities and Site Management) in an inconsistent[1] or unacceptable[2] way. The Western and Crossover Corridors would impact the same three setting indicators on national forest land as the Central Corridor. The Crossover Corridor is the only alternative with major impacts to a Semi-Primitive Non-Motorized area (approximately 3 mi [5 km] through the Peck Canyon inventoried roadless area [IRA]). The Western and Crossover Corridors would have higher total mileage on national forest lands than the Central Corridor. Accordingly, the Western and Crossover Corridors would have greater overall impacts than the Central Corridor to ROS settings on the Coronado National Forest.

Visual. Visual impacts would occur from the introduction of steel support structures, access roads, and transmission line wires into the landscape. Structures would be primarily 140-ft (43-m) high self-weathering monopoles, similar in color to wood utility poles. With the exception of a reduction in existing High Scenic Integrity (degree of intactness and wholeness of the landscape) associated with the Western and Crossover Corridors near the Pima and Santa Cruz County line, the existing Moderate to Low Scenic Integrity would not be reduced for the area crossed by each corridor outside of the Coronado National Forest, including the BLM land. The Central Corridor has the longest length outside of the Coronado National Forest, and would be intermittently visible to more residents than the other corridors given its closer proximity to the towns of Amado, Tubac, and Tumacacori.

On the Coronado National Forest, per analysis using the USFS Scenery Management System (SMS), the area of land that would have reduced Scenic Integrity as a result of construction and operation of the Western or Crossover Corridors is approximately double the area of reduced Scenic Integrity for the Central Corridor. The Western Corridor would be in wide-open view from a longer stretch of Concern Level 1 (primary) travelways on and nearby the Coronado National Forest than the Central or Crossover Corridors would be. While siting the Western Corridor transmission line immediately adjacent to portions of Ruby Road would have a maximum visual impact along Ruby Road, it would protect the viewshed to the south (towards the Pajarita Wilderness) for the public (including photographers) and would eliminate the need for highly visible access roads in this portion of the Western Corridor.

The Central Corridor would minimize the total mileage on national forest land resulting in reduced Scenic Integrity of approximately 9,668 acres (3,912 ha) on national forest land. The Western and Crossover Corridors would have higher total mileage on national forest lands than the Central Corridor, and the Western and Crossover Corridors would result in approximately 18,511 to 18,736 acres (7,491 to 7,582 ha) of reduced Scenic Integrity on national forest lands. Accordingly, the Western and Crossover Corridors would have greater overall visual impact on the Coronado National Forest than the Central Corridor.

Biological Resources. There is a potential for impacting habitat of existing native plant communities located within the ROW and new access road areas during construction. Clearing would be limited to areas required for access roads and structures. Because the proposed project would be in an arid area, where vegetation recovers very slowly, disturbances due to construction could have long-term impacts.

The Western Corridor has the highest potential for adverse effects to special status species. None of the proposed corridors cross any federally designated Critical Habitat for any threatened or endangered

[1] As defined in the ROS, inconsistent means conditions that are not generally compatible with the norm, but may be necessary under some circumstances to meet management objectives.

[2] As defined in the ROS, unacceptable means conditions that, under any circumstance, do not fall within the maintenance of a given class. Where unacceptable conditions are unavoidable, a change in the ROS setting will often result, which must be handled appropriately in the USFS NEPA planning process.

species. The corridors include the current range and habitat types for 7 to 10 species listed under the ESA. The federally listed endangered Pima pineapple cactus is known to occur in each of the three proposed corridors. Additional species-specific surveys would be conducted for the selected corridor before construction activities begin. DOE has initiated consultation under Section 7 (a)(2) of the ESA with the U.S. Fish and Wildlife Service (USFWS). The formal consultation process between DOE, USFS, BLM, and USFWS will begin when DOE tenders its biological assessments of the alternatives to USFWS.

Cultural Resources. Consultation under Section 106 of the NHPA with the State Historic Preservation Officer (SHPO) and Native American communities/tribes/nations has been initiated and is ongoing. Multiple prehistoric and historic archaeological sites have been identified within each corridor, though a large percentage of each corridor has not been surveyed. A low density of cultural resource sites would be expected along most of the Western and Crossover Corridors; a higher density of cultural resource sites would be expected along the Central Corridor segment near the Santa Cruz River. Although there may be a greater number of cultural resource sites in the Central Corridor, the majority of these have already been disturbed by construction of the existing EPNG pipeline. The impacts would be based on the area of land disturbance, and on the overall impact to the landscape. A Cultural Resource survey of the proposed ROW prior to construction would mitigate impacts.

DOE initiated government-to-government consultation with the tribal governments of the 12 Native American communities/tribes/nations that are likely to have traditional concerns in the area:

- Ak-Chin Indian Community
- Fort Sill Apache Tribe
- Gila River Indian Community
- Hopi Tribe
- Mescalero Apache Tribe
- Pascua Yaqui Tribe
- Salt River Pima-Maricopa Indian Community
- San Carlos Apache Tribe
- Tohono O'Odham Nation
- White Mountain Apache Tribe
- Yavapai Apache Nation
- Pueblo of Zuni

Consultation has included information-sharing meetings with DOE and its representatives, and site visits arranged at the tribes' requests. (Note that the initial tribal consultations were for the Western, Central, and Eastern Corridors, originally proposed by TEP; refer to the following paragraph for a description of introduction of the Crossover Corridor in tribal consultations.) Representatives of several tribes have stated that they are opposed to the project, but they would prefer that the project be constructed along the Central Corridor, if it is to be built at all. Tribal consultations are ongoing. No specific traditional cultural properties (TCPs) have been identified along either the Western or the Central Corridors to date by the above consulted tribes.

