ATTACHMENT 1

January 2012

SOUTHWESTERN PUBLIC SERVICE COMPANY

Environmental Assessment and Alternative Route Analysis for the Proposed Kiser to Kress 115-kV Transmission Line Project

Hale and Swisher Counties, Texas

DOCKET NUMBER 40125

PROJECT NUMBER:
122186

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POWER ENGINEERS

TABLE OF CONTENTS

Appendices

List of Figures

List of Tables

Acronyms and Abbreviations

AM	Amplitude Modulation
BEG	Bureau of Economic Geology
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practices
CCN	Certificate of Convenience and Necessity
CLF	civilian labor force
CR	County Road
CWA	Clean Water Act
EA	Environmental Assessment and Alternative Route Analysis
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESSS	Ecologically Significant Stream Segments
FAA	Federal Aviation Administration
FAQ	Frequently Asked Questions
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FM	Frequency Modulation
GIS	Geographic Information Systems
GLO	Texas General Land Office
HPA	high probability area
IP	Individual Permit
kV	kilovolt
MBTA	Migratory Bird Treaty Act
NASS	National Agricultural Statistics Service
NEPA	National Environmental Protection Act
NESC	National Electrical Safety Code

NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTC	Notification to Construct
NWI	National Wetland Inventory
NWP	Nationwide Permit
PEM	palustrine emergent
Pf	palustrine farmed
POWER	POWER Engineers, Inc.
PUC	Public Utility Commission of Texas
PURA	Public Utility Regulatory Act
ROW	right-of-way
RRC	Railroad Commission of Texas
SHPO	State Historic Preservation Office
SPP	Southwest Power Pool
SPS	Southwest Public Service Company
STEP	Transmission Expansion Plan
SWPPP	Storm Water Pollution Prevention Plan
TARL	Texas Archeological Research Laboratory
TASA	Texas Archeological Site Atlas
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
THSA	Texas Historical Site Atlas
TNRIS	Texas Natural Resource Information Systems
TPWD	Texas Parks and Wildlife Department
TSS	Texas Speleological Survey
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
TXNDD	Texas Natural Diversity Database
U.S.	United States

USACE	U.S. Army Corps of Engineers
USBOC	U.S. Bureau of the Census
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

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1.0 DESCRIPTION OF THE PROPOSED PROJECT

1.1 SCOPE OF THE PROJECT

Southwestern Public Service Company (SPS), a subsidiary of Xcel Energy, is proposing to construct a single-circuit, 115-kilovolt (kV) electric transmission line between the proposed Kiser Substation located in Hale County, Texas and the existing Kress Substation located in Swisher County, Texas (see Figure 1-1). The existing Kress Substation is located northwest of the City of Kress, north of Farm-to-Market Road 145 and west of County Road (CR) 10. The proposed Kiser Substation will be located in the northeast portion of the City of Plainview, Texas, on the southwest corner of the intersection of Farm-to-Market Road 400 and 24th Street (see Figure 1-1). The proposed Kiser – Kress 115-kV Transmission Line Project would extend for approximately 25 miles, depending on the final route selected, and also connect with the existing Plainview North and Kress Rural 69-kV substations.

SPS retained POWER Engineers, Inc. (POWER) to prepare this Environmental Assessment and Alternative Route Analysis (EA) to support its application to amend its Certificate of Convenience and Necessity (CCN) with the Public Utility Commission of Texas (PUC). This EA discusses the environmental and land use constraints identified within the project study area, and documents the routing methodology and the public involvement process. This EA also provides an evaluation of alternative routes culminating with the selection of geographically diverse alternative routes that address the requirements under the Public Utility Regulatory Act (PURA) and PUC Substantive Rules. This EA may also be used to support any additional federal, state, or local permitting activities that may be required prior to construction of the proposed project.

To assist POWER in its evaluation of the proposed project, SPS provided POWER with the project endpoints and information regarding the need, construction practices, and right-of-way (ROW) requirements for the proposed project.

1.2 PURPOSE AND NEED

Southwest Power Pool (SPP) identified the need for several projects within the Plainview area as part of the long range plan in the 2009 and 2010 SPP Transmission Expansion Plan (STEP) studies. The Kiser - Kress 115-kV Transmission Line Project is identified as one of these projects and SPS has been issued a Notification to Construct (NTC) these facilities. This line is required to address overloads and low voltage in Kress and Plainview areas due to area load growth. The Kiser – Kress 115-kV transmission line will improve electric reliability and increase the capability of the existing transmission grid in and around the City of Plainview.

1.3 DESCRIPTION OF PROPOSED DESIGN AND CONSTRUCTION

1.3.1 Design Criteria

SPS proposes to construct the 115-kV transmission line using single-circuit, self-supporting steel monopole structures within new ROW areas. In areas where SPS proposes to overbuild an existing 69-kV transmission line, a double-circuit steel monopole is proposed and would be energized as a 115-kV circuit and a 69-kV circuit. SPS proposes to use direct embedment for tangent structures, and proposes drilled pier foundations for structures at dead-end and high angle locations. The typical height of the steel pole structure is between 80 and 140 feet (see Figures 1-2 through 1-6). All design criteria would comply with applicable statutes and codes, including the appropriate edition of the National Electrical Safety Code (NESC) and SPS' standard design practices.

The Kiser – Kress project also includes the construction of the proposed Kiser Substation and upgrades at the existing Kress, Kress Rural, and Plainview North substations to accommodate the new 115-kV transmission line. These existing substations and the proposed Kiser Substation are owned and operated by SPS.

KISER – KRESS 115-kV TRANSMISSION LINE PROJECT

FIGURE 1-1
STUDY AREA LOCATION MAP

Xcel Energy® RESPONSIBLE BY NATURE™ Print Date: January 20, 2012 Power for the Plains

NAZARETH
TULIA
HART
HART AERIAL AIRPORT
KRESS SUBSTATION
County Road Y
County Road 10
JOE VAUGHN SPRAYING AIRPORT
Kress Rural Substation
KRESS
WHITFIELD AIRPORT
CASTRO COUNTY
SWISHER COUNTY
BRISCOE COUNTY
Tule Creek
Rock Draw
Rock Creek
SWISHER COUNTY
HALE COUNTY
EDMONSON
Running Water Draw
BUDDY HARMEL AIRPORT
SMITH FARMS AIRPORT
Plainview North Substation
KISER SUBSTATION
24th St
PLAINVIEW
QUARTERWAY AIRPORT
HALE COUNTY AIRPORT
HORAN AIRPORT
OUTBACK AIRPORT
LANEY FARM AIRPORT
TRUE AIRPORT
LAMB COUNTY
HALE COUNTY
FLOYD COUNTY
LOCKNEY

LEGEND

PROJECT FEATURES
- Proposed Substation Site

LAND USE
- Airport/Landing Strip

EXISTING UTILITIES
- Substation
- Transmission Line

JURISDICTIONAL BOUNDARIES
- City Boundary
- County Boundary

TRANSPORTATION
- Abandoned Railroad
- Railroad
- Interstate
- US Highway
- State Highway
- Farm-to-Market/Ranch Road

WATER
- River or Stream

Note: Some legend symbols are enlarged for easier identification
Base Map: USGS Topographic Map from ESRI

PROJECT LOCATION

N W E S

0 1 2 4
Miles

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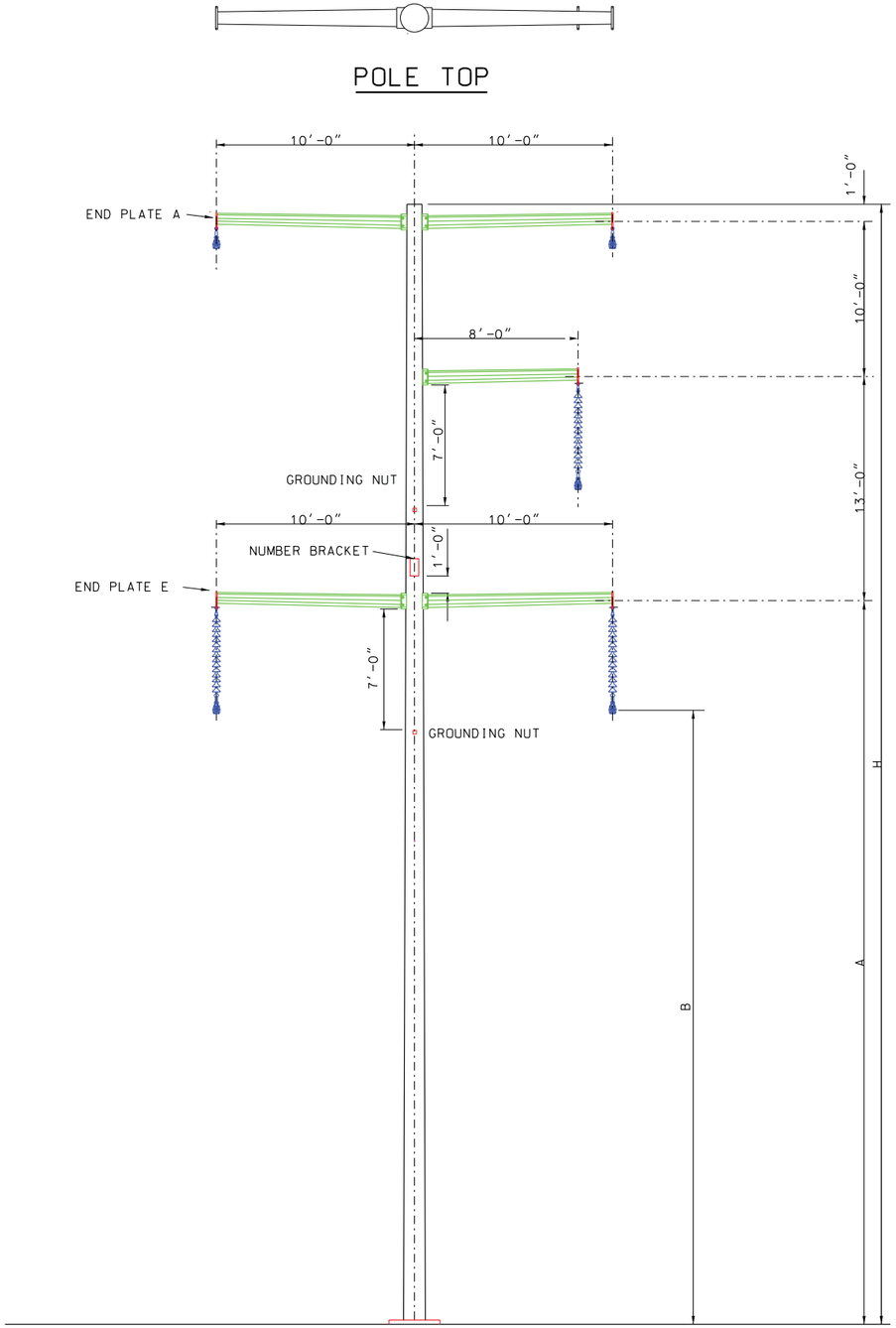


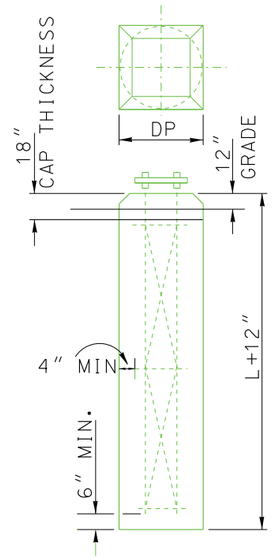
ELEVATION

DESIGN NOTES:

1. FOR TOWER AND FOOTING LOAD DATA SEE FORM IN PROJECT FILE.
2. STRUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.
3. INSTALL STEP LUGS FROM 85FT. ABOVE BASE PLATE TO TOP OF POLE.

REFERENCE DRAWINGS:

1. SEE SHEET T-O-400 FOR GENERAL DETAILS
2. SEE SHEET T-O-400A FOR ARM END PLATE AND DEADEND EAR DETAILS
3. SEE SHEET T-O-400C FOR ANCHOR BOLT CAGE DETAILS.



FOOTING DATA

DIMENSIONS			
H	A	B	
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65'0"	41'0"	36'0"	
70'0"	46'0"	41'0"	
75'0"	51'0"	46'0"	
80'0"	56'0"	51'0"	
85'0"	61'0"	56'0"	
90'0"	66'0"	61'0"	

NO.	REVISIONS	BY	CHK.	APPR.	DATE
					- -

Xcel Energy

69 OR 115KV TANGENT STR.

FIGURE 1-2

DRAWN	ALB	08-08-96	CHECKED		- -		
DESIGNED		- -	APP. ENGR.		- -	SCALE	
APPROVAL			- - ENGINEER	CLIENT DWG. NO.	T-O-427	SHT. NO.	REV. 1

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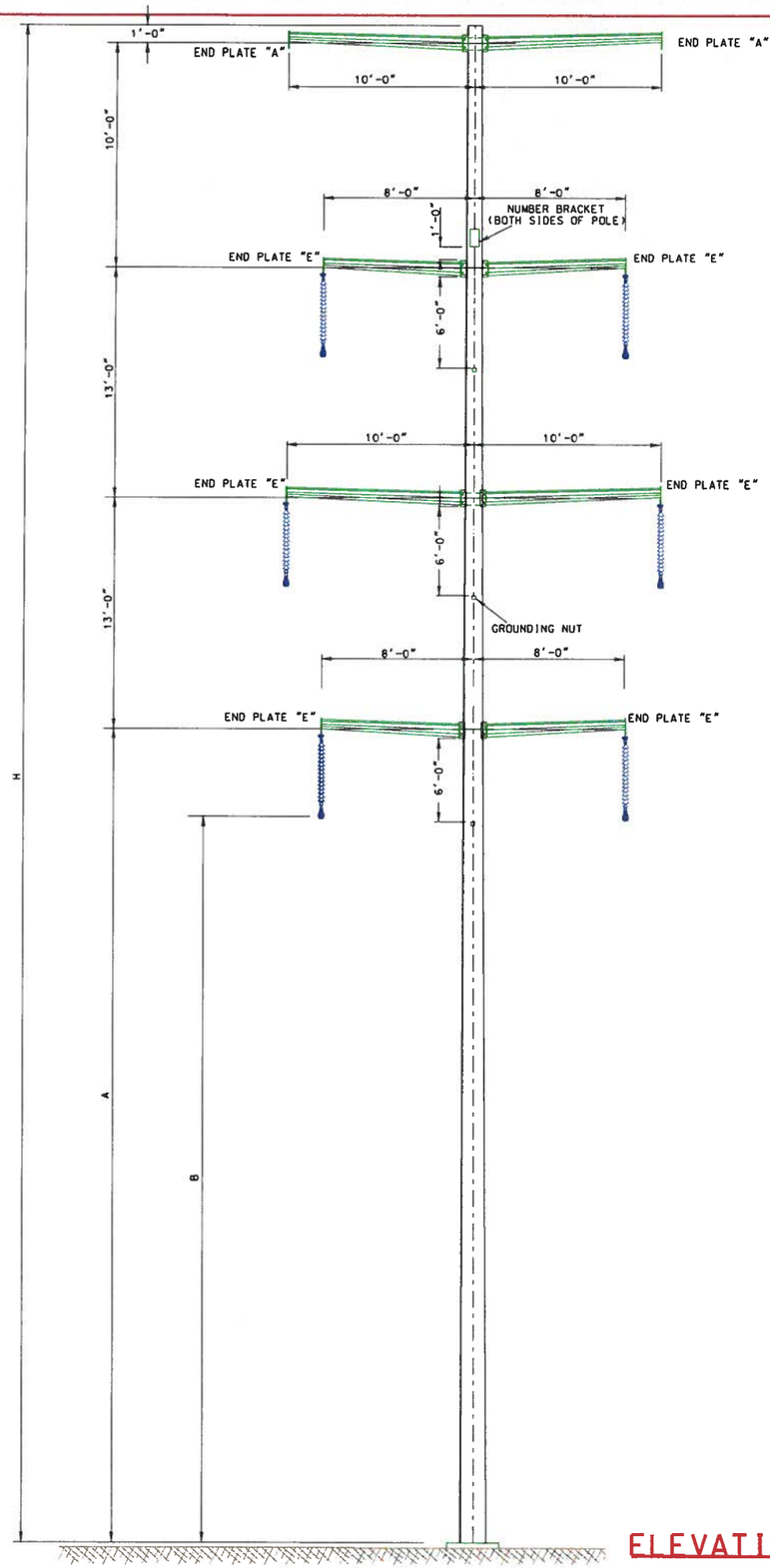
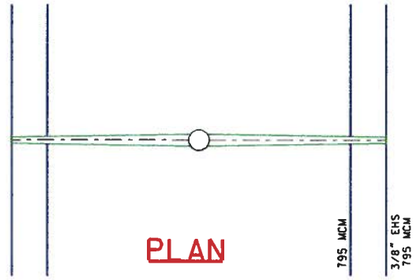


ELEVATION



PLAN

DESIGN NOTES:

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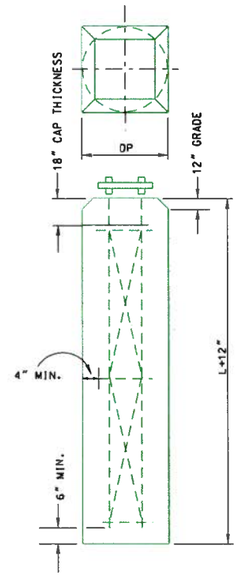
4. SEE SHEET T-0-400 FOR GENERAL DETAILS
5. SEE SHEET T-0-400A FOR ARM END PLATE AND DEADEND EAR DETAILS
6. SEE SHEET T-0-400C FOR ANCHOR BOLT CAGE DETAILS



69 KV DIMENSIONS			FOOTING DETAIL					
			L	DP	NO. EXT.	TOTAL	VOL. CONC.	CAGE
H	A	B	FT.	FT.	A.B.	NO. A.B.	CU. YD.	I.D. NO.
85'	48'0"	42'0"						
90'	53'0"	47'0"						
95'	58'0"	52'0"						
100'	63'0"	57'0"						
105'	68'0"	62'0"	25.0	5.0	4	12	19.4	3101