DOE representatives have presented the Crossover Corridor, developed in response to public and tribal input during scoping, to tribal representatives from the Tohono O'Odham Nation, Gila River Indian Community, Salt River Pima Maricopa and Ak-Chin Indian Communities as well as the Intertribal

Council of Arizona. Noting that the Crossover Corridor is in largely undisturbed territory, tribal representatives have stated that the project be constructed along the Central Corridor, if it is to be built at all. No specific TCPs have been identified to date along the Crossover Corridor, but tribal consultations are ongoing.

Socioeconomics. The construction costs of each of the three action alternatives are roughly similar, approximately $70 million plus or minus $7 million. The construction of any of the three proposed corridors would create approximately 30 direct (construction) jobs, and approximately 31 indirect (service-related) jobs, which would benefit Santa Cruz and Pima Counties. No influx of population or stress to community services would be expected from project construction. No socioeconomic impacts would be expected from project operation because most jobs created would be filled by current residents.

During the public scoping process for the Draft Environmental Impact Statement (EIS), several commentors expressed concern that existence of the proposed transmission line would negatively impact real property values. In this context, any decrease in property values would be perception-based impact, that is, an impact that does not depend on actual physical environmental impacts resulting directly from the proposed project, but rather upon the subjective perceptions of prospective purchasers in the real estate market at any given time. Courts have long recognized that such subjective, psychological factors are not readily translatable into quantifiable impacts. See, for example, *Hanly v. Kleindienst*, 471 F.2d 823, 833 n.10 (2d Cir. 1972), *cert. denied*, 412 U.S. 908, (1973). People do not act consistently in accordance with negative perceptions, and one person's negative perception might be another's positive. Also, perceptions of value may change over time, and perceptions of value are affected by a host of other factors that have nothing to do with the proposed project. Accordingly, any connection between public perception of a risk to property values and future behavior would be uncertain or speculative at best, and therefore would not inform decision making.

There have been studies of the impact of transmission lines and property values in other geographic areas. See, for example, discussion of these studies in the *Environmental Impact Statement for Schultz-Hanford Area Transmission Line Project* (DOE 2002). Based on these studies, DOE can conclude only that, at worst, it is possible that there might be a small negative economic impact of short duration to some properties from the project, and that the impact on value would be highly variable, individualized, and unpredictable. The studies at most conclude that other factors, such as general location, size of property, and supply and demand factors, are far more important criteria in determining the value of residential real estate.

Accordingly, while DOE recognizes that a given property owner's value could be affected by the project, DOE has not attempted to quantify theoretical public perceptions of property values should the proposed project be built.

Geology and Soils. The construction of any of the three proposed corridors would not impact geologic resource availability or mine tailing piles west of Interstate 19 in the northern portion of the project. Slope stability analysis for potential tower locations in mountainous areas would prevent slope failure. Low to moderate seismic risk would be considered in structure design. Direct embedment pole construction techniques (requiring excavation) would be used in unconsolidated soils, while rock bolted bases would be used in areas of relatively intact bedrock near the ground surface. Best Management Practices (BMPs) to minimize soil and water impacts would be developed in coordination with USFS, BLM, and ADEQ before construction, and would be implemented for the entire corridor selected.

All three proposed corridors cross small areas of soils considered to be prime farmland when irrigated.

Water Resources. No adverse impacts to surface water or groundwater resources from any of the three action alternatives or the no action alternative. Each of the three proposed corridors would span across a

number of drainages and washes, and TEP would avoid placing structures in and near these areas where feasible.

The South Substation expansion and some corridor access roads would be within the Santa Cruz River or other 100-year floodplain and could result in an increase in flood elevation, leading to an increase in downstream flood loss and a long-term negative impact on lives and property. The Western and Crossover Corridors would have the greatest potential to impact floodplains in the project area. Impacts resulting from pole placement and construction of laydown areas would be negligible.

There may be small areas of wetlands within the proposed corridors that are associated with manmade stockponds and impoundments. TEP would site the transmission line to avoid such areas. None of the corridors cross any eligible or designated Wild and Scenic Rivers.

Restrictions on refueling locations would protect groundwater from contamination from fuel, lubricants and other fluids during construction. BMPs would be implemented along the length of the line for erosion control.

Air Quality. There are no significant differences in air quality impacts from any of the three action alternatives or the no action alternative. Temporary, localized fugitive dust emission impacts from construction activities would occur. Impacts from operation and maintenance activities would be limited to dust from occasional access by TEP. A conformity review of the proposed project (required under Section 176[c] of the *Clean Air Act*) was conducted in accordance with U.S. Environmental Protection Agency (EPA) and DOE guidance. The review shows that construction project emissions of PM_{10} (particulate matter with an aerodynamic diameter less than or equal to 10 microns) and CO (carbon monoxide) for each alternative are below regulatory thresholds and would not constitute a regionally significant action.

Noise. There are no significant differences in noise impacts from any of the three action alternatives or the no action alternative. Noise levels would increase above background during construction of any action alternative. Temporary construction noise increases would primarily impact residents in Sahuarita and Nogales for all three corridors, and also Amado, Tubac, and Tumacacori for the Central Corridor. Temporary construction noise would also impact recreationalists, especially in more remote areas of the Western and Crossover Corridors. Long-term noise from the corona effect on transmission lines would generally be lost in background noise. Gateway and South Substations operational noise would be near background levels for the nearest receptors.

Human Health and Environment. Long term electric and magnetic field (EMF) exposure at the nearest residences, schools, and commercial establishments would be well below average daily exposure to maximum magnetic fields (0.8 milligauss) from some common household appliances. There would be no health effects from this exposure. Though each proposed corridor passes primarily through undeveloped land, the Central Corridor would have the highest number of houses in close proximity to the transmission line. The project would be designed to minimize EMF and prevent electrical field effects. A minimum distance of 100 ft (30 m) would be maintained between any of the proposed transmission line structures and the edge of the existing EPNG pipeline ROW.

Infrastructure. There are no significant differences in infrastructure impacts from any of the three action alternatives. The proposed project would increase electric transmission facilities to Nogales, Arizona and Mexico, but would not otherwise affect existing infrastructure. Minimal municipal solid waste generated during construction and operation would be taken to appropriate landfill facilities. No hazardous waste would be generated from substation operation.

Transportation. Project access would be on existing utility maintenance roads, ranch access roads and trails, and new access ways where no access currently exists. Because the Central Corridor has the longest segment following the EPNG pipeline ROW, fewer temporary new access roads would be required than for the other alternatives, although considerable upgrade would be required for existing pipeline ROW access roads. Access to the proposed project on BLM land would be the same for all three action alternatives, on existing access from Mission Road to TEP's current transmission lines, with new spur roads to the proposed project. Short-term traffic disruptions on major roads such as I-19 or Ruby Road could occur during construction.

On the Coronado National Forest, the Crossover Corridor passes through an IRA, although no roads would be constructed or reconstructed in an IRA for any of the action alternatives. (Helicopters would be used to insert structures as needed for the Crossover Corridor.) TEP would build more miles of temporary new roads for the Western or Crossover Corridors than for the Central Corridor. In addition, more areas on existing roads would require minor repairs for the Western and Crossover Corridors than for the Central Corridor. By siting the Western Corridor immediately adjacent to Ruby Road for approximately 4 mi (6 km), the need for new project access and ongoing maintenance access for this segment would be reduced. There would be no net increase in roads in the Coronado National Forest.

Environmental Justice. Neither the three action alternatives nor the No Action Alternative would cause disproportionately high and adverse impacts to the minority or low-income populations. No means were identified for minority or low-income populations to be disproportionately affected from any of the resource areas.

Cumulative Impacts. This EIS includes analysis of cumulative impacts, as required under NEPA, that could occur as a result of the potential impacts of TEP's proposed project when added to impacts from other past, present, and reasonably foreseeable future actions. The potential effects are evaluated both for the period of project construction (anticipated to be 12 to 18 months), and for the post-construction (operation) period of the project. The region of influence (ROI) varies for each resource area, primarily depending on the distance a potential effect can reach.

The following actions have been evaluated as reasonably foreseeable and are included in the analysis of cumulative impacts: other transmission line projects in the project area, industrial development, trade corridor/roadway development, other activities under special use permits on the Coronado National Forest, and more generally defined possible actions in the project area such as residential development, increased operations of the U.S. Border Patrol, ongoing activity of undocumented immigrants near the U.S.-Mexico border, and local initiatives to protect biological resources such as the Sonoran Desert Conservation Plan.

The cumulative impacts from the combination of TEP's proposed project and other past, present, and reasonably foreseeable actions could affect land use (including recreation), visual resources, biological resources, cultural resources, socioeconomic resources, geology and soils, water resources, air quality, noise, human health and environment, and transportation. These potential cumulative impacts are primarily related to long-term development of land that is currently undisturbed or used for other activities such as ranching and recreation. In the short term, if multiple projects are under construction simultaneously, an increased amount of land could be used temporarily for construction lay down yards and staging areas, and an increased amount of airborne dust could be generated. The cumulative change in land use could affect natural habitats, special status species, and cultural resources, and could lead to an increase in soil erosion and local water use. The cumulative impacts to human health and safety could be an increase in background electric and magnetic field (EMF) exposure to residents in the immediate vicinity of overlapping transmission line projects. No long-term cumulative human health impacts are expected to occur. No means were identified for minority or low-income populations to be

disproportionately affected, and TEP's proposed project would not contribute cumulatively to any environmental justice impacts.

MITIGATION

TEP's Standard Mitigation Practices are documented in TEP's Environmental Protection Provisions application to the ACC. Additional mitigation, if required, would be in agreements, permits, or ROW grants from land owners or managers (for example, in the Plan of Development agreement with BLM), in stipulations by the ACC, and in the USFWS Biological Opinion, subsequent to ROD issuance. Mitigation measures that are part of TEP's proposed action include confining construction and maintenance activities to predefined limits, siting structures and access roads to minimize impacts, and performing restoration and clean-up following construction in accordance with requirements of land owners or managers.

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MITIGATION

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Table S–1. Summary Comparison of Potential Environmental Effects of Alternatives.