115 KV DIMENSIONS			FOOTING DETAIL					
			L	DP	NO. EXT.	TOTAL	VOL. CONC.	CAGE
H	A	B	FT.	FT.	A.B.	NO. A.B.	CU. YD.	I.D. NO.
85'	48'0"	42'0"	---	---	---	---	---	---
90'	53'0"	47'0"	27.0	6.0	4	8	29.9	3114
95'	58'0"	52'0"	27.0	6.0	4	8	29.9	3115
100'	63'0"	57'0"	27.0	6.0	4	8	29.9	3116
105'	68'0"	62'0"	27.0	6.0	4	12	29.9	3117

NO.	REVISIONS	BY	CHK.	APPR.	DATE

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115 KV DOUBLE CIRCUIT STEEL TANGENT STRUCTURE

FIGURE 1-3

DRAWN	HRD 09-25-97	CHECKED			
DESIGNED		APP. ENGR.		SCALE	
APPROVAL	ENGINEER	CADD DWG. NO	T-10-347	SHT. NO.	REV 0

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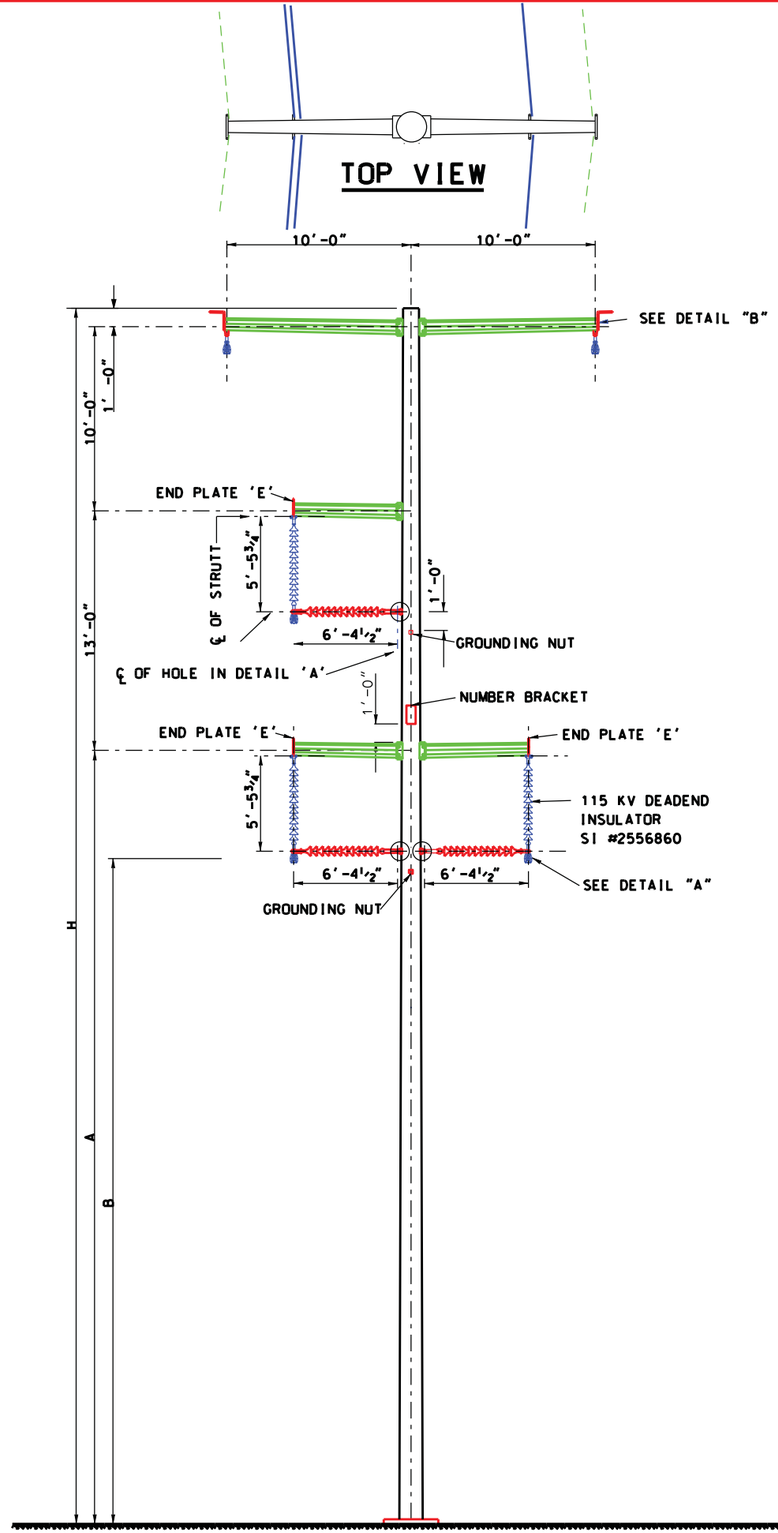
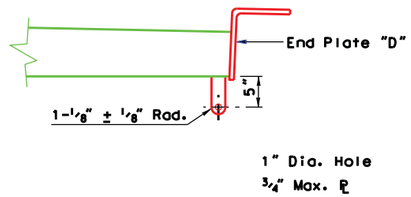
DESIGN NOTES:

1. FOR TOWER AND FOOTING LOAD DATA SEE FORM IN PROJECT FILE.
2. STRUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.
3. INSTALL STEP LUGS FROM 85FT. ABOVE BASE PLATE TO TOP OF POLE.

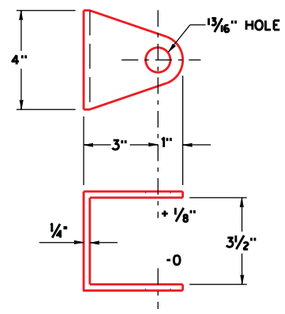
REFERENCE DRAWINGS:

1. SEE SHEET T-0-400 FOR GENERAL DETAILS
2. SEE SHEET T-0-400A FOR ARM END PLATE AND DEADEND EAR DETAILS
3. SEE SHEET T-0-400C FOR ANCHOR BOLT CAGE DETAILS.

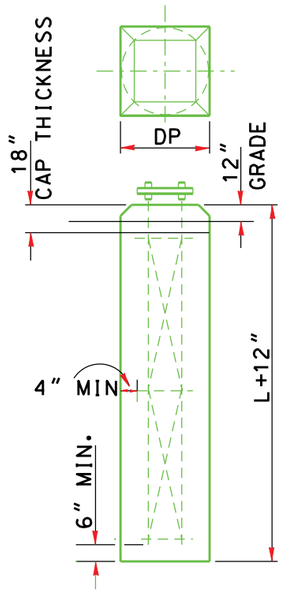




DETAIL "B"



DETAIL "A"



FOOTING DATA

DIMENSIONS		
H	A	B
65'0"	42'0"	36'0"
70'0"	47'0"	41'0"
75'0"	52'0"	46'0"
80'0"	57'0"	51'0"
85'0"	62'0"	56'0"
90'0"	67'0"	61'0"

NO.	REVISIONS	BY	CHK.	APPR.	DATE
					- -

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115 KV ANGLE STRUCTURE 3° - 10°

FIGURE 1-4

DRAWN	ALB	06-07-9	CHECKED	JCC	06-19-9			
DESIGNED		- -	APP. ENGR.	JCC	06-19-9	SCALE		

APPROVAL - - - - ENGINEER

CADD DWG. NO. T-0-466 | SHT. NO. | REV. 0

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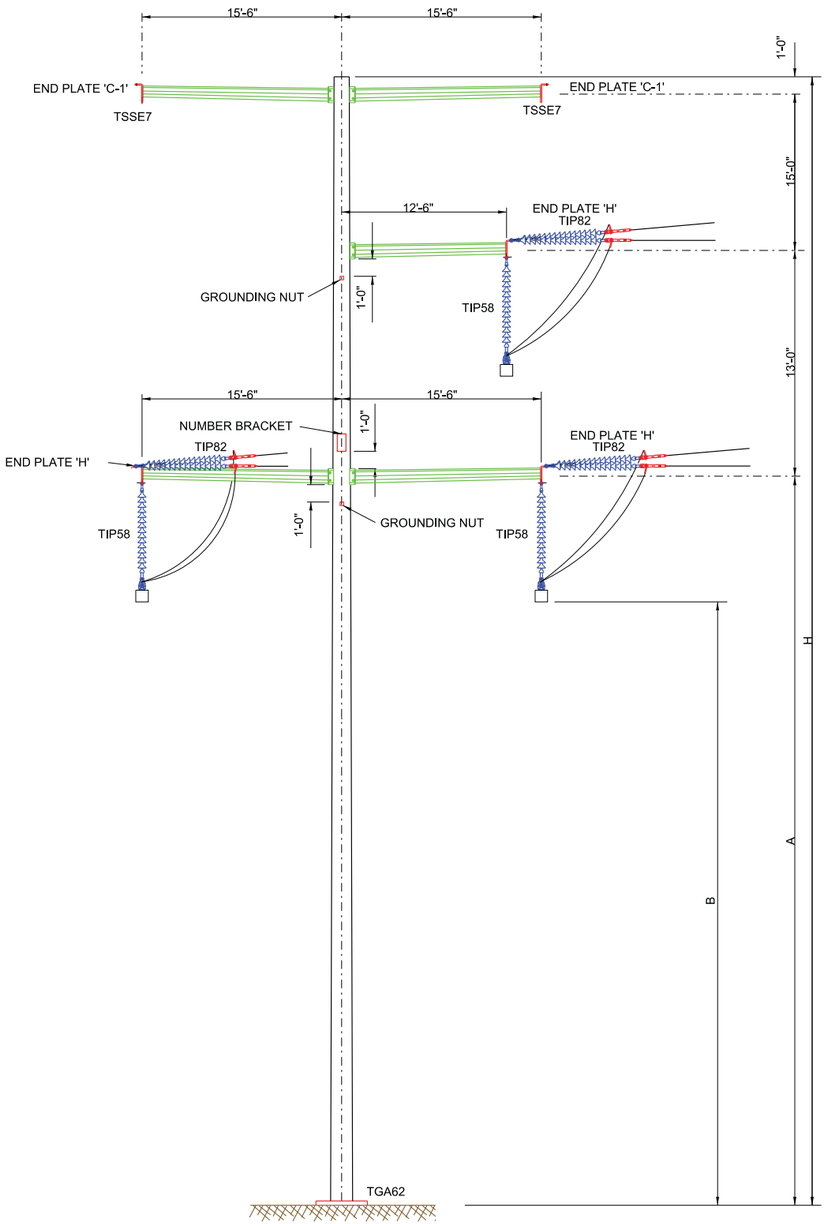
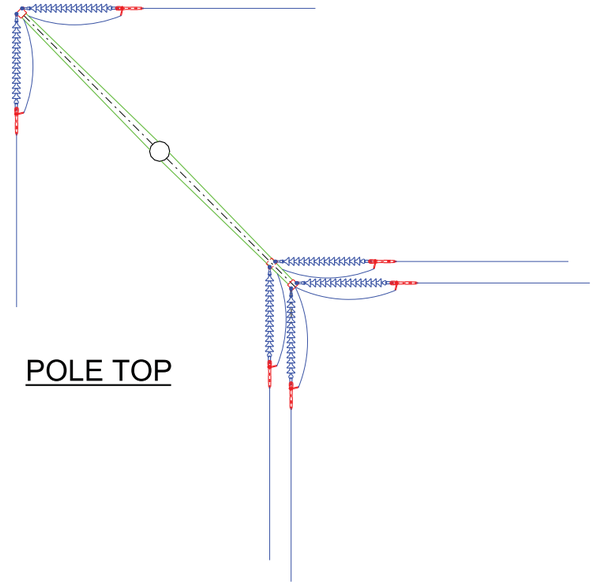


ELEVATION



POLE TOP

DESIGN NOTES:

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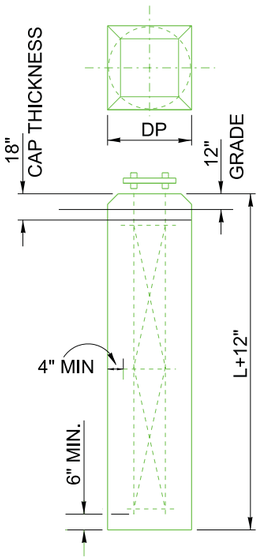
3. INSTALL STEP LUGS FROM 85FT. ABOVE BASE PLATE TO TOP OF POLE.
4. ALL INSULATORS, BOTH DEADEND AND SUSPENSION, TO BE 115KV.

REFERENCE DRAWINGS:

1. SEE SHEET T-0-400 FOR GENERAL DETAILS
2. SEE SHEET T-0-400A FOR ARM END PLATE AND DEADEND EAR DETAILS
3. SEE SHEET T-0-400C FOR ANCHOR BOLT CAGE DETAILS.



FOOTING DATA

DIMENSIONS

H	A	B	
65'0"	36'0"	31'0"	
70'0"	41'0"	37'0"	
75'0"	46'0"	41'0"	
80'0"	51'0"	47'0"	
85'0"	56'0"	51'0"	
90'0"	61'0"	57'0"	

NO.	REVISIONS	BY	CHK.	APPR.	DATE
					- -

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69/115KV STEEL SINGLE POLE 90° CORNER STR.

FIGURE 1-5

DRAWN	ALB	08-07-96	CHECKED		- -			
DESIGNED		- -	APP. ENGR.		- -	SCALE		

APPROVAL - - - - ENGINEER

CADD DWG. NO. SD-T0-426 | SHT. NO. | REV. 0

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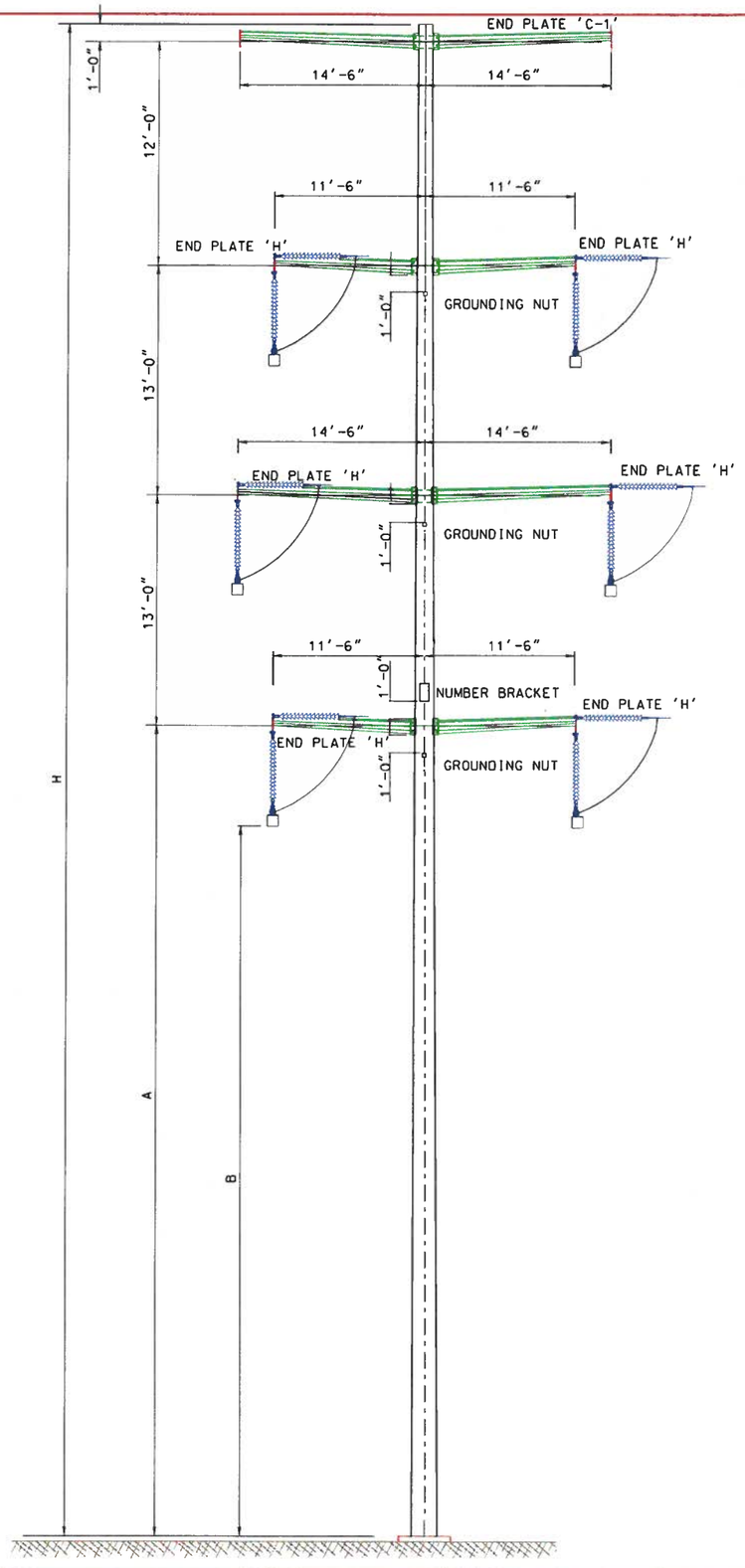
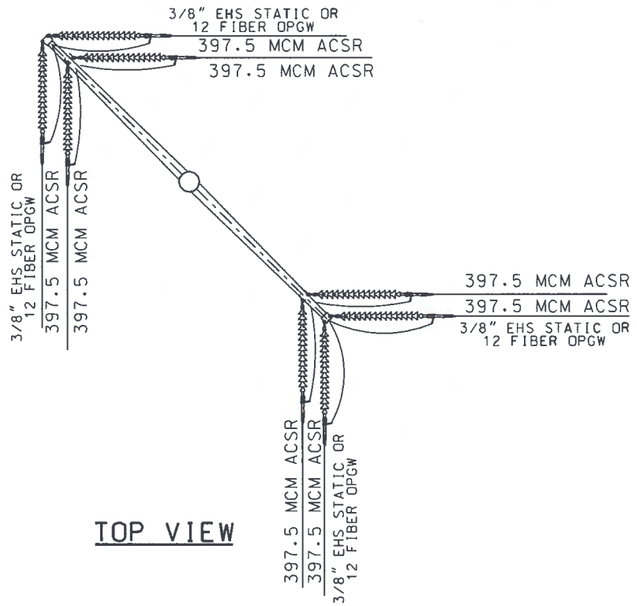




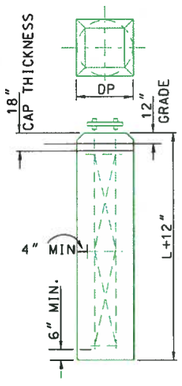
TOP VIEW

DESIGN NOTES:

1. FOR TOWER AND FOOTING LOAD OATA SEE FORM IN PROJECT FILE.
2. STRUCTURE DESIGN SHOWN IS FOR CONFIGURATION ONLY. ENGINEERING STRENGTH CALCULATIONS AND STRUCTURE DESIGN DETAILS MUST BE PERFORMED FOR EACH PROJECT.
3. ANGLE FOR EACH STRUCTURE REQUIRED MUST BE SPECIFIED AND EACH STRUCTURE MARKED DURING MANUFACTURE WITH IDENTIFICATION TO PREVENT ERRORS DURING INSTALLATION.
4. ALL INSULATORS, BOTH DEADEND AND SUSPENSION, TO BE 115KV.