Resource	Western Corridor (TEP's Preferred Alternative)	Central Corridor	Crossover Corridor	No Action Alternative
Land Use				No impacts to existing land use. Current land use trends would continue. Residential and commercial developments would continue to be concentrated along Interstate 19 with some residences located in more remote areas that primarily contain ranches and undeveloped land.
Length	Estimated 65.7 mi (106 km)	Estimated 57.1 mi (91.9 km)	Estimated 65.2 mi (105 km)	
Length on CNF	Estimated 29.5 mi (47.5 km)	Estimated 15.1 mi (24.3 km)	Estimated 29.3 mi (47.2 km)	
Length on BLM	Estimated 1.25 mi (2.01 km)	Estimated 1.25 mi (2.01 km)	Estimated 1.25 mi (2.01 km)	
	Note that the Western and Crossover Corridors are identical outside of the Coronado National Forest (CNF).		Note that the Western and Crossover Corridors are identical outside of the CNF.	
Corridor length that follows or crosses the El Paso Natural Gas Company (EPNG) pipeline	Estimated 9.3 mi (15 km)	Estimated 43 mi (69 km)	Estimated 17 mi (27 km)	
Number of support structures (poles and towers):				
Total	Estimated 429	Estimated 373	Estimated 431	
On CNF	Estimated 191	Estimated 102	Estimated 196	
On BLM	Estimated 8	Estimated 8	Estimated 8	
Permanent area occupied by transmission line structures:				
Total	0.25 acres (0.10 ha)	0.21 acres (0.08 ha)	0.25 acres (0.10 ha)	
On CNF	0.11 acres (0.04 ha)	0.06 acres (0.02 ha)	0.11 acres (0.04 ha)	
On BLM	0.005 acres. (0.002 ha)	0.005 acres (0.002 ha)	0.005 acres (0.002 ha)	
Permanent area occupied by substations and fiber-optic regeneration station	19.8 acres (8 ha)	19.8 acres (8 ha)	19.8 acres (8 ha)	

(continues)

Table S–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*.

Resource	Western Corridor (TEP's Preferred Alternative)	Central Corridor	Crossover Corridor	No Action Alternative
Land Use *(continued)*				
On the CNF: New permanent disturbance	Estimated 29 acres (12 ha)	Estimated 23 acres (9.3 ha)	Estimated 36 acres (15 ha)	
New temporary disturbance	Estimated 197 acres (79.7 ha)	Estimated 105 acres (42.5 ha)	Estimated 238 acres (96.3 ha)	
	The Western Corridor passes primarily through undeveloped land with few residences (five houses approximately 1,000 ft [305 m] from the centerline west of Sahuarita).	In addition to the residences near the Western Corridor, the Central Corridor centerline passes approximately 1,000 ft [305 m] from eight residences in the vicinity of Tubac, more than the Western or Crossover Corridors. The Central Corridor has the shortest segment on the CNF.	The Crossover Corridor passes primarily through undeveloped land with few residences (same as the Western Corridor, five houses approximately 1,000 ft [305 m] from the centerline west of Sahuarita). The Crossover Corridor passes through an inventoried roadless area (IRA) within Peck Canyon. TEP plans to use helicopter access in this area, and would not build or upgrade any roads in the IRA.	
Compatibility with land use plans	A *Coronado National Forest Land and Resource Management Plan* (Forest Plan) amendment would be required to implement any of the three corridors on the CNF. Outside of national forest land, all corridors are compatible with current land use and land use plans. TEP does not anticipate any ground disturbance in the reserved lands (120 ft [36.6 m] total) along the U.S.-Mexico border.			

Table S–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*.

Resource	Western Corridor (TEP's Preferred Alternative)	Central Corridor	Crossover Corridor	No Action Alternative
Recreation	Recreation activities in the vicinity of the proposed project would primarily be impacted by a change in the visual setting of the recreation.			No change in impacts to existing recreational resources. Current recreation activities including hiking, biking, birding, photography, rock climbing, horseback riding, and off-road vehicle use would be expected to continue.
CNF Recreation Opportunity Spectrum (ROS) Areas Crossed	Total 29.5 mi (47.5km) In order from most to least developed: Roaded Natural 1.7 mi (2.7 km) Roaded Modified 7.0 mi (11 km) Semi-Primitive Motorized 21 mi (34 km) Semi-Primitive Non-Motorized none, but passes within 0.25 mi of an area	Total 15.1. mi (24.3 km) In order from most to least developed: Roaded Natural 1.1 mi (1.8 km) Roaded Modified none Semi-Primitive Motorized 14 mi (23 km) Semi-Primitive Non-Motorized none, but passes within 0.25 mi of an area	Total 29.3 mi (47.2 km) In order from most to least developed: Roaded Natural 1.2 mi (1.9 km) Roaded Modified none Semi-Primitive Motorized 25 mi (41 km) Semi-Primitive Non-Motorized 3.3 mi (5.3 km)	
ROS Area Classification	For each ROS area classification USFS has established the limits of acceptable change to certain setting indicators, classifying the changes as "fully compatible or normal," "inconsistent," or "unacceptable." The setting indicators within each area would be impacted as follows: For Access, Social Encounters, Visitor Impacts, and Visitor Management, all alternatives would be compatible with all ROS area classifications. For Facilities and Site Management, most of the length of all three corridors would be unacceptable with all ROS area classifications. For Naturalness and Remoteness, impacts would be as follows:			
	The Western Corridor would have an unacceptable impact on Naturalness where it runs adjacent to Ruby Road for approximately 4 mi (6 km) southwest of the Atascosa Mountains. Most of the Western Corridor would be inconsistent with Remoteness. The length of the Western Corridor on the CNF (29.5 mi [47.5 km], similar to the Crossover Corridor) affects the extent of potential recreation impacts on the CNF.	The Central Corridor would have an unacceptable impact on Naturalness where it crosses Ruby Road, in the same location as the Crossover Corridor. Most of the Central Corridor would be inconsistent with Remoteness. The length of the Central Corridor on the CNF (15.1 mi [24.3 km], approximately half the length of the other alternatives on the CNF) affects the extent of potential recreation impacts on the CNF.	The Crossover Corridor would have an unacceptable impact on Naturalness within Peck Canyon and where it crosses Ruby Road, in the same location as the Central Corridor. The Crossover Corridor would also have a higher impact on Remoteness than the other alternatives, as approximately 3 mi (5 km) of the Crossover Corridor at Peck Canyon would have unacceptable impacts on Remoteness. The length of the Crossover Corridor on the CNF (29.3 mi [47.2 km], similar to the Western Corridor) affects the extent of potential recreation impacts on the CNF.	

(continues)

Table S–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*.

Resource	Western Corridor (TEP's Preferred Alternative)	Central Corridor	Crossover Corridor	No Action Alternative
Recreation ***(continued)***				
Impacts outside the CNF	Potential impacts on recreation activities would be similar to those within the CNF but would be lower given less recreational use of the Western Corridor outside the CNF.	Potential impacts on recreation activities would be similar to those within the CNF, as the Central Corridor crosses recreational trails where it parallels just outside the CNF boundary for approximately 7 mi (11 km) east of the Tumacacori Mountains.	Potential impacts on recreation activities would be similar to those within the CNF but would be lower given less recreational use of the Crossover Corridor outside the CNF.	
Visual Resources	Visual impacts would occur from the introduction of steel support structures, access roads, and transmission line wires into the landscape. Structures would be primarily 140-ft (43-m) high self-weathering monopoles, similar in color to wood utility poles.			The existing landscape and Scenic Integrity would continue, subject to visual impacts from any potential development in the project area.
Outside the CNF	The Western Corridor passes through areas of existing development near Sahuarita and Nogales, and is shielded from Interstate 19 (I-19) outside these areas by mine tailing piles and natural terrain, passing through primarily undeveloped land. With the exception of a reduction in Scenic Integrity from High to Moderate/Low near the Pima and Santa Cruz county line, the existing Moderate to Low Scenic Integrity would not change.	The Central Corridor passes through areas of existing development near Sahuarita and Nogales, and passes a number of towns along I-19 including Amado, Tubac, and Tumacacori. The Central Corridor would be visible from more residences than Western although some potential views would be blocked by terrain. The existing Moderate to Low Scenic Integrity would not change.	The Crossover Corridor passes through areas of existing development near Sahuarita and Nogales, and is shielded from I-19 outside these areas by mine tailing piles and natural terrain, passing through primarily undeveloped land. With the exception of a reduction in Scenic Integrity from High to Moderate/Low near the Pima and Santa Cruz county line, the existing Moderate to Low Scenic Integrity would not change. (same as Western Corridor)	
Substations	The South Substation expansion would have minimal visual impact given that similar equipment already exists onsite. There would be little visual change introduced by construction of the new Gateway Substation because of existing industrial development in the area.			
On the CNF	Crosses approximately 30 mi (48 km) of mostly Scenic Class 1 and 2 areas, of high public value, and would be most visible from roadways in an approximately 4-mi (6-km) stretch in the immediate foreground of Ruby Road southwest of the Atascosa Mountains.	Crosses approximately 15 mi (24 km) of mostly Scenic Class 2 areas, of high public value but below Scenic Class 1. The primary visual impact of the Central Corridor when viewed from roadways would be at the crossing of Ruby Road, with two structures in the foreground.	Crosses approximately 30 mi (48 km) of mostly Scenic Class 1 and 2 areas, of high public value. The primary visual impact of the Crossover Corridor when viewed from roadways would be at the crossing of Ruby Road, with two structures in the foreground.	

Table S–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*.