REFERENCE DRAWINGS:

1. SEE SHEET T-0-400 FOR GENERAL DETAILS
2. SEE SHEET T-0-400A FOR ARM END PLATE AND DEADEND EAR DETAILS
3. SEE SHEET T-0-400C FOR ANCHOR BOLT CAGE DETAILS



FOOTING DATA

DIMENSIONS			
H	A	B	
85'	46'0"	40'0"	
90'	51'0"	45'0"	
95'	56'0"	50'0"	
100'	61'0"	55'0"	
105'	66'0"	60'0"	

NO.	REVISIONS	BY	CHK.	APPR.	DATE

Xcel Energy

69 OR 115KV DOUBLE CIRCUIT STEEL 90° CORNER STR.

FIGURE 1-6

DRAWN	DEE	10-16-08	CHECKED		
DESIGNED			APP. ENGR.		SCALE
APPROVAL		ENGINEER	CHOO DWG. NO.	T-0-412	SHT. NO. / REV. 0

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1.3.2 Right-of-Way

A 70-foot wide easement is required for construction and maintenance of the 115-kV transmission line within new ROW areas. The ROW typically extends an equal distance (35 feet) on both sides of the transmission line centerline. Where SPS proposes to overbuild existing 69-kV transmission lines, additional new ROW may be required adjacent to the existing easement in order to expand the ROW to at least 70 feet wide. The additional new ROW required will vary depending on the ROW width of the existing transmission lines. Additional areas of temporary ROW may also be required at line angles and dead-ends for tensioning locations and equipment staging areas with landowner agreements. Pole locations will be marked in the field and any sensitive environmental resources within the ROW will be surveyed and marked prior to clearing activities.

1.4 CONSTRUCTION CONSIDERATIONS

1.4.1 Clearing

Removal of woody vegetation within the ROW would be limited to establish the required conductor to ground clearances, and to facilitate construction and future maintenance operations. Mowing and/or shredding of herbaceous vegetation may be required within grasslands or pasturelands. Major grading activities are not anticipated within the ROW due to the relatively flat, featureless terrain within the study area. Grading activities will be limited to the minimum required to facilitate construction activities and future maintenance access. Future ROW maintenance activities may include periodic mowing and/or herbicide applications to maintain an herbaceous vegetation layer within the ROW.

ROW clearing activities would be completed while minimizing the impacts to existing groundcover vegetation when practical. All the alternative routes primarily cross areas of pastureland, cropland, or grassland which are currently maintained in an herbaceous vegetation stratum. SPS plans to span all surface waters and playa lake wetlands. Ingress and egress to the ROW would be afforded from adjacent public roads, or where necessary, through additional temporary easements across private property.

1.4.2 Construction

After each pole location has been surveyed and the ROW cleared, a single hole will be augured into the ground at each monopole location. The hole depth at each location will be determined by the geotechnical profile, terrain, and pole height. Each steel pole will be assembled on the ground near its designated location, and then lifted by crane and aligned with structure arms oriented perpendicular to the transmission line centerline. For angle structures, towers will be set with structure arms oriented on the angle bisector. The steel poles will be backfilled with natural soil to provide stability. Excavated material will be spread onsite or disposed offsite in accordance with any federal, state, and local regulations.

Concrete foundations may be required at dead-ends and high angle monopole locations. After the hole is augured, a rebar reinforced concrete foundation is poured. The monopoles are then attached to the foundation.

After the monopoles are erected, the insulators and hardware assemblies are then attached. After a series of poles are constructed, the conductor and shield wire is strung tensioned.

Guard structures are proposed during the line stringing phase where the transmission line crosses existing transmission and distribution lines, telephone lines, and roadways. Once the transmission line is permanently attached, the guards are removed.

1.4.3 Cleanup

ROW cleanup activities include restoration and will be conducted concurrently with the completion of each series of monopoles as ROW access requirements allow. All equipment, debris, culverts, and temporary environmental controls will be removed. ROW restoration will be completed and include revegetation with native grass species as necessary to stabilize the soil, and the construction of any necessary permanent environmental controls. The timeliness of these restoration activities are expected to prevent soil erosion.

1.4.4 ROW Maintenance

Maintenance of the ROW is typically completed on an interval of two to four years, depending on the rate of vegetation regrowth. Maintenance activities include mowing the entire ROW, and the application of herbicides to stumps. The application of herbicides will be conducted within federal, state, and local guidelines.

1.5 AGENCY ACTIONS

Numerous federal, state, and local regulatory agencies and organizations have developed rules and regulations regarding the routing and potential impacts associated with the construction of the proposed project. This section briefly describes each primary regulatory agency and the potential issues involved in project planning and permitting. POWER solicited comments from the various regulatory entities during the development of this document. Records of all correspondence and additional discussions with these agencies and organizations are provided in Appendix A.

1.5.1 Public Utility Commission of Texas

The PUC regulates the routing of transmission lines in Texas under PURA § 37.056. The PUC regulatory guidelines for routing transmission lines include:

- Substantive Rule 25.101(b)(3)(B)
- Procedural Rule 22.52(a)(4)
- Policy of prudent avoidance
- CCN application requirements

This EA has been prepared by POWER in support of SPS' application for a CCN from the PUC.

1.5.2 United States Army Corps of Engineers

The United States Army Corps of Engineers (USACE) is directed by Congress under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (CWA) (33 USC 1344). Under Section 10, the USACE regulates all work or structures in or affecting the course, condition, or capacity of navigable waters of the United States (U.S.). The intent of this law is to protect the navigable capacity of waters important to interstate commerce. Under Section 404, the USACE regulates the discharge of dredged and fill material into all waters of the U.S., including associated wetlands. The intent of this law is to protect the nation's waters from the indiscriminate discharge of material capable of causing pollution, and to restore and maintain their chemical, physical, and biological integrity.

No navigable waters were identified within the study area that would necessitate a Section 10 Permit for this project. If construction of the project impacts waters of the U.S., or jurisdictional wetlands as defined in Section 404 of the CWA then the project will likely meet the criteria of the Nationwide Permit (NWP) No. 12 - Utility Line Activities, which applies to activities associated with any cable, line, or wire for the transmission of electrical energy. In the unlikely event that the proposed impacts of the project exceed the criteria established under General Condition 13 or other regional conditions listed under the NWP 12, then an Individual Permit (IP) may be required.

1.5.3 United States Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) is charged with the responsibility for enforcement of federal wildlife laws, and providing comments on proposed construction projects that trigger compliance with the National Environmental Policy Act (NEPA) (i.e., federal nexus) and within the framework of several federal laws including the Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and Bald and Golden Eagle Protection Act (BGEPA). The potential federal nexus for the project would be associated with the USACE Section 404 Permit, if required. The PUC may also mandate in the CCN

final order that additional consultation with the USFWS is required prior to project construction.

POWER reviewed the Texas Natural Diversity Database (TXNDD) records and no historical occurrences of federally listed species or designated critical habitat were identified within the study area. Upon PUC approval of a route, a natural resource assessment would be completed to identify any potentially suitable habitat for federally listed species. If required, informal consultation with the USFWS would be completed to determine the need for any required species-specific surveys and/or permitting requirements under Section 7 of the ESA.

1.5.4 Federal Aviation Administration

According to Federal Aviation Administration (FAA) regulations, Part 77 (FAA 2008), the construction of a transmission line requires FAA notification if any tower structure height exceeds the height of an imaginary surface extending outward and upward at one of the following slopes:

- A 100:1 slope for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of a public or military airport having at least one runway longer than 3,200 feet.
- A 50:1 slope for a horizontal distance of 10,000 feet from the nearest runway of a public or military airport where no runway is longer than 3,200 feet in length.
- A 25:1 slope for a horizontal distance of 5,000 feet for heliports.

The PUC CCN application also requires listing private airports within 10,000 feet of any alternative route centerline. After PUC route approval, and if any of the FAA notification criteria are met for the selected route, a Notice of Proposed Construction or Alteration, FAA Form 7460-1, will be completed and submitted to the FAA Southwest Regional Office in Fort Worth, Texas at least 30 days prior to construction.

1.5.5 Texas Parks and Wildlife Department

The Texas Parks and Wildlife Department (TPWD) is the state agency with primary responsibility for protecting the state's fish and wildlife resources in accordance with the Texas Parks and Wildlife Code Section 12.0011(b). POWER solicited comments from the TPWD during the project scoping phase. A copy of the CCN application and this EA will be submitted to the TPWD at the time they are filed with the PUC.

1.5.6 Floodplain Management

The Federal Emergency Management Agency (FEMA) published Flood Insurance Rate Maps (FIRM) were reviewed to determine the floodplain boundaries within the study area. The proposed transmission line project is not anticipated to create any significant permanent changes in the existing topographical grades, and should not significantly increase the stormwater runoff within the study area due to increased areas of impermeable surfaces. Coordination with the local floodplain administrator will be completed if necessary.

1.5.7 Texas Commission on Environmental Quality

The construction of the project will require a Texas Pollution Discharge Elimination System General Construction Permit (TX150000) as implemented by the Texas Commission on Environmental Quality (TCEQ) under the provisions of Section 402 of the CWA and Chapter 26 of the Texas Water Code. The TCEQ has developed a three-tiered approach for implementing this permit which is dependent on the acreage of disturbance. No permitting is required for land disturbances of less than one acre (Tier I). If more than one acre, but less than five acres are disturbed, then a Storm Water Pollution Prevention Plan (SWPPP) must be developed and implemented during construction activities, accompanied with posting a site notice and notification sent to the Municipal Separate Sewer System Operator (Tier II). If more than five acres of land are disturbed, then the requirements mentioned above for Tier II are necessary and the submittal of a Notice of Intent and Notice of Termination to the TCEQ is also required (Tier III). Once a route is approved by the PUC,

the proposed acreage of ground disturbance will be determined and the appropriate Tier and conditions of the TX150000 permit will be evaluated.

A Section 401 Water Quality Certificate from the TCEQ may also be required if the project requires a USACE IP. States have the authority to review federally permitted or licensed activities that may result in a discharge of pollutants to the waters of the U.S. As previously discussed, a USACE IP is not anticipated for this project.

1.5.8 Texas Historical Commission

Cultural resources are protected by federal and state laws if they have some level of significance under the criteria of the National Register of Historic Places (NRHP) (36 Code of Federal Regulations 60) or under state guidance (Texas Administrative Code, Title 13, Part 2, Chapter 26.7-8). The Texas Historical Commission (THC) was contacted by POWER to obtain shapefiles for locations of known archeological sites and previously conducted cultural resource investigations within the study area boundary. POWER also reviewed Texas Archeological Research Laboratory (TARL) records, including the Texas Historic Sites Atlas, to identify locations of documented architectural resources and cemeteries. Once a route is approved by the PUC, additional coordination with the THC will occur, if required, to determine the need for cultural resource surveys or additional permitting requirements. Even if no additional surveys are required, SPS will implement an unanticipated discovery procedure during construction activities. If artifacts are discovered during construction, activities will cease and SPS will notify the State Historic Preservation Office (SHPO) for additional consultation.

1.5.9 Texas Department of Transportation

The Texas Department of Transportation (TxDOT) was notified of the proposed project during the scoping process. If the PUC approved route crosses TxDOT ROW, it will be constructed in accordance with the rules, regulations, and policies of TxDOT. Best Management Practices (BMPs) will be used, as required, to minimize erosion and sedimentation resulting from the construction. Revegetation will occur as required under the

"Revegetation Special Provisions" contained in TxDOT form 1023 (Rev. 9-93). Traffic control measures will comply with applicable portions of the Texas Manual of Uniform Traffic Control Devices.

1.5.10 Texas General Land Office

The Texas General Land Office (GLO) requires a miscellaneous easement for ROW within any state owned riverbeds/navigable streams or tidally influenced waters. Coordination with the GLO is normally completed after the PUC approval of a route; however, no GLO easement is anticipated for this project because no rivers or navigable streams are crossed by any of the alternative routes.

2.0 SELECTION AND EVALUATION OF ALTERNATIVE TRANSMISSION LINE ROUTES

2.1 ROUTING STUDY METHODOLOGY

The objective of this Routing Study/EA is to develop alternative routes that provide geographic diversity and comply with PURA § 37.056(c)(4)(A)-(D) and P.U.C. SUBST. R. 25.101(b)(3)(B), including the Commission's policy of prudent avoidance. The foundation for the approach utilized by POWER includes the identification and characterization of existing community values, land use/environmental constraints, and identification of areas of potential routing opportunity located within the study area. POWER assigns sensitivity levels to resources potentially affected by a transmission line and considers each during the route development process. Regulatory agency, local officials', and public meeting comments are also incorporated into the alternative route development process. Modifications, additions, and/or preliminary alternative segments recommended not to be carried forward are identified while considering the resource sensitivities and comments. Feasible and geographically diverse primary alternative routes are then selected for analysis and comparison using the evaluation criteria to determine potential impacts to land use and environmental resources. This Routing Study/EA documents the siting process conducted to develop and select alternative routes that culminates with the selection of one alternative route by SPS and POWER that best addresses the requirements under PURA and PUC Substantive Rules. This alternative route, as well as other alternative routes that provide geographic diversity and sufficient routing options, will be submitted to the PUC for review and approval.

The study approach to develop alternative routes included the following major tasks:

- Identification of environmental and land use constraints
- Identification of potential routing opportunities
- Identification of preliminary alternative route segments
- Public involvement program

- Modifications to preliminary alternative route segments
- Selection of alternative routes

SPS and POWER utilized a comprehensive routing and evaluation methodology to develop and evaluate alternative transmission line routes. The following sections provide a detailed description of the methodology and assumptions used to complete the alternative route development process.

2.2 IDENTIFICATION OF ENVIRONMENTAL AND LAND USE CONSTRAINTS

2.2.1 Study Area Delineation

To accomplish the data collection task, the initial study area boundaries were developed to include the project endpoints and provide for sufficient geographic diversity for route development purposes. The initial study area boundaries were developed to incorporate potential route paralleling opportunities where appropriate (see Figure 2-1). The project endpoints include the proposed Kiser Substation and the existing Kress Substation, while also connecting into the Plainview North Substation located north of the proposed Kiser Substation. The Kiser Substation is proposed within the proximity of the intersection of Farm-to-Market Road 400 and 24th Street in northeastern Plainview, Texas.

The study area boundaries were later revised based on the need for the new 115-kV transmission line to tap into the existing Kress Rural Substation ("Kress Rural tap"). SPP identified the need in the 2009 and 2010 STEP studies to tie the Kress Rural Substation with the proposed Kiser – Kress 115-kV transmission line to address overloads and low voltage issues in the Kress and Plainview area due to area load growth. In researching and evaluating its project options, SPS determined that this requirement could be met without the need to file an additional CCN application if the new 115-kV transmission line were located within one mile of the Kress Rural Substation site. Including this tap with the Kiser to Kress Project is an efficient use of SPS' time and resources. The revised study area

boundaries were further defined to include feasible geographically diverse alternatives for the location of a new 115-kV transmission line. The project endpoints and existing linear features were primarily used to define the revised study area boundaries. The eastern extent of the study area is defined by CR AA/CR 20 and the western extent is defined by the Kress Substation. The northern and southern study area boundaries were limited to include paralleling opportunities with apparent property boundaries. The revised study area covers approximately 144 square miles (see Figure 2-2) to develop alternative transmission line routes between the proposed Kiser Substation, Plainview North Substation, Kress Rural Substation, and the Kress Substation.

2.2.2 Base Map Development

After delineation of the study area, a project base map was prepared and used to initially display environmental and land use data within the study area. The data categories and other criteria that were determined appropriate for sensitivity analysis were selected and mapped for review and analysis. The base map provides a broad overview of various resource locations indicating routing constraints and areas of potential routing opportunities. Data typically displayed on the base map includes major land jurisdictions, political subdivisions and land uses, major roadways, existing utility corridors, parks and wildlife management areas, and surface waters.

2.2.3 Data Collection and Constraints Mapping

Once the study area boundaries were defined and the base map completed, several methods were utilized to collect and review environmental and land use data. These included the utilization of readily available Geographic Information System (GIS) coverage with associated metadata, review of maps and published literature, consultation and review of files and records from federal, state, and local regulatory agencies, and multiple reconnaissance surveys. Data collected was mapped utilizing GIS layers to develop a composite constraints data layer and map. The data collection effort, although concentrated in the early stages of the project, was an ongoing process.