Resource	Western Corridor (TEP's Preferred Alternative)	Central Corridor	Crossover Corridor	No Action Alternative
Visual Resources *(continued)*				
On the CNF *(continued)*	Is mostly blocked by terrain from I-19 and the eastern portion of Ruby Road.	Is mostly blocked by terrain from I-19, and is only visible from Ruby Road at the crossing area.	Is mostly blocked by terrain from I-19, and is only visible from Ruby Road at the crossing area.	
	The existing Scenic Integrity of Peña Blanca Lake Recreation Area and the Pajarita Wilderness would not change.			
Scenic Integrity Changes On the CNF	From: High/Very High To: Moderate/Low 13, 870 acres (5,613 ha)	From: Very High To: Moderate/Low 8,992 acres (3,639 ha)	From: Very High To: Moderate/Low 18, 060 acres (7,307 ha)	
Total Reduced Scenic Integrity On the CNF	From: High To: Very Low 4,641 acres (1,878 ha) 18,511 acres (7,491 ha)	From: High To: Very Low 676 acres (274 ha) 9,668 acres (3,912 ha)	From: High To: Very Low 676 acres (274 ha) 18,736 acres (7,582 ha)	
Biological Resources	Because the proposed project would be in an arid area, where vegetation recovers very slowly, disturbances due to construction could have long-term impacts.			No impacts to biological resources associated with the project.
Vegetation communities potentially disturbed:				
Arizona Upland/Sonoran Desertscrub	Entire Corridor 119 acres (48 ha) CNF 0 acres BLM 0 acres Other Land Ownership 119 acres (48 ha)	Entire Corridor 119 acres (48 ha) CNF 0 acres BLM 0 acres Other Land Ownership 119 acres (48 ha)	Entire Corridor 119 acres (48 ha) CNF 0 acres BLM 0 acres Other Land Ownership 119 acres (48 ha)	
Semidesert grassland	Entire Corridor 165 acres (67 ha) CNF 102 acres (41 ha) BLM 8 acres (3.2 ha) Other Land Ownership 55 acres (22 ha)	Entire Corridor 109 acres (44 ha) CNF 67 acres (27 ha) BLM 8 acres (3.2 ha) Other Land Ownership 34 acres (14 ha)	Entire Corridor 97 acres (39 ha) CNF 66 acres (27 ha) BLM 8 acres (3.2 ha) Other Land Ownership 23 acres (9.3 ha)	
Madrean Evergreen Woodland	Entire Corridor 95 acres (38 ha) CNF 95 acres (38 ha) BLM 0 acres Other Land Ownership 0 acres	Entire Corridor 38 acres (15 ha) CNF 38 acres (15 ha) BLM 0 acres Other Land Ownership 0 acres	Entire Corridor 72 acres (29 ha) CNF 72 acres (29 ha) BLM 0 acres Other Land Ownership 0 acres	

(continues)

Table S–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*.

Resource	Western Corridor (TEP's Preferred Alternative)	Central Corridor	Crossover Corridor	No Action Alternative
Biological Resources *(continued)*				
Sonoran Riparian Deciduous Forest	Entire Corridor 0.14 acres (0.06 ha) CNF 0 acres BLM 0 acres Other Land Ownership 0 acres	Entire Corridor 0 acres CNF 0 acres BLM 0 acres Other Land Ownership 0 acres	Entire Corridor 0 acres CNF 0 acres BLM 0 acres Other Land Ownership 0 acres	
Special status species	Both within and outside the CNF, there is a potential to impact habitat during construction of existing native plant communities located within the ROW and areas of new access roads. Biological Assessments (BAs) on federally listed species and reports on USFS Management Indicator Species (MIS) and Migratory Bird Treaty Act (MBTA) species were completed to evaluate impacts to species and their habitats and identify potential adverse effects for special status species that occur, or may occur, within each corridor. The corridors do not cross any federally designated critical habitats for any listed threatened or endangered species. The federally listed endangered Pima pineapple cactus is known to occur in each corridor. Additional species-specific surveys are recommended in some cases.			
Potential Adverse Effects to:	Includes habitat for the following 10 federally listed species: cactus ferruginous pygmy-owl, Chiricahua leopard frog, Gila topminnow, jaguar, lesser long-nosed bat, Mexican gray wolf, Mexican spotted owl, Pima pineapple cactus, Sonora chub, and southwestern willow flycatcher. 74 special status species	Includes habitat for the following 7 federally listed species: cactus ferruginous pygmy-owl, Gila topminnow, jaguar, lesser long-nosed bat, Mexican gray wolf, Mexican spotted owl, and Pima pineapple cactus. 62 special status species	Includes habitat for the following 9 federally listed species: cactus ferruginous pygmy-owl, Chiricahua leopard frog, Gila topminnow, jaguar, lesser long-nosed bat, Mexican gray wolf, Mexican spotted owl, Pima pineapple cactus, and southwestern willow flycatcher. 67 special status species	
Socioeconomics	Socioeconomic impacts would be similar for all corridors. The proposed project would result in the creation of approximately 30 direct (construction) jobs, and approximately 31 indirect (service-related) jobs during construction. No influx of population or stress to community services would be expected because most of the jobs created would be filled by current residents. No adverse socioeconomic impacts would be expected from project operation.			No socioeconomic impacts associated with the project. Current socio- economic trends would continue.

Table S–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*.

Resource	Western Corridor (TEP's Preferred Alternative)	Central Corridor	Crossover Corridor	No Action Alternative
Cultural Resources	Potential for land disturbance or loss of cultural resources due to land disturbances (pole locations and access roads). Cultural resource survey of proposed ROW prior to construction would mitigate impacts.			No archaeological and historical sites would be disturbed under this alternative. No additional archaeological surveys or Native American consultation would be undertaken in a systematic study of these areas in the foreseeable future. USFS and BLM would still allow access to public lands, which could result in the discovery and/or the destruction of cultural sites.
	Low density of cultural resource sites expected along a majority of the route.	Higher density of cultural resource sites expected along the Central Corridor segment near the Santa Cruz River.	Low density of cultural resource sites expected along a majority of the route. (same as Western Corridor)	
Native American Consultations	Indian tribal representatives have expressed opposition to all three proposed corridors, but have not (to date) named specific locations of any traditional cultural properties (TCPs) or sacred sites.			
	Several tribes (Tohono O'Odham Nation, Gila River Indian Community, Ak-Chin Indian Community, Salt River Pima Maricopa Indian Community and the Pascua Yaqui Tribe) have stated that they value the landscape through which the Western Corridor passes and have expressed opposition to this corridor.	Several tribes (Ak-Chin Indian Community, Tohono O'Odham Nation, Gila River Indian Community, Salt River Pima Maricopa Indian Community and the Pascua Yaqui Tribe) stated that they would prefer that the project be constructed along the Central Corridor, if it was built at all. They view the Central Corridor as an already-disturbed area. None of the tribes wished to express approval of the project overall when stating this preference. Similar statements favoring the Central Corridor, if any is to be built, were made in January 2003 meetings and a site visit with Tohono O'Odham Nation, Gila River Indian Community, Salt River Pima Maricopa and Ak-Chin Indian Communities.	Passes through portions of the landscape (where common with the Western Corridor) that have been identified as valued by several tribes. Official tribal concerns have not been stated regarding the unique portion of the Crossover Corridor.	

Table S–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*.

Resource	Western Corridor (TEP's Preferred Alternative)	Central Corridor	Crossover Corridor	No Action Alternative
Geology and Soils	No impact to geologic resource availability or mine tailings areas expected. The placement of poles and access roads would require some disturbance and removal of near-surface material. (See Land Use for estimates of areas disturbed). Structures on relatively intact shallow bedrock would be installed by rock bolting. Foundations for structures on unconsolidated alluvium probably would require direct embedment poles, requiring excavation of a large pit. Construction in alluvium containing large cobbles would require use of lean-concrete slurry for backfill of the pit because soils with large cobbles are difficult to compact adequately. Potential for ground failure exists in mountainous areas. Slope stability analysis for potential tower locations in mountainous areas would prevent slope failure. Low to moderate seismic risk would be considered in structure design.			No geologic or soils impacts associated with the project.
	There are limited areas of alluvium where direct embedment poles would be required, but steep terrain in the southern portion of the corridor increases potential for ground failure.	There are extensive areas of cobbly alluvium where direct embedment poles would be required, but relatively low relief reduces potential for ground failure.	There are limited areas of alluvium where direct embedment poles would be required, but rock bolting probably would be feasible in the unique portion of the Crossover Corridor. However, steep terrain in this section increases potential for ground failure.	
New roads on unconsolidated alluvium	Road construction on unconsolidated alluvium could cause soil erosion and compaction.			
On the CNF	Estimated 9 miles (15 km) of roads on unconsolidated alluvium.	Estimated 12 miles (19 km) of roads on unconsolidated alluvium.	Estimated 10 miles (16 km) of roads on unconsolidated alluvium.	
Prime farmland soils	All three proposed corridors cross soils considered to be prime farmland when irrigated. These soils would be spanned where feasible, and the total prime farmland soil converted to pole foundations would be less than 0.25 acres (0.1 ha).			
Water Resources	No adverse impacts to groundwater or limited surface water resources. Construction activity that takes place within a jurisdictional water requires a Section 404 Permit from the U.S. Army Corps of Engineers (USACE); TEP would complete consultation with USACE for an applicability determination upon final selection of an alternative. For all alternatives, an estimated 1 acre-foot (1,233.5 cubic meter) of groundwater would be used during construction.			No water resource impacts associated with the project. Current water resource patterns would continue.
Floodplain Area Disturbed	Estimated 1.97 acres (0.80 ha) of 100-year floodplain, including the expansion of the South Substation, pole construction and laydown areas, and access roads.	Estimated 1.58 acres (0.64 ha) of 100-year floodplain, including the expansion of the South Substation, pole construction and laydown areas, and access roads.	Estimated 1.97 acres (0.80 ha) of 100-year floodplain including, the expansion of the South Substation, pole construction and laydown areas, and access roads. (same as Western Corridor).	

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Table S–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*.

Resource	Western Corridor (TEP's Preferred Alternative)	Central Corridor	Crossover Corridor	No Action Alternative
Water Resources *(continued)*				
Large washes crossed	15	14	15	
Structures within a wash	1 in Sopori Wash, outside the normal flow line.	1 in Sopori Wash, outside the normal flow line.	1 in Sopori Wash, outside the normal flow line. Also 2 in the bottom of Peck Canyon	
Air Quality				No impacts to air resources associated with the project. Current air quality trends would continue. Nogales, Arizona, within the proposed project vicinity, is not in attainment with the EPA's National Ambient Air Quality Standard (NAAQS) for PM_{10}.
Construction	Temporary, localized fugitive dust emission impacts from construction activities would occur. A conformity review of the proposed project (required under Section 176[c] of the *Clean Air Act*) was conducted in accordance with EPA and DOE guidance. The review shows that the maximum year of construction project emissions of PM_{10} and CO for each alternative would be below the regulatory thresholds and below the regionally significant action level for carbon monoxide (CO). Specific results are as follows:			
PM_{10} in Nogales Non-attainment area	62.1 tons per year (tpy) (56.5 metric tpy[mtpy])	72.7 tpy (66.2 mtpy)	72.7 tpy (66.2 mtpy)	No PM_{10} emissions associated with the proposed project.
PM_{10} regulatory threshold	100 tpy (91 mtpy)	100 tpy (91 mtpy)	100 tpy (91 mtpy)	
PM_{10} regionally significant action level	None	None	None	
CO in Tucson Maintenance area	24.2 tpy (21.9 mtpy)	24.2 tpy (21.9 mtpy)	24.2 tpy (21.9 mtpy)	No CO emissions associated with the proposed project.
CO regulatory threshold	100 tpy (91 mtpy)	100 tpy (91 mtpy)	100 tpy (91 mtpy)	

(continues)

Table S–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*.