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KISER – KRESS 115-kV TRANSMISSION LINE PROJECT

FIGURE 2-1
INITIAL
STUDY AREA BOUNDARY MAP

Xcel Energy® RESPONSIBLE BY NATURE™

Print Date: January 20, 2012

Power for the Plains

LEGEND

PROJECT FEATURES
- Proposed Substation Site
- Study Area Boundary

LAND USE
- Airport/Landing Strip
- Landing Strip
- Park

EXISTING UTILITIES
- Substation
- Transmission Line

JURISDICTIONAL BOUNDARIES
- City Boundary
- County Boundary

TRANSPORTATION
- Abandoned Railroad
- Railroad
- Interstate
- US Highway
- State Highway
- Farm-to-Market/Ranch Road
- Local Road

WATER
- River or Stream
- Waterbody

Note: Some legend symbols are enlarged for easier identification
Base Map: USGS Topographic Map from ESRI

PROJECT LOCATION

N
W E
S

0 0.5 1 2
Miles

KRESS SUBSTATION

KISER SUBSTATION

Swisher Co. Substation

Kress Rural Substation

Plainview North Substation

Plainview West Substation

Plainview City Substation

JOE VAUGHN SPRAYING AIRPORT

KRESS

PLAINVIEW

EDMONSON

SWISHER COUNTY

HALE COUNTY

SANTA FE RAILWAY

CRMWA Aqueduct

Rock Draw

Running Water Draw

Hood Park

Lakeside Park

Givens Park

Frisco Park

City Park

Running Water Draw Regional Park

24th St

Xray Rd

County Road X
County Road Y
County Road Z
County Road AA
County Road BB
County Road CC
County Road DD
County Road EE
County Road W
County Road 5
County Road 6
County Road 8
County Road 10
County Road 12
County Road 14
County Road 15
County Road 16
County Road 18
County Road 19
County Road 20
County Road 21
County Road 22
County Road 35
County Road 40
County Road 50
County Road 60
County Road 65
County Road 70
County Road 80
County Road K
County Road L
County Road N
County Road O
County Road P
County Road Q
County Road R
County Road S
County Road T
County Road U
County Road V
County Road W

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KISER – KRESS 115-kV TRANSMISSION LINE PROJECT

FIGURE 2-2
REVISED
STUDY AREA BOUNDARY MAP

Xcel Energy® RESPONSIBLE BY NATURE™

Print Date: January 20, 2012

Power for the Plains

LEGEND

PROJECT FEATURES
- Proposed Substation Site
- Study Area Boundary

LAND USE
- Airport/Landing Strip
- Landing Strip
- Park

EXISTING UTILITIES
- Substation
- Transmission Line

JURISDICTIONAL BOUNDARIES
- City Boundary
- County Boundary

TRANSPORTATION
- Abandoned Railroad
- Railroad
- Interstate
- US Highway
- State Highway
- Farm-to-Market/Ranch Road
- Local Road

WATER
- River or Stream
- Waterbody

Note: Some legend symbols are enlarged for easier identification
Base Map: USGS Topographic Map from ESRI

PROJECT LOCATION

N
W E
S

0 0.5 1 2
Miles

KRESS SUBSTATION

KISER SUBSTATION

Swisher Co. Substation

Kress Rural Substation

Plainview North Substation

Plainview West Substation

Plainview City Substation

JOE VAUGHN SPRAYING AIRPORT

KRESS

PLAINVIEW

EDMONSON

SWISHER COUNTY
HALE COUNTY

SANTA FE RAILWAY

CRMWA Aqueduct

Rock Draw

Running Water Draw

Salton Draw

Ebeling Dr

24th St

Lakeside Park

Hood Park

City Park

Running Water Draw Regional Park

Givens Park

Frisco Park

EIN

Center Plains

Landing Strip

Radio Tower

Water Tank

Gravel Pit

Wright

Boone

Finley

Valley

Landing

INDEFINITE BOUNDARY

County Road X
County Road Y
County Road Z
County Road W
County Road AA
County Road BB
County Road CC
County Road DD
County Road EE
County Road 5
County Road 6
County Road 8
County Road 10
County Road 12
County Road 14
County Road 15
County Road 16
County Road 18
County Road 19
County Road 20
County Road 21
County Road 22
County Road 35
County Road 40
County Road 50
County Road 60
County Road 65
County Road 70
County Road 80
County Road K
County Road L
County Road N
County Road O
County Road P
County Road Q
County Road R
County Road S
County Road T
County Road U
County Road V
County Road W
County Road X
Xray Rd

1424
145
87
27
400
1612
788
3183
1767
2286
194 TEXAS
70

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Maps and/or data layers reviewed include U.S. Geological Survey (USGS) 7.5 minute topographic maps, National Wetland Inventory (NWI) maps, TxDOT county highway maps, and Hale and Swisher county appraisal district land parcel boundary maps. Aerial photography (ESRI 2010) was reviewed and used as the base layer for the environmental and land use constraints data.

2.2.3.1 Agency Consultation

In addition to obtaining readily available information, regulatory agency and local officials were mailed consultation letters to solicit additional information regarding sensitive resources and constraints within the study area. A list of federal, state, and local regulatory agencies, elected officials, and organizations was developed to receive a consultation letter regarding the proposed project. The purpose of the letter was to inform the various agencies and officials of the proposed project and provide them with an opportunity to provide information regarding resources and potential issues within the study area. POWER utilized websites from Hale and Swisher counties and telephone confirmations to identify local officials. Copies of all correspondence with the various state/federal regulatory agencies and local/county officials and departments are included in Appendix A.

Federal, state, and local agencies/officials contacted include:

- U.S. Army Corps of Engineers (USACE) – Fort Worth and Tulsa Districts
- U.S. Environmental Protection Agency (EPA)
- U.S. Fish and Wildlife Service (USFWS)
- Federal Aviation Administration (FAA)
- Federal Emergency Management Agency (FEMA)
- Natural Resource Conservation Service (NRCS)
- Railroad Commission of Texas (RRC)
- Texas Commission on Environmental Quality (TCEQ) – Lubbock Regional Director

- Texas Department of Transportation (TxDOT) – Aviation Division, Environmental Affairs Division, Planning and Programming, and Lubbock District
- Texas General Land Office (GLO)
- Texas Historical Commission (THC)
- Texas Parks and Wildlife Department (TPWD)
- Texas Water Development Board (TWDB)
- Hale County Farm Bureau
- Hale County Historical Commission
- Hale County Officials (Judges and Commissioners)
- Swisher County Farm Bureau
- Swisher County Historical Commission
- Swisher County Officials (Judges and Commissioners)
- City of Plainview Officials
- City of Kress Officials
- Plainview Independent School District
- Kress Independent School District

2.2.3.2 Evaluation Criteria

Evaluation criteria were developed to reflect accepted practices for routing electric transmission lines in Texas (see Table 2-1). Emphasis was placed on acquiring information identified in PURA § 37.056(c)(4)(A)-(D), the PUC CCN application, and P.U.C. SUBST. R. 25.101, including the policy of prudent avoidance. Evaluation criteria were further refined based on data collection, reconnaissance surveys, and public input. The routing activities were conducted with consideration and incorporation of the evaluation criteria. Evaluation criteria data were reviewed, tabulated, and compared (see Section 4.0) for each resulting alternative route.

TABLE 2-1 LAND USE AND ENVIRONMENTAL EVALUATION CRITERIA
LAND USE
Length of alternative route (feet)
Length of alternative route (miles)
Total number of habitable structures[1] within 300 feet of ROW centerline
Length of ROW parallel and adjacent to apparent property boundaries[2]
Length of ROW using existing compatible ROW
Length of ROW parallel and adjacent to existing transmission line ROW
Length of ROW parallel and adjacent to existing pipelines
Total length of route parallel and adjacent to existing corridors (including apparent property boundaries)
Percentage of route parallel and adjacent to existing corridors (including apparent property boundaries)
Number of parks/recreational areas[3] within 1,000 feet of ROW centerline
Length of ROW through cropland
Length of ROW through pasture/rangeland
Length of ROW through land irrigated by traveling systems (rolling or pivot type)
Number of pipeline crossings
Number of transmission line crossings
Number of railroad crossings
Number of Interstate, U.S., and State highway crossings
Number of farm-to-market and ranch road crossings
Number of cemeteries within 1,000 feet of the ROW centerline
Number of private airstrips within 10,000 feet of ROW centerline
Number of heliports within 5,000 feet of the ROW centerline
Number of FAA registered airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline
Number of FAA registered airports having no runway more than 3,200 feet in length located within 20,000 feet of ROW centerline
Number of commercial AM radio transmitters within 10,000 feet of ROW centerline
Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline
AESTHETICS
Estimated length of ROW within foreground visual zone[4] of Interstate, U.S. and State highways
Estimated length of ROW within foreground visual zone[4] of farm-to-market roads
Estimated length of ROW within foreground visual zone[4] of parks/recreational areas[3]

TABLE 2-1 LAND USE AND ENVIRONMENTAL EVALUATION CRITERIA
ECOLOGY
Length of ROW across NWI mapped wetlands
Length of ROW across known habitat of federally listed endangered or threatened species
Length of ROW across open water (lakes, ponds)
Length of ROW across playa lakes
Number of stream crossings
Number of river crossings
Length of ROW parallel (within 100 feet) to streams or rivers
Length of ROW across 100-year floodplain
CULTURAL RESOURCES
Number of recorded historic or prehistoric sites crossed by ROW
Number of additional recorded historic or prehistoric sites within 1,000 of ROW centerline
Number of National Register listed or determined-eligible sites crossed by ROW
Number of additional National Register listed or determined-eligible sites within 1,000 feet of ROW centerline
Length of ROW through areas of high archaeological/historic site potential

Notes:

[1] Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230-kV or less.

[2] Apparent property boundaries created by existing roads, highway, or railroad ROW are not “double-counted” in the length of ROW parallel to property lines criteria.

[3] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church.

[4] One-half mile, unobstructed.

2.2.3.3 Reconnaissance Surveys

Reconnaissance surveys of the study area (from public viewpoints) were conducted by POWER and SPS personnel to confirm the findings of the research and data collection activities, to identify land use changes occurring after the date of the aerial photography and to identify potential unknown constraints that may not have been previously noted in the data. Reconnaissance surveys of the study area were conducted by POWER on April 18-20, 2011, and August 11-12, 2011. SPS personnel also conducted numerous field reconnaissance surveys during the alternative route development process.

Data collection, regulatory agency and local official consultations, and reconnaissance surveys were used to develop the composite constraints data layer.

2.3 RESOURCE SENSITIVITY ANALYSIS

The composite constraints data layer was used as a foundation for the resource sensitivity analysis. Sensitivity is defined as a measure of probable adverse response of a resource from direct and/or indirect impacts associated with the construction, operation, and maintenance of a transmission line. Sensitivity criteria were developed for each resource to establish constraint parameters which facilitated the identification of preliminary alternative route segments. The following definitions were considered during sensitivity criteria development:

- **Resource Value:** A measure of rarity, intrinsic worth, singularity, or diversity of a resource within a particular area.
- **Protective Status:** A measure of the formal concern as expressed by legal protection or special status designation.
- **Present and Future Uses:** A measure of the level of potential conflict with land management and land use policies.
- **Hazards:** A measure of the degree to which construction and operation of the transmission line could be affected by a known resource hazard.

Using this framework, the mapped data were reviewed and assigned sensitivity ratings categorized as exclusion, avoidance, moderate, or low, based upon the magnitude of the potential land use conflict, potential impact to a sensitive resource, or hazard to construction and operation of the transmission line.

Exclusion areas include those where: property ownership and/or land use conflicts preclude routing; sensitive resources are legally protected or regulated; or where significant

hazards are present during construction or operation of the transmission line. No exclusion areas were identified within the study area.

Avoidance areas include those where: potential conflicts with current or proposed land uses are significant but could be minimized with engineering design; unique or highly valued resources are identified that require lengthy permitting or mitigation procedures; or where hazards during construction and operation of the transmission line can be mitigated through engineering design.

Moderate rated areas demonstrate minimal potential conflicts with: current or proposed land uses; sensitive resources that are also easily permitted or minimized with mitigation; or have minimal hazards associated with the construction and operation of the transmission line.

Low rated areas include those with no significant potential conflicts with: land use; sensitive resources; or with significant hazards associated with the construction and operation of a transmission line.

Data layers of individual resources were mapped to provide a visual representation of constraint areas and potential routing opportunities. Table 2-2 summarizes the sensitivity criteria developed within each resource area if identified within the study area.

TABLE 2-2 SENSITIVITY RATINGS FOR LAND USE AND ENVIRONMENTAL RESOURCES

Resource Component	Avoidance	Moderate	Low	Rationale*
Land Use				
Habitable Structure	X			1, 5, 7, 8
Airports/Heliports	X			1, 3, 5, 8
Cemetery	X			1, 2, 5
Residential Areas	X			5, 7
School	X			5, 6, 7
Park or Recreational Areas	X			5, 6, 7

TABLE 2-2 SENSITIVITY RATINGS FOR LAND USE AND ENVIRONMENTAL RESOURCES

Resource Component	Avoidance	Moderate	Low	Rationale*
Communication Tower: AM/FM/Microwave	X			4, 7
Oil and Gas Facilities	X			5, 7
Commercial/Industrial Areas		X		8, 14
Agricultural: Crops/Pasture		X		8, 14
Existing Linear ROWs			X	14
Aesthetics				
Designated Scenic Overlooks or Views		X		1, 2, 5, 6
High Quality Scenic Landscapes		X		1, 2, 5, 6
Cultural				
Historical: NRHP listed/eligible	X			2, 5, 7
Archeological: NHRP listed/eligible	X			2, 5, 7
State Archeological Landmarks	X			2, 5, 7
Water				
River		X		7, 11, 12
Stream/Lake		X		7, 11, 12
Forested/Shrub-Scrub Wetland	X			9, 14
Emergent Wetland		X		9, 14
100 Year Floodplain			X	9
Ecological				
Federal/State Threatened and Endangered Species	X			13, 14
Forested habitat	X			14
Scrub/shrub habitat		X		14
Grassland habitat			X	10

*Rationale of constraint or opportunity for routing a transmission line:

(1) Permanent preclusion of existing, permitted, or planned land uses.

(2) Ownership and use of the land preempting the routing of a transmission line.

(3) Potential hazard and safety risks to aviation operations/activities.

(4) Potential transmission line technical compatibility/reliability/interference issues.

(5) Potential conflict with existing or planned use.

(6) Potential conflicts with existing or proposed recreation uses and facilities.
(7) Requiring careful consideration of design, structure placement and minimization of adverse impacts.
(8) Potential interference with agricultural equipment, operations, irrigation practices, wind breaks, or aerial spraying activities that would result in long-term impairment of agricultural operations and productivity.
(9) Potential for engineering constraints.
(10) Potential for biological constraints.
(11) Surface water width may exceed potential transmission line span lengths.
(12) Surface water width typically spanned.
(13) Recorded locations of critical habitat.
(14) Minimize potential habitat impacts and fragmentation.

2.4 OPPORTUNITIES AND CONSTRAINTS EVALUATION

2.4.1 Existing Linear Corridors

Based on PURA § 37.056(c) and the P.U.C. SUBST. R. 25.101(b)(3)(B)(i-iii), paralleling or utilizing existing compatible linear facility ROWs are considered areas of opportunity when selecting route alternatives for new transmission lines. In general, locating a transmission line adjacent to linear facilities typically minimizes potential environmental impacts due to existing adjacent disturbances, improved access, and decreased habitat fragmentation. Linear facilities identified within the study area include roadways, railways, electrical transmission and distribution lines, pipelines, and apparent property boundaries.

2.4.1.1 Roadway ROW

POWER evaluated paralleling Interstate 27, U.S. Highway 80, and Farm-to-Market Roads 400, 145, 788, 3183, and 1767, as well as numerous county and local roads. Several route paralleling opportunities were identified and included in the route development process.

2.4.1.2 Railroads

One railroad was identified within the study area, the Santa Fe Railway. The Santa Fe Railway extends north to south across the study area and primarily parallels the east side of Interstate 27. The existing constraints, primarily habitable structures, would require multiple railroad and interstate crossings or deviations away from the railway. No potential

paralleling opportunities adjacent to the Santa Fe Railway were identified due to these existing constraints.

2.4.1.3 Transmission Line ROW

POWER evaluated utilizing and paralleling existing transmission lines identified within the study area. For reliability reasons, SPS provided POWER with guidance on the feasibility of utilizing existing transmission line ROWs, as well as acceptable locations and lengths proposed for overbuild construction of existing transmission and distribution lines.

The transmission lines identified and considered for potential paralleling or overbuilding include three existing 69-kV lines, one 115-kV line, and one 230-kV line. The first existing transmission line extends north near the proposed Kiser Substation to the Plainview North and Kress Rural substations. The second existing transmission line is generally oriented east and west of the proposed Kiser Substation, located on the south side of 24th Street. The third existing 69-kV transmission line extends from the Kress Rural Substation to the Kress Substation, extending north from the Kress Rural Substation and then to the west. The Kiser to Plainview North, and the Kress Rural to Kress 69-kV lines provided potential paralleling and/or overbuilding opportunities. The transmission line located parallel with 24th Street did not provide any such opportunities due to its orientation.

One existing 230-kV transmission line was identified that is oriented north/south and bisects the western half of the study area. No paralleling opportunities were identified due to the extent of adjacent agricultural development with mobile irrigation.

Two existing 115-kV transmission lines were also identified that extend north from the existing Kress Substation, with one extending north out of the study area and the other turning to the east connecting with the Swisher Substation. Potential paralleling opportunities were only identified for portions of the easterly oriented transmission line.

Due to reliability concerns for a possible outage within the same corridor or ownership of the existing transmission lines, only short portions of the existing transmission lines were evaluated for parallel or overbuild opportunities.

2.4.1.4 Distribution Lines

Several existing distribution lines were identified within the study area and these features were evaluated for paralleling opportunities. Numerous paralleling opportunities adjacent to distribution lines were incorporated into the route development process.

2.4.1.5 Pipeline ROW

Multiple pipeline corridors were identified throughout the study area. No parallel opportunities were identified with these pipelines due to their orientation within the study area and the extensive croplands they cross.

2.4.1.6 Apparent Property Boundaries

Apparent property boundaries and fence lines were initially identified on existing aerial photography. Apparent property boundaries within the study area provided several paralleling opportunities between the project endpoints when no other existing linear features were present. Later, in July 2011, SPS obtained hard copies of property boundary information from the Hale and Swisher county Tax Appraisal District Offices. These hard copies were digitized by POWER using GIS and overlaid on the aerial photography. Initial property boundaries were reviewed again and where necessary, alternative route segment modifications were made to better parallel the refined property boundaries.

2.5 PRELIMINARY ALTERNATIVE ROUTE SEGMENTS

Preliminary alternative route segments were identified by the POWER planning team using the composite constraints data layer and map while considering the resource sensitivity analysis. Appendix B includes a copy of the map that was displayed at the public meeting

which depicts the preliminary alternative route segments. The POWER planning team was comprised of technical experts within each respective resource field. POWER identified areas of routing opportunities and constraints for the development of geographically diverse preliminary alternative route segments to connect the project endpoints and midpoints. Preliminary alternative route segments were developed based upon maximizing the use of opportunity areas while avoiding areas of higher environmental constraint or conflicting land uses. Existing aerial photography was used in conjunction with the composite constraints superimposed to identify optimal locations of preliminary alternative route segment centerlines.

The preliminary alternative route segments were identified in accordance with PURA § 37.056(c)(4)(A)-(D) and P.U.C. SUBST. R. 25.101, including the PUC's policy of prudent avoidance, and were consistent with SPS transmission line routing preferences. It was POWER's intent to identify an adequate number of environmentally acceptable and geographically diverse preliminary alternative route segments while considering such factors as community values, parks and recreational areas, historical and aesthetic values, environmental integrity, route length parallel to existing compatible corridors or parallel to apparent property boundaries, and prudent avoidance.

The preliminary alternative route segments were reviewed by POWER and SPS for engineering and constructability. SPS hosted a public meeting on August 11, 2011 to receive public input and comment on the preliminary alternative route segments. Additional public meeting information is provided in Section 5.0.

2.6 ALTERNATIVE ROUTE IDENTIFICATION

Subsequent to the public meetings, POWER staff and SPS performed additional reviews of any areas of concern expressed at the public meetings and evaluated the public comments to consider revisions to the alternative route segments. In response to public and landowner concerns, and to meet the project purpose and need, two new route segments were added, and several were modified or not carried forward.

New Segments

Segment M3 (see Figure 2-3 in Appendix C) was added to the west of the Plainview North Substation. Although the segment had previously been located there, it had not been labeled as a separate segment from Segment L2. It was determined that a segment node was required to allow for an opportunity to tap into Plainview North from Segment K2.

Segment L3 (see Figure 2-3 in Appendix C) was added to the west side of Interstate 27. Segment L3 was previously the northern portion of Segment V, but due to the new node location for Segments N2 and V, Segment V was reduced and Segment L3 was created.

Segment Modifications

A portion of Segment B (see Figure 2-3 in Appendix C) was modified by extending it south along the east side of an unnamed road and a property boundary, and east along the south side of Farm-to-Market Road 145. This modification did not require shifting the node location for Segments B, K, and J. This modification was made to better parallel the existing linear features.

The western portion of Segment C3 (see Figure 2-3 in Appendix C) was modified by shifting it to the south side of CR 20. This modification was made at the landowner's request. This modification parallels the road and moves the line further away from an existing habitable structure and a large tree. This modification also required an extension of Segment Y1 to the south side of CR 20. Segments C3 and Y1 were combined and renamed Segment Y1 as a result of this modification.

The northern portion of Segment I3 (see Figure 2-3 in Appendix C) was modified by extending it north and then east to parallel the north side of CR EE at the landowner's request. This modification required shifting the node location for Segments I3, J3, and I1 to the north. This modification resulted in a reduction of the length of Segment J3 and an extension of the length of Segment I1.

A portion of Segment N2 (see Figure 2-3 in Appendix C) was modified by extending it south along a property boundary, west along another property boundary and west again across

Interstate 27. This modification was made at the landowner's request. The modification required shifting the node location for Segments N2 and V to the south, which resulted in the reduction of the length of Segment V and the addition of new Segment L3.

A portion of Segment K (see Figure 2-3 in Appendix C) was modified by extending it north across Farm-to-Market 145, east paralleling the north side of Farm-to-Market 145 and then south back across Farm-to-Market 145. This modification was made to minimize potential impact to a habitable structure.

Additional segments were removed from further consideration on the east side of the study area to address public comment and to meet the project description, purpose, and need. These segments include: F3, X2, Q2, R, L1, and K3. The justification for removing these segments is listed below:

- The segment did not parallel existing linear features when other alternative segments provided the same connection along existing linear features (e.g., property boundaries, transmission or distribution ROW, or corridors);
- the segment bisected property boundaries;
- there were road and railroad crossing constraints; or
- the segment was over a mile away from the Kress Rural Substation site.

Following the public meeting, the Kiser to Kress project description was clarified to include the Kress Rural tap as discussed in Section 2.2.1. Because an additional CCN application would be required if the new transmission line was more than one mile from the Kress Rural Substation, SPS and POWER removed several segments from further consideration because they exceeded this distance from the substation. These segments were primarily located on the west side of Interstate 27. The segments that were removed from further consideration include: L, S, X, Z, U, J1, K1, D1, F1, O1, P1, Z1, V1, W1, U1, X1, C2, B2, F2, E2, H2, and I2.

Due to modifications to the preliminary route segments, multiple segments were combined and relabeled as indicated on Figure 2-3 in Appendix C.

POWER and SPS identified numerous possible alternative routes using the 41 alternative route segments. These alternative route segments were developed based on the established evaluation criteria and public comment while ensuring a diverse geographic distribution of segments. The final 41 alternative route segments are considered environmentally compatible. Because of the numerous possible combinations of segments to develop routes that meet the project purpose and need, POWER and SPS identified a total of 11 alternative routes that incorporate all of the alternative route segments while also providing geographic diversity, minimizing the potential impacts to environmental and land use resources, and meeting the project purpose and need. However, numerous additional alternative routes may be formed by reconnecting the segments in various combinations. Table 2-3 presents the composition of the alternative routes by route segment and includes their approximate length in miles.

TABLE 2-3 ALTERNATIVE ROUTES

Alternative Route	Segment Combination	Total Length (miles)
1	C-O-M2-P2-S2-W-N1-J3-I1-G2-A2-M3-K2	28.0
2	B-K-O-O2-L3-N2-P2-S2-U2-W2-Y-M1-J3-I3-Q1-E3-D2-A2-M3-K2	24.4
3	B-J-N-P-L3-N2-P2-S2-W-N1-J3-I1-H1-E3-J2-M3-K2	27.7
4	A-N-T-E1-S2-U2-V2-S1-Y1-Q1-E3-D2-A2-M3-K2	26.1
5	B-J-N-P-L3-V-E1-S2-U2-V2-S1-Y1-Q1-E3-J2-M3-K2	24.7
6	B-K-O-M2-P2-S2-U2-V2-S1-G3-M1-J3-I1-G2-A2-L2	26.7
7	C-O-O2-L3-N2-P2-S2-W-T2-Y-M1-J3-I3-Q1-E3-D2-A2-L2	26.2
8	B-J-N-P-L3-N2-P2-S2-U2-W2-Y-M1-J3-I1-G2-A2-L2	26.7
9	A-N-T-E1-S2-U2-V2-S1-G3-M1-J3-I1-H1-E3-J2-M3-L2	30.0
10	C-O-M2-P2-S2-U2-W2-Y-G3-Y1-Q1-E3-J2-M3-L2	23.9
11	B-J-N-P-L3-N2-P2-S2-U2-V2-S1-Y1-Q1-E3-D2-A2-M3-K2	23.6

POWER evaluated the potential environmental and land use impacts of each alternative route using the evaluation criteria and by completing a comparison of these potential impacts as discussed in Section 4.0. The alternative routes are depicted on the folded map in Appendix C (Figure 2-3).

3.0 ENVIRONMENTAL SETTING OF THE STUDY AREA

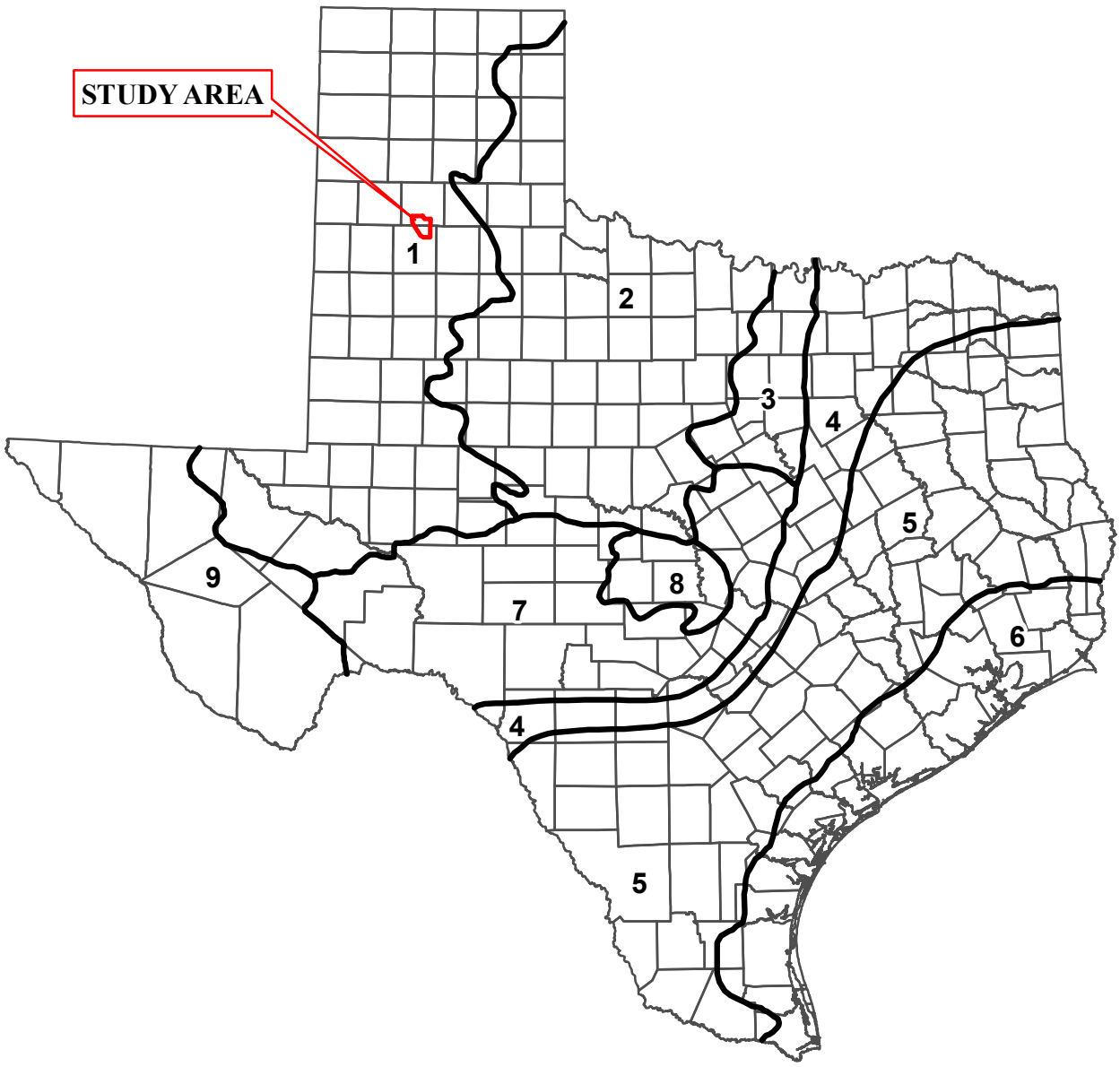
3.1 Physiography and Geology

The study area is located within the Southern High Plains Province of Texas, as shown in Figure 3-1. This province is located west of the North Central Plains Province. The Southern High Plains Province is described as a nearly flat plateau with numerous playa lakes scattered across the nearly treeless terrain, with widespread intermittent streams. Elevations within the study area range from 2,200 to 3,800 feet above mean sea level (BEG 1996).

Geologic formations occurring within the study area include the Pleistocene-aged Blackwater Draw Formation with scattered playa deposits on the plateau and outcrops of the Tertiary-aged Ogallala Formation associated with the slopes of dissecting stream channels, and Quaternary-aged alluvium deposits located within the stream bottoms. The Blackwater Draw Formation consists of sand, fine to medium grained quartz, silty, calcareous with a thickness of 25 feet. The Ogallala Formation consists of sand, silt clay, gravel, and caliche in a layer from 75 to 350 feet thick. Alluvium deposits are floodplain deposits that include terraces that are periodically flooded (BEG 1992).

3.1.1 Geological Hazards

Several potential geologic hazards that could affect the construction and operation of the transmission line were evaluated within the study area. Hazardous areas typically reviewed include potential karst areas, coal mining locations, gravel quarries, and potential subsurface contamination. No known karst geology or other karst features were identified within the study area (TSS 1994). No current or historical coal mining activities or gravel quarries are located within the study area (RRC 2011a).



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0 30 60 120 180 240

Miles

Printed November 11, 2011

Source: Texas Bureau of Economic Geology, 1996

LEGEND

Physiographic Region Boundary

1 High Plains
2 North-Central Plains
3 Grand Prairie
4 Blackland Prairies
5 Interior Coastal Plains
6 Gulf Coastal Prairies
7 Edwards Plateau
8 Central Texas Uplift
9 Trans-Pecos Basin and Range

County Boundary

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FIGURE 3-1
LOCATION OF THE STUDY AREA IN RELATION TO THE PHYSIOGRAPHIC REGIONS OF TEXAS

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Review of the TCEQ State Superfund Site and Leaking Petroleum Storage Tank databases indicated one previous State Superfund Site (Stoller Chemical Company) located in the northern section of Plainview within the study area. The case file record indicates closure with no further remedial actions required (TCEQ 2011a). Review of the EPA Superfund Site database did not identify any Superfund sites within the study area (EPA 2011).

The Texas Railroad Commission oil/gas database was reviewed for the study area and several dry hole and permitted well locations were identified within the study area. No active oil/gas wells were identified during the database search or during field reconnaissance surveys (RCC 2011b).

Review of the TCEQ - Leaking Underground Storage Tank database indicated 72 cases within the Plainview area. Only three of the 72 sites reviewed had open files and they were located outside of the study area. Three additional sites were recorded within the City of Kress and all were issued closure letters from the TCEQ (TCEQ 2011b).

3.2 Soils

3.2.1 Soil Associations

The published Natural Resource Conservation Service (NRCS) soil survey for Hale and Swisher counties was reviewed (NRCS 1974) to identify and characterize the soils occurring within the study area.

A soil association map unit consists of one or more major soil series and other minor soils. The predominant soil association occurring within the study area is the Pullman association. Soils within the Pullman association are characterized as non-calcareous clay loams on a nearly level plateau. The Pullman soil series comprises approximately 80% of the association with other soil series present including the Olton, Mansker, Estacado, Lofton, and Randall series. The Pullman soil series is considered a prime farmland series and is not a hydric soil (NRCS 2011).

The Pullman association occurs on a smooth, nearly level plain with numerous dish shaped, closed depressions called playas which collect localized surface water runoff. Soil series located on the slopes of these playas include the Olton and Lofton series, with the Randall soil series within the depression bottom. The Randall series is described as very slowly permeable soil, with a surface layer of dark grayish brown, mildly alkaline, silty clay loam. A soil association map unit consists of one or more major soil series and other minor soils.

3.2.2 Prime Farmland

The Secretary of Agriculture, within U.S. Code 7-4201(c)(1)(A), defines prime farmland soils as those soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. They have the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. Additional potential prime farmlands are those soils that meet most of the requirements of prime farmland, but fail because they lack the installation of water management facilities, or they lack sufficient natural moisture. The U.S. Department of Agriculture would consider these soils as prime farmland if water management practices were installed. Listed prime farmland soils identified within the study area include the Pullman soil series.

The NRCS was sent a consultation letter regarding this project. It replied that: “This project should have no significant adverse impact on the environment or natural resources in the areas. We do not require any permits, easements, or approvals for activities such as this” (see Appendix A).

Typically, the construction of a transmission line is not considered a conversion of prime farmlands. While the study area may contain Prime and other Important Farmland Soils; the project would be considered exempt from the Farmland Protection Policy Act.

3.3 WATER RESOURCES

3.3.1 Surface Water

Surface waters identified within the study area include numerous playa lakes, ponds, and one ephemeral flow stream (Rock Draw). Information on water resources within the study area were obtained from a variety of sources including USGS topographical maps, the National Hydrology Dataset (USGS 2011) aerial photographs, and field reconnaissance.

The study area is located within the Brazos River and Red River Basins. Rock Draw is located in the northeastern portion of the study area and flows into Rock Creek, Tule Creek, and the Prairie Dog Town Fork of the Red River. Rock Draw is ephemeral with numerous playa lakes located along its length. The City of Kress Wastewater Treatment Plant discharges effluent into a pond located southeast of the City of Kress located on Rock Draw.

Numerous playa lakes were identified within the study area. The playa lakes are wetland areas that are seasonally inundated with rainwater and provide important forage and shelter for migratory waterfowl and nesting shorebirds during migration and nesting seasons. These areas also provide habitat for local wildlife species.

Under 31 TAC 357.8, TPWD has designated Ecologically Significant Stream Segments (ESSS) based on habitat value, threatened and endangered species, species diversity, and aesthetic value criteria. Review of the TPWD database did not indicate any designated ESSS within the study area (TPWD 2011a).

In accordance with Section 303(d) and 304(a) of the CWA, the TCEQ identifies surface waters for which effluent limitations are not stringent enough to meet water quality standards and for which the associated pollutants are suitable for measurement by maximum daily load. Review of the most recent TCEQ, 303(d) list indicates that Rock Draw currently meets its designated water quality standards (TCEQ 2011c).

The Canadian River Municipal Water Authority aqueduct traverses the western half of the study area with a north/south orientation. This aqueduct is part of a 358-mile buried aqueduct system that provides raw water from Lake Meredith and the John C. Williams Aqueduct & Wellfield to eleven member municipalities in the Texas Panhandle (CRMWA 2011).

3.3.2 Groundwater/Aquifer

The study area is underlain by the Ogallala aquifer and the minor Dockum aquifer (subcrop). The Ogallala aquifer is the largest aquifer in the U.S. and underlies much of the High Plains Region. It consists of sand, gravel, clay, and silt. In Texas, the water quality increases in salinity in areas south of the Canadian River. The aquifer provides significantly more water for users (irrigation) than any other major aquifer in the state. Well yields, from a depth of 200 feet, range from 500 to 1,000 gallons per minute (TWDB 2007). The subcrop area of the minor Dockum aquifer underlies the Ogalalla aquifer. Water within this aquifer is generally brackish and is pumped from a depth of 800 feet. The town of Tulia utilizes this aquifer for municipal supplies.

The TWDB database was reviewed for public and private water wells within the study area. The database identified numerous irrigation well locations throughout the study area. These identifications were verified during the field reconnaissance survey. Water well locations were mapped utilizing GIS. No active springs were identified within the study area after review of USGS topographic maps and Springs of Texas (Brune 2002).