Resource	Western Corridor (TEP's Preferred Alternative)	Central Corridor	Crossover Corridor	No Action Alternative
Air Quality *(continued)*				
CO regionally significant action level	11,866 tpy (10,765 mtpy)	11,866 tpy (10,765 mtpy)	11,866 tpy (10,765 mtpy)	
Operation	Impacts from operation and maintenance activities would be limited to dust from occasional access by TEP. Corona effects would generate less than 1 part per billion of ozone.			
Noise				No noise impacts would be associated with the project. Current noise patterns would continue, with background noise levels ranging from 30 to 60 decibels, depending on proximity to development and roads.
Construction	The primary effect of noise would be annoyance to the residents nearest to the ROW (see Land Use above) during construction and would be short-term.			
	Temporary construction noise increases would primarily impact residents in Sahuarita and Nogales and recreationalists.	Temporary construction noise increases would primarily impact residents in Sahuarita, Amado, Tubac, Tumacacori, and Nogales, and recreationalists.	Temporary construction noise increases would primarily impact residents in Sahuarita and Nogales and recreationalists (same as Western Corridor).	
Operation	Long-term noise from corona effect on transmission lines would generally be lost in background noise (ranging from 30 to 60 decibels, depending on proximity to residential areas and roads). Gateway and South Substations operational noise would be near background levels for the nearest receptors. (There are no residences within 0.5 mi [0.8 km] of either substation).			
Infrastructure	The proposed project would increase electric transmission facilities, but would not otherwise affect existing infrastructure. Minimal municipal solid waste generated during construction and operation would be taken to appropriate landfill facilities. No hazardous waste would be generated from substation operation. Powerline reliability would increase.			No change to existing infrastructure. The unreliability of electricity in Nogales, Arizona would continue unless other transmission lines or power plants are built in the Nogales area.
Human Health and Environment	EMF exposure at the nearest residences, schools, and commercial establishments would be well below 0.8 milligauss, the average daily exposure to maximum magnetic fields from some common household appliances. EMF exposure at the nearest residences (listed previously under Land Use) would be less than 10 percent of EMF exposure from common household appliances, and would decrease further at the nearest schools and commercial establishments. No health effects would be expected from this exposure. Corona effects (audible noise, radio and television interference, visible light, and photochemical reactions) would be minimal and would be mitigated using proper line design.			No EMF effects associated with the project. EMF exposure from existing transmission lines and household appliances would continue.
Environmental Justice	No disproportionately high and adverse impact to the minority or low-income populations.			Existing conditions would continue.

Table S–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*.

Resource	Western Corridor (TEP's Preferred Alternative)	Central Corridor	Crossover Corridor	No Action Alternative
Transportation	Short-term traffic disruptions on major roads such as Ruby Road could occur during construction. Where no access currently exists, new access ways would be required in coordination with land owners and managers, as follows:			Current traffic patterns and growth of wildcat (unauthorized) roads on the CNF would be expected to continue.
New roads (estimated)	Not determined. Existing roads would be used for construction and maintenance access to the extent possible.	Same as Western, except that fewer new access roads would be required because a longer segment follows an existing utility (gas pipeline) ROW.	Same as Western.	
On CNF	20 mi (32 km)	14 mi (22 km)	21 mi (33 km)	
On BLM	0.9 mi (1.4 km)	Same as Western.	Same as Western.	
Road Repairs and Upgrades	Spot repairs would be made to existing roads as needed.	Same as Western, except that extensive upgrades to existing pipeline access roads would be required.	Same as Western.	
On CNF	An estimated 95 locations on existing roads would require minor repairs or improvements.	An estimated 15 locations on existing roads would require minor repairs or improvements.	An estimated 98 locations on existing roads would require minor repairs or improvements.	
Helicopter Use	Helicopters would be used for stringing conductors, but are not expected to be used to bring in structures.	Same as Western.	Helicopters would be used for stringing conductors and to bring an estimated 20 to 25 structures to the Peck Canyon area.	
Traffic	Short-term traffic disruptions could occur during construction, particularly where a corridor crosses a major road such as Arivaca Road.			
Permanent Changes to Road System	Roads not required for long-term maintenance would be closed in coordination with land managers and owners.	Same as Western.	Same as Western.	
On CNF	No net increase in road density. Roads not required for long-term maintenance would be closed, and the sites would be restored. For every mile of new road required for operation and maintenance of the project, TEP would close a mile of existing road. Roads required to remain open for project maintenance would be administratively closed, with restricted access.	Same as Western.	Same as Western.	

(continues)

Table S–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*.

Resource	Western Corridor (TEP's Preferred Alternative)	Central Corridor	Crossover Corridor	No Action Alternative
Transportation *(continued)*				
On BLM	0.9 mi (1.4 km) of additional roads	Same as Western	Same as Western	

BA = Biological Assessment
BLM = Bureau of Land Management
CO = Carbon monoxide
CNF = Coronado National Forest
EMF = Electric and magnetic field
EPNG = El Paso Natural Gas Company
EPA = U.S. Environmental Protection Agency
ESA = *Endangered Species Act*
IRA = inventoried roadless area
MBTA = *Migratory Bird Treaty Act*
MIS = Management Indicator Species
PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns
ROS = Recreation Opportunity Spectrum
ROW = right-of-way
TCP = Traditional Cultural Property
TEP = Tucson Electric Power Company
USFS = U.S. Forest Service