3.3.3 Floodplains

The FEMA website (FEMA 2011) was reviewed to obtain floodplain information for the study area. Flood Insurance Rate Maps were available for Hale and Swisher counties and delineated a Special Flood Hazard Area which is subject to inundation by the 1% chance annual flood (100 year flood). These areas are associated with Rock Draw and several of the playa lakes within the study area. No base flood elevations were determined for this area.

3.4 ECOLOGY

The study area is located within the High Plains Ecoregion – Level III and the Llano Estacado - Level IV Ecoregion (Hatch et al. 1990). The High Plains Ecoregion is the southern extent of the North American Great Plains and is characterized by a relatively level plateau with numerous surface ephemeral depressional lakes (playa lakes). The Llano Estacado is described as a level, treeless, elevated plain surrounded by escarpments on three sides. The geologic origin of the Llano Estacado was an apron of Miocene-Pliocene sediments (Ogallala formation) eroded from the eastern Rocky Mountains. Several hard caliche horizons and a caprock caliche layer were developed and the caprock was covered by Pleistocene wind-borne sand and silt (Blackwater Draw Formation).

3.4.1 Vegetation

Historically, the Llano Estacado was covered in short-grass prairie vegetation composed of buffalograss (*Buchloe dactyloides*), blue grama (*Bouteloua gracilis*), sideoats grama (*Bouteloua curtipendula*), and silver bluestem (*Bothriochloa laguroides* var*. torryana*). Today, approximately 80% of the Llano Estacado has been converted to cropland (Schmidley 2002). Crops of cotton, corn, grain sorghum, and winter wheat are grown utilizing dryland techniques or with irrigation using ground water drawn from the Ogallala aquifer. Surface waters occur within the ecoregion as seasonal playa lakes that have formed in shallow depressions. Many of the historical playa lakes have also been converted to agricultural croplands (Hatch et al. 1990). Average annual precipitation within Hale and Swisher counties is approximately 19 inches (Griffith et al. 2007), although the region is currently experiencing a record drought.

3.4.1.1 Terrestrial

As indicated on Figure 3-2, the study area is located within a vegetation area classified as cropland and includes a small portion of mesquite (*Prosopis glandulosa*) shrub/grassland vegetation within the City of Plainview (McMahan et al. 1984). Localized areas of remnant short-grass prairie could occur in areas that have not been converted to farmland or

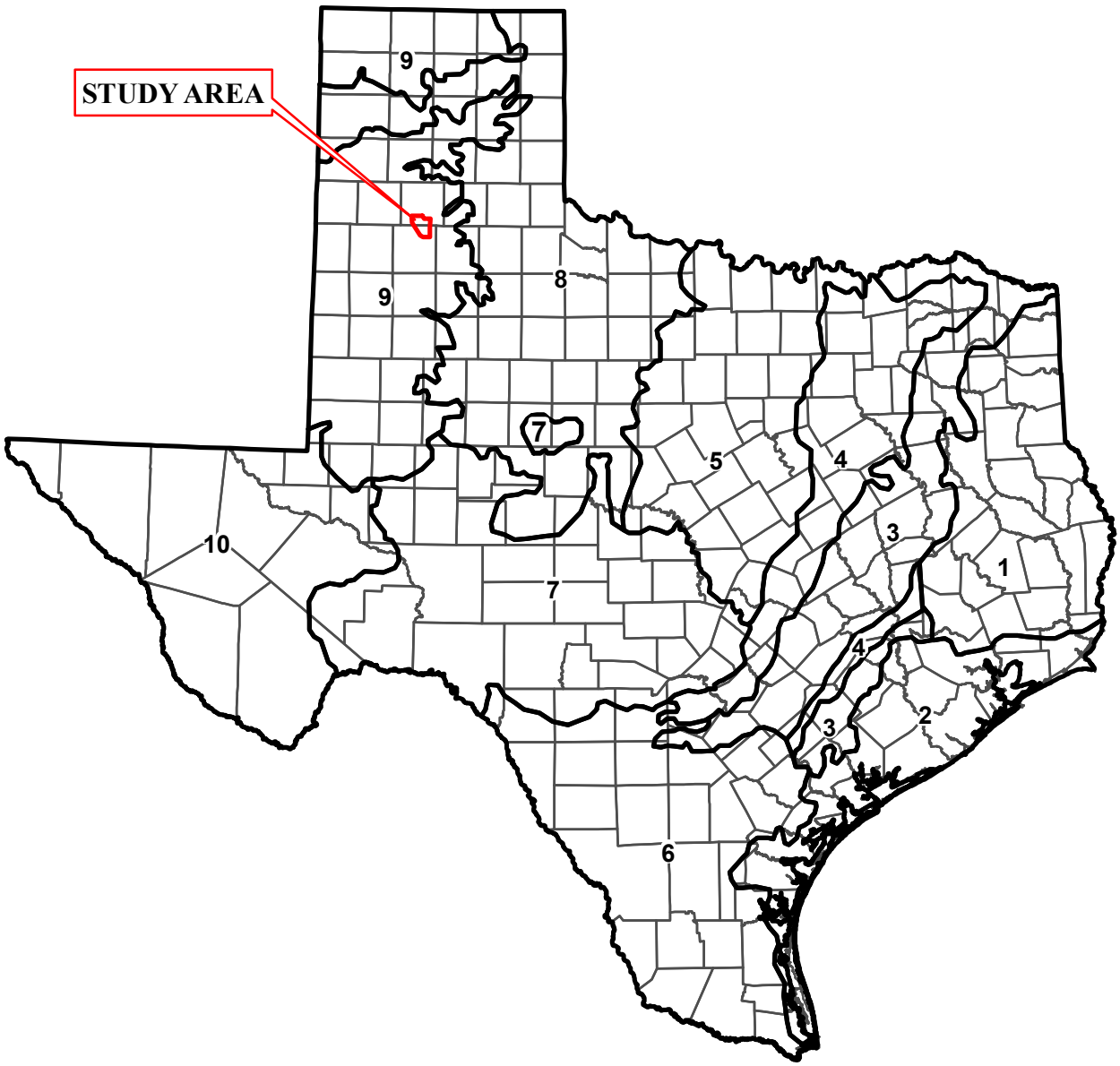
improved pastures. Plant species associated with the mesquite shrub/grassland vegetation type includes narrow-leaf yucca (*Yucca angustissima)*, tasajillo (*Opuntia leptocaulis*), juniper (*Juniperus* spp.), grassland pricklypear (*Opuntia cymochila*), blue grama, hairy grama (*Bouteloua hirsuta)*, purple three-awn (*Aristida purpurea*), buffalograss, little bluestem (*Schizachyrium scoparium)*, western wheatgrass (*Pascopyrum smithii*), indiangrass (Sorghastrum nutans), switchgrass (Panicum virgatum), James rushpea (Caesalpinia jamesii), scurfpea (Psoralea spp.), sandlily (Mentzelia nuda), plains beebalm (Monarda pectinata), scarlet guara (Gaura coccinea), yellow primrose (Oenothera missouriensis), sandsage (Oligosporus filifolius), and wild buckwheat (Erigonum annuum) (McMahan et al. 1984).

3.4.1.2 Aquatic/Hydric

Aquatic and/or hydric vegetation types mapped within the study area include the numerous playa lakes. These features are seasonally saturated/inundated shallow depressional areas that have clay soil bottoms. Dominant vegetation associated with the playa lakes ranges depending on the frequency and duration that these features are influenced by precipitation, irrigation runoff, or by intentional filling or emptying by landowners.

Typical playa lake vegetation within this region consists of annuals that can respond rapidly to changing water regimes. These commonly include pink smartweed (*Polygonum penylvanicum*), willow smartweed (*Polygonum lapathifolia*), barnyardgrass (*Echinochloa crusgalli*), spikerush (*Eleocharis* spp.), arrowhead (*Sagittaria longiloba*), toothcup (*Ammannia* spp.), and dock (*Rumex crispus*). Playas with a more stable saturated soil will also support bulrush (*Scirpus* spp.) and cattail (*Typhus* spp.). Vegetation within the drier playas will resemble the surrounding plains with various prairie grasses and ragweed (*Ambrosia* spp.) (Haukos and Smith 1992).

Mapped NWI wetlands within the study area are associated with the playa lakes (USFWS 2011a). Wetland types mapped associated with the playa lakes includes palustrine emergent (PEM) and palustrine farmed (Pf). The Pf mapped wetlands include historical playa lakes that have been converted to cropland uses.



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0 30 60 120 180 240

Miles

Printed November 11, 2011

Source: Gould, F.W., Hoffman, G.O., and Rechenthin, C.A. 1960, modified

LEGEND

Vegetational Areas Boundary

1 Pineywoods
2 Gulf Prairies and Marshes
3 Post Oak Savannah
4 Blackland Prairies
5 Cross Timbers and Prairies
6 South Texas Plains
7 Edwards Plateau
8 Rolling Plains
9 High Plains
10 Trans-Pecos

County Boundary

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FIGURE 3-2
LOCATION OF THE STUDY AREA IN RELATION TO THE VEGETATIONAL AREAS OF TEXAS

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3.4.1.3 Commercially or Recreationally Important Plant Species

Commercially or recreationally important plant species within the study area include the plants grown as crops, those within native prairie areas, and those within playa lakes. The crop plants are of economic value and contribute to the base of the economy within the region. The plants within the native prairie areas will be of a recreation/conservation value since so few of these areas remain undisturbed. The annuals located within the playa lakes are of recreational value and are important seed sources for vast numbers of migrating waterfowl.

3.4.1.4 Endangered and Threatened Plant Species

Review of the TPWD and USFWS county listings for special status plant species, indicated only one plant species, the Mexican mud-plantain (*Heteranthera mexicana*). This plant is listed as rare with TPWD for Swisher County and is associated with the wet clayey soils along the margins of playa lakes.

3.4.2 Fish and Wildlife

3.4.2.1 Terrestrial

The study area is located within the Kansan Biotic Province (see Figure 3-3) as described by Blair (1950). The Kansan Biotic Province includes three distinct biotic districts including the Mixed-grass Plains, the Short-grass Plains, and the Mesquite Plains. The study area is located within the Short-grass Plains District. Buffalo grass and blue grama grass are the dominant short-grasses within this district. The historical terrestrial wildlife community assemblage within this district was an interdependent web with dominant species including the bison (*Bison bison*), black-tailed prairie dog (*Cynomys ludovivianus*), black-footed ferret (*Mustela nigripes*), burrowing owl (*Athene cunicularia*), ferriginous hawk (*Buteo regalis*), coyote (*Canis latrans*), gray wolf (*Canis lupis*), swift fox (*Vulpes velox*), pronghorn antelope (*Antilocarpa americana*), deer (*Odocoileus* spp.), and mountain lion (*Puma concolor*) (Griffith et al. 2007). This web is no longer functional due to the overharvesting and/or eradication of

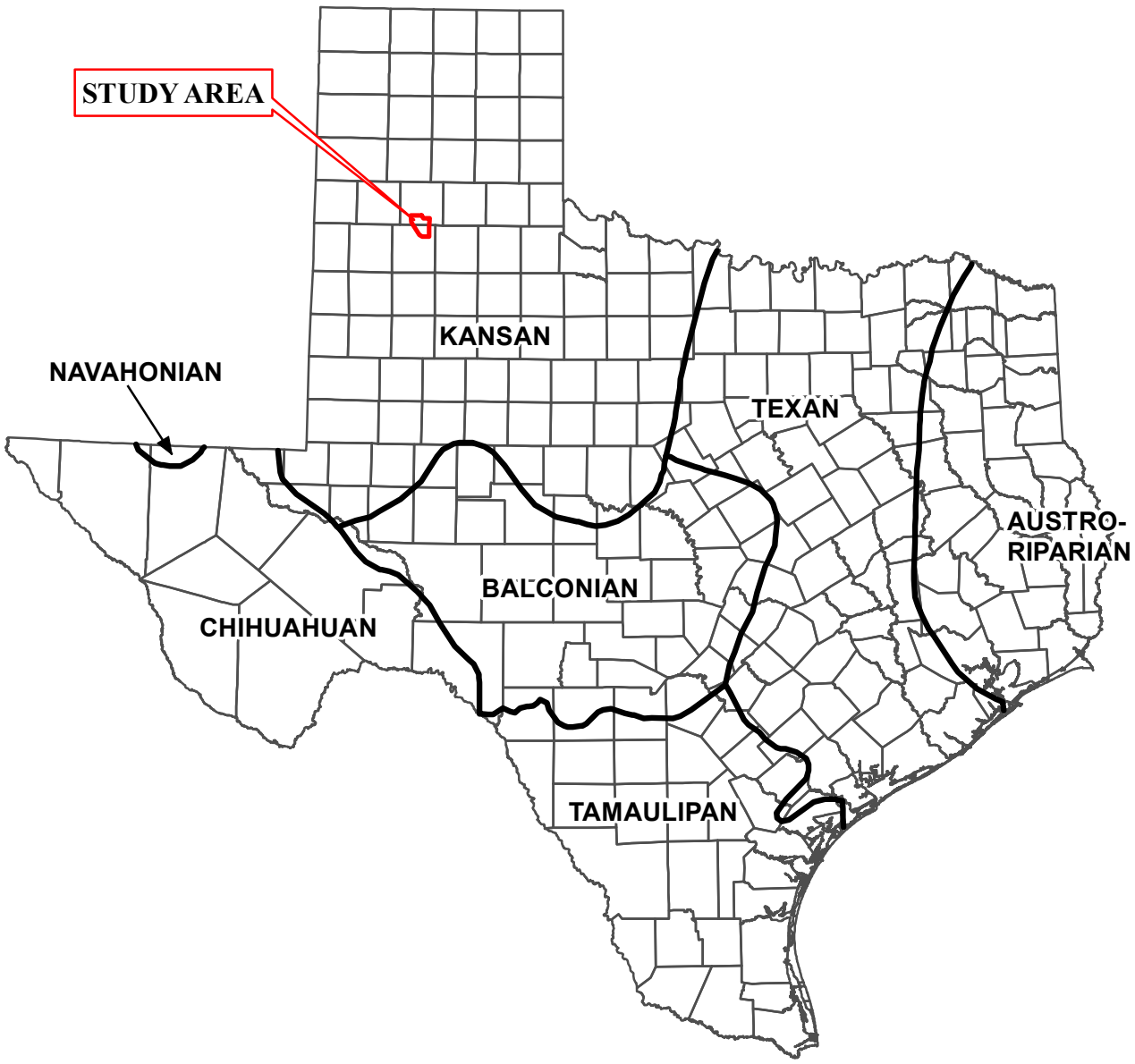
some of these species from the ecosystem, and from the conversion of the majority of native habitat to croplands. Species able to adapt to the conversion in habitat conditions will be more commonly observed within the study area.

According to Blair, species diversity within the Kansan Biotic Province includes 14 frog and toad species, one salamander species, 31 snake species, 14 lizard species, one species of land turtle, and 59 species of mammals.

Amphibian species (frogs, toads, salamanders, and newts) that may occur within the study area are listed in Table 3-1 (Dixon 2000). Frogs and toads may occur in all vegetation types; salamanders are typically restricted to moist or hydric habitats. None of the species listed are state or federally listed as rare, threatened, or endangered.

TABLE 3-1 TYPICAL AMPHIBIAN SPECIES OCCURRING WITHIN THE STUDY AREA

Common Name	Scientific Name
Frogs/Toads	
American bullfrog	*Rana catesbeiana*
Blanchard's cricket frog	*Acris crepitans blanchardi*
Couch's spadefoot toad	*Scaphiopus couchi*
Great plains toad	*Bufo cognatus*
Plains leopard frog	*Rana blairi*
Plains spadefoot toad	*Spea bombifrons*
New Mexico spadefoot toad	*Spea multiplicata*
Spotted chorus frog	*Pseudacris clarki*
Woodhouse's toad	*Bufo woodhousii woodhousii*
Salamander/Newt	
Barred tiger salamander	*Ambystoma tigrinum mavortium*



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0 30 60 120 180 240

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Printed November 11, 2011

Source: Blair, 1950, modified

LEGEND

Biotic Province Boundary

County Boundary

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FIGURE 3-3
LOCATION OF THE STUDY AREA IN RELATION TO THE BIOTIC PROVINCES OF TEXAS

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Reptiles (turtles, lizards, and snakes) that may occur in the study area are listed in Table 3-2 (Dixon 2000) and (Werler and Dixon 2007). These include those species that are more commonly observed near water (i.e., aquatic turtles) and those that are more common in terrestrial habitats.

TABLE 3-2 TYPICAL REPTILIAN SPECIES OCCURRING WITHIN THE STUDY AREA

Common Name	Scientific Name
Turtles	
Ornate box turtle	*Terrapene ornate ornata*
Yellow mud turtle	*Kinosternon flavescens flavescens*
Lizards	
Northern earless lizard	*Holbrookia maculata maculata*
Snakes	
Bull snake	*Pituophis catenifer sayi*
Central plains milk snake	*Lampropeltis triangulum gentilis*
Checkered garter snake	*Thamnophis marcianus*
Desert King snake	*Lampropeltis getula splendida*
Great plains ground snake	*Sonora semiannulata*
Kansas Glossy snake	*Arizon elegans elegans*
Plains black-headed snake	*Tantilla nigriceps*
Plains hog-nosed snake	*Heterodon nasicus*
Prairie rattlesnake	*Crotalus viridis*
Prairie ring-necked snake	*Diadophis punctuatus arnyi*
Texas brown snake	*Storeria dekayi texana*
Texas long-nosed snake	*Rhinocheilus lecontei tessellatus*
Western coachwhip	*Masticophis flagellum testaceus*

Numerous avian species may be present within the study area. They include year-round residents as listed in Table 3-3. Additional bird species may migrate within or through the study area in the spring and fall and/or use the area for nesting (spring/summer) or to overwinter. Migrant winter residents that may occur in the study area are listed in Table 3-4. Summer residents that may occur in the study area are listed in Table 3-5 (Lockwood and Freeman 2004).

The likelihood for occurrence of each species will depend upon suitable habitat and the season. The playa lakes provide cover and forage for migrating birds and/or overwintering birds. All migratory birds have protection under the MBTA.

TABLE 3-3 TYPICAL RESIDENT BIRD SPECIES OCCURRING WITHIN THE STUDY AREA

Common Name	Scientific Name
American coot	*Fulica americana*
American crow	*Corvus brachyrhynchos*
American kestrel	*Falco sparverius*
American robin	*Turdius migratorius*
Barn owl	*Tyto alba*
Bewick's wren	*Thryomanes bewickii*
Blue jay	*Cyanocitta cristata*
Brown-headed cowbird	*Molothrus ater*
Burrowing owl	*Athene cunicularia*
Chihuahuan raven	*Corvus cryptoleucus*
Common grackle	*Quiscalus quiscula*
Common yellowthroat	*Geothlypis trichas*
Curvebill thrasher	*Toxostoma curvirostre*
Eastern screech owl	*Megascops asio*
Eurasian collared-dove	*Streptopelia decaocto*
Great blue heron	*Ardea herodias*
Great horned owl	*Bubo virginianus*
Greater roadrunner	*Geococcyx californianus*
Great-tailed grackle	*Quiscalus mexicanus*
Horned lark	*Eremophila alpestris*
House sparrow	*Passer domesticus*
House finch	*Carpodacus mexicanus*
Inca dove	*Columbina inca*
Killdeer	*Charadrius vociferus*
Ladder-backed woodpecker	*Picoides scalaris*
Loggerhead shrike	*Lanius ludovicianus*

TABLE 3-3 TYPICAL RESIDENT BIRD SPECIES OCCURRING WITHIN THE STUDY AREA

Common Name	Scientific Name
Mourning dove	*Zenaida macroura*
Northern bobwhite	*Colinus virginianus*
Northern cardinal	*Cardinalis cardinalis*
Northern mockingbird	*Mimus polyglottos*
Northern pintail	*Anas acuta*
Pied-billed grebe	*Podilymbus podiceps*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-necked pheasant	*Phasianus colchicus*
Rock pigeon	*Columba livia*
Rock wren	*Salpinctes obsoletus*
Scaled quail	*Callipepla squamata*
Western meadowlark	*Sturnella neglecta*

TABLE 3-4 TYPICAL WINTER RESIDENT BIRD SPECIES OCCURRING WITHIN THE STUDY AREA

Common Name	Scientific Name
American goldfinch	*Carduelis tristis*
American pipit	*Anthus rubescens*
American wigeon	*Anas americana*
Blue-winged teal	*Anas discors*
Brewer's blackbird	*Euphagus cyanocephalus*
Brown creeper	*Certhia americana*
Bufflehead	*Bucephala albeola*
Canada goose	*Branta canadensis*
Canvasback	*Aythya valisineria*
Cedar waxwing	*Bombycilla cedrorum*
Chestnut-collared longspur	*Calcarius ornatus*
Chipping sparrow	*Spizella passerina*
Clark’s grebe	*Aechmophorus clarkii*

TABLE 3-4 TYPICAL WINTER RESIDENT BIRD SPECIES OCCURRING WITHIN THE STUDY AREA

Common Name	Scientific Name
Common goldeneye	*Bucephala clangula*
Common loon	*Gavia immer*
Common merganser	*Mergus merganser*
Cooper's hawk	*Accipiter cooperii*
Dark-eyed junco	*Junco hyemalis*
Double-crested cormorant	*Phalacrocorax auritus*
Downy woodpecker	*Picoides pubescens*
Eastern bluebird	*Sialia sialis*
Eastern meadowlark	*Sturnella magna*
Ferruginous hawk	*Buteo regalis*
Field sparrow	*Spizella pusilla*
Gadwall	*Anas strepera*
Golden-crowned kinglet	*Regulus satrapa*
Golden eagle	*Aquila chrysaetos*
Greater scaup	*Aythya marila*
Green-tailed towhee	*Pipilo chlorus*
Green-winged teal	*Anas crecca*
Hermit thrush	*Catharus guttatus*
Herring gull	*Larus argentatus*
Hooded Merganser	*Lophodytes cucullatus*
Horned grebe	*Podiceps auritus*
Lapland longspur	*Calcarius lapponicus*
Least sandpiper	*Calidris minutilla*
Lesser scaup	*Aythya affinis*
Lincoln's sparrow	*Melospiza lincolnii*
Long-eared owl	*Asio otus*
Mallard	*Anas platyrhynchos*
Marsh wren	*Cistothorus palustris*
McCown's longspur	*Calcarius Mccownii*
Northern flicker	*Colaptes auratus*
Northern harrier	*Circus cyaneus*

TABLE 3-4 TYPICAL WINTER RESIDENT BIRD SPECIES OCCURRING WITHIN THE STUDY AREA

Common Name	Scientific Name
Northern shoveler	*Anas clypeata*
Pine siskin	*Carduelis pinus*
Prairie falcon	*Falco mexicanus*
Pyrrhuloxia	*Cardinalis sinuatus*
Red-breasted nuthatch	*Sitta canadensis*
Redhead	*Aythya americana*
Red-naped sapsucker	*Spyrapicus nuchalis*
Ring-billed gull	*Larus delawarensis*
Ring-necked duck	*Aythya collaris*
Ross's goose	*Chen rossii*
Rough-legged hawk	*Buteo lagopus*
Ruby-crowned kinglet	*Regulus calendula*
Ruddy duck	*Oxyura jamaicensis*
Sandhill crane	*Grus canadensis*
Savannah sparrow	*Passerculus sandwichensis*
Sharp-shinned hawk	*Accipiter striatus*
Short-eared owl	*Asio flammeus*
Snow goose	*Chen caervlescens*
Song sparrow	*Melospiza melodia*
Spotted towhee	*Pipilo maculatus*
Swamp sparrow	*Melospiza georgiana*
Vesper sparrow	*Pooecetes gramineus*
Western grebe	*Aechmophorus occidentalis*
White-breasted nuthatch	*Sitta carolinensis*
White-crowned sparrow	*Zonotrichia leucophrys*
Wilson's snipe	*Gallinago delicata*
Wood duck	*Aix sponsa*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Yellow-rumped warbler	*Dendroica coronata*

TABLE 3-5 TYPICAL SUMMER RESIDENT BIRD SPECIES OCCURRING WITHIN THE STUDY AREA

Common Name	Scientific Name
American advocet	*Recuruirostra americana*
Ash-throated flycatcher	*Myiarchus cinerascens*
Barn swallow	*Hirundo rustica*
Belted kingfisher	*Ceryle alcyon*
Black-crowned night heron	*Nycticorax nycticorax*
Black-necked stilt	*Himantopus mexicanus*
Blue grosbeak	*Passerina caerulea*
Bullock's oriole	*Icterus bullockii*
Cassin's sparrow	*Aimophila cassinii*
Cattle egret	*Bubulcus ibis*
Chimney swift	*Chaetura pelagica*
Cinnamon teal	*Anas cyanoptera*
Cliff swallow	*Petrochelidon pyrrhonota*
Common moorhen	*Gallinula chloropus*
Common nighthawk	*Chordeiles minor*
Common poorwill	*Phalaenoptilus nuttallii*
Dickcissel	*Spiza americana*
Eastern phoebe	*Sayornis phoebe*
European starling	*Sturplus vulgaris*
Grasshopper sparrow	*Ammodramus savannarum*
Great egret	*Ardea alba*
Green heron	*Butorides virescens*
Lark bunting	*Calamospiza melenocorys*
Lark sparrow	*Chondestes grammacus*
Merlin	*Falco columbarius*
Mississippi kite	*Ictinia mississippiensis*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Orchard oriole	*Icterus spurius*
Prairie falcon	*Falco mexicanus*
Purple martin	*Progne subis*
Scissor-tailed flycatcher	*Tyrannus forficatus*

TABLE 3-5 TYPICAL SUMMER RESIDENT BIRD SPECIES OCCURRING WITHIN THE STUDY AREA

Common Name	Scientific Name
Swainson's hawk	*Buteo swainoni*
Turkey vulture	*Cathartes aura*
Yellow-billed cuckoo	*Coccyzus americanus*
Western kingbird	*Tyrannus verticalis*

Mammals that may commonly occur in the study area are listed in Table 3-6 (Davis and Schmidly 1994). The occurrence of each species will be dependent on suitable habitat available with some species migrating through the study area.

TABLE 3-6 TYPICAL MAMMALIAN SPECIES OCCURRING WITHIN THE STUDY AREA

Common Name	Scientific Name
American badger	*Taxidea taxus*
Big brown bat	Eptesicus fuscus
Black-tailed jackrabbit	Lepus californicus
Bobcat	Lynx rufus
Brazilian free-tailed bat	Tadarida brasiliensis
Brush mouse	*Peromyscus boylii*
Cave myotis bat	*Myotis velifer*
Common gray fox	*Urocyon cinereoargenteus*
Common raccoon	*Procyon lotor*
Coyote	*Canis latrans*
Desert cottontail rabbit	*Sylvilagus audubonii*
Desert shrew	*Notiosorex cwafordi*
Deer mouse	*Peromyscus maniculatus*
Eastern cottontail rabbit	*Sylvilagus floridanus*
Eastern red bat	*Lasiurus borealis*
Eastern spotted skunk	*Spilogale putorius*
Feral pig	*Sus scrofa*
Hispid cotton rat	*Sigmodon hispidus*
Hispid pocket mouse	*Chaetodipus hispidus*

TABLE 3-6 TYPICAL MAMMALIAN SPECIES OCCURRING WITHIN THE STUDY AREA

Common Name	Scientific Name
Hoary bat	*Lasiurus cinereus*
Least shrew	*Cryptotis parva*
Long-tailed weasel	*Mustela frenata*
Merriam's pocket mouse	*Perognathus merriami*
Mexican ground squirrel	*Spermophilus mexicanus*
Mountain lion	*Felis concolor*
Mule deer	*Odocoileus hemionus*
Nine-banded armadillo	*Dasypus novemcinctus*
Northern grasshopper mouse	*Onychomys leucogaster*
Northern pygmy mouse	*Baiomys taylori*
Ord's kangaroo rat	*Dipodomys ordii*
Pallid bat	*Antrozous pallidus*
Plains harvest mouse	*Reithrodontomys montanus*
Plains pocket gopher	*Geomys bursarius*
Plains pocket mouse	*Perognathus flavescens*
Porcupine	*Erethizon dorsatum*
Pronghorn	*Antilocarpa americana*
Red fox	*Vulpes vulpes*
Ringtail	*Bassariscus astutus*
Silver-haired bat	*Lasionycteris noctivagans*
Southern plains woodrat	*Neotoma micropus*
Spotted ground squirrel	*Spermophilus spilosoma*
Striped skunk	*Mephitis mephitis*
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Townsend's big-eared bat	*Plecotus townsendii*
Virginia opossum	*Didelphis virginiana*
Western harvest mouse	*Reithrodontomys megalotis*
Western pipistrelle bat	*Pipistrellus hesperus*
White-footed mouse	*Peromyscus leucopus*
White-throated woodrat	*Neotoma albigula*
Yellow-faced pocket gopher	*Cratogeomys castanops*

3.4.2.2 Aquatic

Open water aquatic habitats within the study area are associated with the numerous playa lakes. Emergent vegetation within the open water aquatic habitats is typically limited to the shallow areas along the shorelines or within the entire playa lake as previously discussed. The divisions of the biotic provinces were separated on the basis of terrestrial vertebrate distributions; however, the distribution of freshwater fishes generally corresponds with the terrestrial province boundaries (Hubbs 1957). The northern section of the study area is located within the Red River Basin and southern study area within the Upper Brazos River Basin.

Rock Draw and the seasonally filled playa lakes support aquatic species primarily adapted to ephemeral pool habitats. Aquatic species supported by the ephemeral water regime are typically adapted to rapid dispersal and life cycle completion within pool habitats typically having fine-grained substrates. Within the playa lakes the invertebrate species assemblage includes a multitude of species and their composition is dependent on duration of inundation and is poorly understood. These invertebrate populations are consumed by migratory waterfowl during the winter seasons. The playa lakes that are kept inundated through artificial means may gradually change successional characteristics and support populations of higher trophic level organisms.

No significant fisheries are anticipated within the study area. Rock Draw is likely to provide intermittent water flow type habitats. The aquatic habitats associated with the playa lakes that have managed water levels may develop more open water or perennial habitat types for aquatic species. The intermittent flow habitats may support populations of Red River pupfish (*Cyprinidon rubrofluviatilis*), mosquitofish (*Gambusia affinis*), plains killifish (*Fundulus kansae*), and plains minnow (*Hybognathus placitus*) (Ostrand 2000). Surface waters with perennial characteristics may also support red shiner (*Cyprinella lutrensis*). No sustainable fish populations are anticipated within the isolated ephemeral playa lakes.

3.4.2.3 Commercially or Recreationally Important Animal Species

Commercially or recreationally important native animal species typically occurring within the study area include those associated with hunting and/or bird watching activities. These species include mule deer (*Odocoileus hemionus*), ring-necked pheasant (*Phasianus colchicus*), mourning dove (*Zenaida macroura*), quail (*Colinus virginianus*), migrating waterfowl, and nesting shorebirds. Representative species of migratory waterfowl include sandhill crane (*Grus canadensis*), Canada goose (*Branta canadensis*), gadwall (*Anas strepera*), northern shoveler (*Anas clypeata*), and redhead duck (*Aythya americana*). Representative species of nesting shorebirds includes black-necked stilt (*Himantopus mexicanus*), American avocet (*Recuruirostra americana*), and killdeer (*Charadrius vociferus*). The extent of the occurrence of these animals within the study area is dependent on the availability of suitable habitat.

3.4.2.4 Endangered and Threatened Animal Species

Emphasis was placed on obtaining known occurrences of special status species and/or their designated critical habitat and occurrences of sensitive species and unique vegetative communities within the study area. Special status species include those listed by the USFWS as threatened, endangered, proposed, or candidate; and those species listed by the TPWD as threatened or endangered. Sensitive species include those listed as rare by the TPWD and unique vegetation communities are those listed by the TPWD. A GIS file (TXNDD 2011) of known occurrences for listed species and/or sensitive vegetative communities was obtained from the TXNDD.

The USFWS maintains a federal listing of all threatened, endangered, and candidate species for each county (USFWS 2011b). By definition, a threatened species is defined as likely to become endangered within the near foreseeable future throughout all or a significant portion of its range. An endangered species is in danger of extinction throughout all or a significant portion of its range. Candidate species are those that have sufficient information on their biological vulnerability and threat(s) to support listing as threatened or endangered and are likely to be proposed for listing in the near foreseeable future.

The ESA also provides for the conservation of "designated critical habitat," which is defined as the areas of land, water, and air space that an endangered species needs for survival. These areas include sites with food and water, breeding areas, cover or shelter sites, and sufficient habitat to provide for normal population growth and behavior for the species. The primary threat to threatened/endangered species is the destruction or modification of critical habitat areas by uncontrolled land and/or water development.

Animals

Threatened, endangered, and sensitive animal species lists from the USFWS and TPWD for Hale and Swisher counties, Texas were reviewed and are summarized in Table 3-7 (USFWS 2011b; TPWD 2011b). Species not designated as federally threatened or endangered are not afforded any regulatory protection under the ESA; however, additional federal and state laws may provide additional regulatory protection.

TABLE 3-7 LISTED SPECIAL STATUS SPECIES FOR HALE AND SWISHER COUNTIES, TEXAS

Listed Species		Legal Status	
Common Name	**Scientific Name**	**USFWS**	**TPWD**
Birds			
Bald eagle	*Haliaeetus leucocephalus*	DL	T
Lesser-prairie chicken	*Tympanuchus pallidicinctus*	C	
Peregrine falcon	*Falco peregrinus*	DL	T
Whooping crane	*Grus americana*	E	E
Reptiles			
Texas horned lizard	*Phrynosoma cornutum*		T
Mammals			
Gray wolf	*Canis lupis*		EXT

USFWS Listed Species

Federally listed species for Hale and Swisher counties is limited to the endangered whooping crane (*Grus americanus*). The study area is located to the west of the central migratory corridor within Texas for this species. The central migratory corridor is

approximately 200 miles wide and extends from the nesting grounds located at Wood Buffalo National Park in northern Canada, to the wintering grounds at the Aransas National Wildlife Refuge located north of Rockport, Texas. The cranes overwinter in Texas from November through March. During migration, the birds typically fly at altitudes greater than 1,000 feet but will regularly roost and feed in areas away from human disturbance. Stopover areas include wetlands associated with large rivers, lakes, playa lakes, pastureland and cropland (Campbell 2003). This species may be incidentally present within the study area during nightly migration stopovers of the spring or fall migrations.

Candidate Species

The lesser prairie-chicken (*Tympanuchus pallidicintus*) is a listed USFWS candidate species for Swisher County. This species utilizes arid grassland habitats generally interspersed with shrubs including sand sagebrush (*Artemisia filifolia*), sand plum (*Prunus angustifolia*), skunkbush sumac (*Rhus trilobata*), and shinnery oak (*Quercus harvardii*). Grassland species include sand dropseed, sideoats grama, sand bluestem, and little bluestem. The lesser prairie-chicken may occur within the study area where suitable habitat exists.

Delisted Species

Species recently delisted by the USFWS include the bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon *(Falco peregrinus anatum*). The bald eagle was removed from the federal list in 2007 since the population has recovered beyond the ESA listing criteria. The bald eagle is still listed as threatened on the TPWD list. Review of the TXNDD report did not indicate any known occurrences of bald eagles within the study area. No nesting bald eagles are anticipated to occur within the study area due to the lack of suitable habitat.

The peregrine falcon has been delisted by the USFWS, but remains listed as threatened by the TPWD. The falcon is a year round resident and breeder in West Texas, nesting on tall cliffs. This species may occur as a migrant throughout the study area. Populations of each species are now monitored by USFWS and are still afforded federal protection under the MBTA and the BGEPA.

TPWD Listed Species

In addition to the federal special-status species discussed above, the TPWD lists the Texas horned lizard (*Phrynosoma cornutum*) and gray wolf as threatened and extirpated respectively. The Texas horned lizard population has recently decreased due to collection, land use conversions, habitat loss, and increased fire ant populations. The lizard inhabits open, arid to semiarid regions with sparse vegetation. The lizard thermo-regulates by basking or burrowing into the soil and forages primarily on ants, but also consumes grasshoppers, beetles, and grubs (TPWD 2009e). The lizard is active (not hibernating) between early spring to late summer. This species may occur within the study area if suitable habitat exists.

The gray wolf was formerly known throughout the western two-thirds of the state inhabiting forests, brushlands and grasslands; however, the species is now considered extirpated from the state of Texas. The occurrence of a gray wolf within the study area is not anticipated.

Rare Species and Sensitive Vegetation Communities

While not regulated, TPWD also lists rare species and sensitive vegetation communities. TPWD generally recommends consideration for these species and avoidance of these listed vegetation communities when routing linear utility corridors. Rare species or Species of Special Concern are those within the state that are experiencing population declines due to habitat loss. TPWD promotes the conservation of these species and their habitats. TPWD lists seven bird species and six mammal species for Hale and Swisher counties as summarized in Table 3-8.

TABLE 3-8 STATE LISTED RARE SPECIES FOR HALE AND SWISHER COUNTIES, TEXAS

Listed Rare Species[1]	
Common Name	**Scientific Name**
Birds	
Baird's sparrow	*Ammodramus bairdii*
Ferruginous hawk	*Buteo regalis*
Mountain plover	*Charadrius montanus*

TABLE 3-8 STATE LISTED RARE SPECIES FOR HALE AND SWISHER COUNTIES, TEXAS

Listed Rare Species[1]	
Common Name	**Scientific Name**
Prairie falcon	*Falco mexicanus*
Snowy plover	*Charadrius alexandrinus*
Western burrowing owl	*Athene cunicularia hypugaea*
Western snowy plover	*Charadrius alexandrinus nivosus*
Mammals	
Big free-tailed bat	*Nyctinomops macrotis*
Black-footed ferret	*Mustela nigripes*
Black-tailed prairie dog	*Cynomys ludovicianus*
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*
Plains spotted skunk	*Spilogale putoris interrupta*
Swift fox	*Vulpes velox*

Birds

Bird species listed as rare include Baird's sparrow (*Ammodramus bairdii*), ferruginous hawk, mountain plover (*Charadrius montanus), prairie falcon (Falco mexicanus),* snowy plover (*Charadrius alexandrinus*), western burrowing owl (*Athene cunicularia hypugaea*), and the western snowy plover (*Charadrius alexandrinus nivosus*). Baird's sparrow is a migrant species and utilizes short-grass prairie habitat with scattered low bushes and matted vegetation. No records of occurrence have been documented for Hale and Swisher counties, Texas (Seyffert 2001). The ferruginous hawk inhabits open prairie, plains and badlands nesting in tall trees or structures. These birds are considered a year-round resident and are observed near active prairie dog towns. The mountain plover may be a resident or winter migrant species, and typically utilizes short-grass prairies or overgrazed pastures to forage for insects. The prairie falcon inhabits open plains and prairies nesting on cliff faces. The snowy plover and western snowy plover are likely migratory transients or may be residents within the study area favoring alkali flats, lake or river shoreline habitats. The western burrowing owl utilizes vacant prairie dog burrows or other manmade structures

on the ground to roost and nest. The owl emerges from the burrow at dusk to forage on insects (primarily beetles) (Rappole and Blacklock 1994).

Mammals

Rare listed mammals include the big free-tailed bat (*Nyctinomops macrotis*), black-footed ferret, black-tailed prairie dog, Pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*), plains spotted skunk (*Spilogale putorius interrupta*), and the swift fox. The big free-tailed bat is an opportunistic insectivore feeding primarily on moths, crickets, flying ants, and leafhoppers. It inhabits rocky landscapes roosting high on cliff faces but may also roost on buildings. The Pale Townsend's big-eared bat is also an opportunistic insectivore that roosts in caves, mines, and old buildings. The species hibernates in groups during the winter, and during breeding season maternal colonies are formed. The black-tailed prairie dog and black-footed ferret are associated through the prairie dog town. The black-tailed prairie dog lives in large groups on open plains creating numerous burrows. The black-footed ferret utilized these burrows and foraged on the prairie dogs. With the eradication and fragmentation of prairie dog towns associated with the conversion of prairies to agriculture, population numbers for both species decreased rapidly (Campbell 2003). The swift fox inhabits short-grass prairies residing in dens. They hunt at night feeding on rabbits, rodents, and insects. The plains spotted skunk is a subspecies of the eastern spotted skunk (*Spilogale putorius*), that favors wooded and tall-grass prairie habitats with rocky outcrops utilized as den sites. The plains spotted skunk can also utilize the attics of buildings or under buildings near farmyards. Their diet varies by season, feeding on mice, insects, fruit, and birds (Davis and Schmidly 1994).

The TXNDD report was reviewed and indicated several records of the swift fox occurring within the study area (TXNDD 2011). These were recorded within Hale County and associated with the Running Water Draw area. It should be noted that the TXNDD report is not substituted as presence/absence survey data and that the TXNDD data was used during this study as an indication of whether or not the listed species or species of concern has historically occurred within the study area. Any of the rare species discussed above may occur within the study area where suitable habitat exists.

3.5 SOCIOECONOMICS

The recent and existing economic and demographic characteristics for the study area are summarized in this section. Statistics for Hale and Swisher counties and the State of Texas are briefly described and compared to evaluate the socioeconomic environment of the study area. Literature sources reviewed include publications of the U.S. Bureau of the Census (USBOC), and the TWDB.

3.5.1 Population Trends

The study area is located within Hale and Swisher counties. The population of Hale County decreased by approximately 0.9% between 2000 (36,605 persons) and 2010 (36,273 persons). The population of Swisher County also decreased from 8,378 persons in 2000, to 7,854 persons in 2010 at 6.3% (Table 3-9). During the same time period, the State of Texas's population increased approximately 21% with 20,851,820 persons in 2000 to 25,145,561 persons in 2010 (USBOC 2011).

According to population projections published by the TWDB, the state's population is predicted to increase by 22% by 2020, while Hale and Swisher counties' population is expected to increase by 16% during the same time period (TWDB 2011).

TABLE 3-9 POPULATION TRENDS

State/County	1990	2000	2010
Texas	16,986,510	20,851,818	25,145,561
Hale County	34,671	36,605	36,273
Swisher County	8,133	8,378	7,854

Source: USBOC 2011

3.5.2 Employment

The civilian labor force (CLF) in Hale and Swisher counties has not increased. Between 1990 and 2000, Hale County's CLF remained nearly constant at 15,704 persons and Swisher County's CLF decreased by 1% at 3,537. By comparison, the state's CLF increased during the same decade by 20%. From 2005 to 2009, Hale County's CLF was

estimated to decrease by 1,041 persons at a rate of 7%, and Swisher County's CLF was estimated to decrease by 455 persons at a rate of 13%. The states estimated CLF for 2009 was an increase of 19% (USBOC 1990, 2000, and 2011). These estimates have not yet been confirmed by the 2010 Census.

3.5.3 Leading Economic Sectors

Employment in Hale County in 2000 consisted of 15,704 employed civilian persons 16 years of age and over. The major occupations in 2000 included: management, professional, and related occupations; and sales and office occupations. The next leading occupations included production, transportation, and material moving occupations; service occupations; and construction, extraction, and maintenance occupations (USBOC 2011). Table 3-10 presents the number of persons employed in each occupation category during 2000.

Employment in Swisher County in 2000 consisted of 3,332 employed civilian persons 16 years of age and over. The major occupations in 2000 included: management, professional, and related occupations; and sales and office occupations. The next leading occupations included production, transportation, and material moving occupations; service occupations; and construction, extraction, and maintenance occupations (USBOC 2000). Table 3-10 presents the number of persons employed in each leading occupation category during 2000 in Swisher County, Texas.

TABLE 3-10 LEADING OCCUPATIONS IN HALE AND SWISHER COUNTIES, TEXAS

Occupations	Hale County Total	Swisher County Total
Management, professional, and related occupations	4,099	1,129
Sales and office occupations	3,397	646
Production, transportation, and material moving occupations	2,907	565
Service occupations	2,416	506
Construction, extraction, and maintenance occupations	1,282	208
Farming, fishing, and forestry occupations	545	206

Source: USBOC 2011

In 2000, the three industries employing the most people in Hale County were educational, health and social services; retail trade; and manufacturing. In Swisher County, during 2000, the three industries employing the most people were educational, health and social services; agriculture, forestry, fishing and hunting, and mining; and retail trade. Manufacturing was the next industry employing the greatest number of individuals during this year. Table 3-11 presents the number of persons employed in each top employing industry and county in 1990 and 2000. In Hale County, educational, health and social services experienced the greatest and only increase in growth between 1990 and 2000; with an additional 726 employees. In Swisher County, educational, health and social services also experienced the greatest increase in growth between 1990 and 2000; with an additional 229 employees (USBOC 2011).

TABLE 3-11 TOP EMPLOYING INDUSTRIES IN HALE AND SWISHER COUNTIES, TEXAS

Industries	1990	2000
Hale County		
Educational, health, and social services	2,378	3,104
Retail trade	2,627	2,171
Manufacturing	2,033	1,897
Agriculture, forestry, fishing and hunting, and mining	2,072	1,287
Swisher County		
Educational, health, and social services	462	691
Retail trade	849	648
Manufacturing	560	312
Agriculture, forestry, fishing and hunting, and mining	278	279

Source: USBOC 2000 and 2011

3.5.4 Agriculture

Agriculture is an important segment of the economy throughout the Texas Panhandle and is represented mostly by pastureland and cropland. The ability to pump groundwater has enabled farmers in the region to irrigate croplands and increase product yields compared to dryland farming techniques. The aerial photography of the study area (Figure 2-3 in

Appendix C) illustrates the extent of circle pivot irrigation and dryland agriculture areas. The study area is located within the Texas Agricultural Statistics Service District 1, the Northern High Plains Region. Livestock and crops for Hale and Swisher counties include beef cattle and dairy cattle, and sheep; crops include cotton, sorghum for grain, and wheat (NASS 2010).

3.5.5 Community Values

The term "community values" has not been formally defined for regulatory purposes by the PUC but is included as a consideration for transmission line certification under PURA § 37.056(c)(4)(A). In several dockets, the PUC and staff have used the following as a working definition: the term "community values" may be interpreted as a shared appreciation of an area or other natural resource by a national, regional, or local community. The PUC CCN application requires information concerning the following items which may reveal community values:

- Public meeting or public open house;
- Approval or permits required from other governmental agencies;
- Brief description of the area traversed;
- Habitable structures within 300 feet of the centerline for a 115-kV transmission line;
- Amplitude Modulation (AM), Frequency Modulation (FM), microwave, and other electronic installations in the area;
- FAA-registered airstrips, private airstrips, and heliports located in the area;
- Irrigated pasture or croplands utilizing center-pivot or other traveling irrigation systems.

POWER also evaluated the study area for community values that may not be specified by the PUC, but may be of importance to a particular community as a whole. Examples of a community value would be a park or recreational area, historical and archaeological site, or a scenic vista (aesthetics). POWER mailed consultation letters to various local elected and appointed officials, and also participated in a public open house meeting to identify and collect information from the public regarding community values and community resources.

3.6 LAND USE, RECREATION, AND AESTHETICS

3.6.1 Land Use

The study area includes portions of Hale and Swisher counties, Texas, and encompasses the communities of Plainview and Kress. Development is generally concentrated in the cities and along major roadways; however, rural single-family residences and farm operations are scattered throughout the study area along the various farm-to-market roads and ranch roads. Major roadway corridors include Interstate 27, U.S. Highway 87, and State Highway 194.

POWER solicited information from Hale and Swisher counties, independent school districts, and various state and federal agencies regarding environmental and/or land use constraints within the study area (see Appendix A).

3.6.2 Parks and Recreational Areas

Parks and recreational areas are defined by the PUC as areas being owned by a governmental body or an organized group, club, or church. These areas also include those recognized as nationally or regionally significant preservation/recreation areas or as formally designated as unique or undisturbed natural areas.

Federal and state databases and county/local maps were reviewed to identify any parks and/or recreational areas within the study area. Reconnaissance surveys were also conducted to identify any additional park or recreational areas.

Lakeside Park was the only park or recreational area identified within the study area. The park is owned and maintained by the City of Plainview. Lakeside Park covers approximately three acres of open space in northern Plainview and offers recreation activities such as a baseball/softball field, a junior soccer field, and a playground area (Plainview 2011). The park is more than 1,000 feet from the centerline of the alternative routes.

No state, county, or national parks were identified within the study area. Additional recreational activities such as hunting and fishing may occur on private properties throughout the study area, but are not considered to be open to the general public.

3.6.3 Transportation /Aviation

Roadways – Federal, state, and local roadways were identified using TxDOT county transportation maps, Texas Atlas and Gazetteer, 2009, Texas Natural Resource Information System (TNRIS) data, and reconnaissance surveys. The roadway transportation system within the study area includes two major roadways: Interstate 27 and U.S. Highway 87. Numerous Farm-to-Market roads were also identified including 400, 145, 788, 3183, and 1767. Most of the smaller roadways (paved and unpaved) in the study area are county roads and private ranch roads.

TxDOT's "Project Tracker," which contains detailed information by county for every project which is or could be scheduled for construction, was reviewed to identify any state roadway projects planned within the study area. Based on the research findings, portions of Interstate 27 that are within the study area are scheduled for roadway repair and resurfacing (TxDOT 2011).

Aviation – Air facilities reviewed include public and private airports, airstrips, and airfields and heliports. A review of Dallas-Fort Worth Sectional Aeronautical Chart (FAA 2009a) and review of the FAA database were used to identify FAA registered facilities (FAA 2009b). Review of topographical maps, aerial photograph review, and reconnaissance surveys were used to identify private airstrips within the study area. One FAA registered air facility (Joe Vaughn Spraying) was identified within the study area boundaries. This facility is open to the public and has a dirt landing strip. One FAA registered air facility (Hale County Airport) is outside the study area, but is within 20,000 feet of the study area boundary, this facility has two asphalt covered runways. No non-FAA registered private air facilities were identified within the study area or within 10,000 feet of the study area boundaries. No

heliports were identified within the study area or within 5,000 feet of the study area boundaries.

Railways – Two active railways and a railway spur were identified within the study area. The Santa Fe Railway parallels Interstate 27 and U.S. Highway 87 (north of Kress) as it enters the City of Plainview from the north. The Burlington Northern Railroad parallels State Highway 194 within the southwestern section of the study area. One railway spur servicing the Grain Storage Silo facility was located on the east side of Interstate 27 just north of Plainview.

3.6.4 Communication Towers

The Federal Communication Commission (FCC) database was reviewed and one commercial AM radio transmitter and 14 FM and other communication tower types were located within the study area boundaries (FCC 2010). No other communication towers were identified based on aerial photo review or during reconnaissance surveys.

3.6.5 Aesthetic Values

Aesthetics is included as a factor for consideration in the evaluation of transmission facilities in PURA § 37.056(c)(4)(C). There are currently no formal guidelines provided for managing visual resources on private, state, or county owned lands within the study area. For the purposes of this study, the term aesthetics is defined by POWER as the subjective perception of natural beauty in a landscape and the measurement of an area's scenic qualities.

Consideration of the visual environment included a determination of aesthetic values and recreational values (where the location of a transmission line could potentially affect the scenic enjoyment of the area). POWER considered the following aesthetic criteria that combine to give an area its aesthetic identity:

- topographical variation (hills, valleys, etc.);
- prominence of water in the landscape (rivers, lakes, etc.);
- vegetation variety (woodland, meadows, etc.);
- diversity of scenic elements;
- degree of human development or alteration; and
- overall uniqueness of the scenic environment compared with the larger region.

The study area is located on the Llano Estacado, which is a vast plain that extends from the Texas Panhandle, south of the Canadian River, into New Mexico. Historically, this region consisted of vast extensive grasslands with limited surface water availability, but with the advent of groundwater pumping from the underlying Ogallala Aquifer, much of the region has been converted to the largest cotton producing area within the state of Texas. It is renowned for its featureless terrain and is rural with agricultural cropland with prominent pivot irrigation and sparse commercial/industrial and residential developments. The majority of the study area has been impacted by activities associated with agricultural operations and to a lesser extent by the construction of residential structures, roadways, and utility corridors.

No TPWD Great Texas Wildlife Viewing Trails or Texas Heritage Trails were identified within the study area (TPWD 2011 and THC 2011). No National Wild and Scenic Rivers, Historic Trails, National Parks, National Monuments, or National Battlefields are within the study area (NPS 2010, 2011, and NWSRS 2011). No other noteworthy aesthetic resources, designated scenic views, scenic roadways, or unique visual elements were identified within the study area.

3.7 CULTURAL RESOURCES

The evaluation of cultural resources is often a key component for the assessment of community values. Cultural resources include districts, sites, buildings, structures, or objects important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. For this environmental assessment cultural resources have been divided

into three major categories: archaeological resources, architectural resources, and cemeteries.

Archaeological resources – are locations where human activity has measurably altered the earth or left deposits of physical remains (e.g., burned rock middens, stone tools, petrogylphs, house foundations, trash scatters, and trails). Archaeological resources can date to either the prehistoric (Native American) or historic eras.

Architectural resources – include standing buildings (e.g., houses, barns, outbuildings, schools, churches, and intact structures (dams, canals, railroads, bridges, etc.)).

Cemeteries – are places of intentional human interment and can consist of large community burial grounds with many burials, small family plots, or individual grave sites.

3.7.1 Cultural Background

The study area is located on the eastern edge of the Llano Estacado geographical region of the Texas Panhandle and eastern New Mexico (Figure 3-4). This region is virtually void of any noticeable topographic relief with small lake and playa basins, dunes, and dry valleys. The majority of *in situ* Native American archaeological deposits have been recorded in association with these features. Archaeologists have divided the Native American occupation of the Llano Estacado into three main periods: the Paleoindian, Archaic, and Late Prehistoric or Ceramic (Johnson and Holliday 2004).

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Printed November 11, 2011

Source: Mercado- Allinger et. al., 1996

LEGEND

Cultural Resource Planning Region Boundary

County Boundary

KISER - KRESS 115-kV TRANSMISSION LINE PROJECT

FIGURE 3-4
LOCATION OF THE STUDY AREA IN RELATION TO THE CULTURAL RESOURCE PLANNING REGIONS OF TEXAS

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PaleoIndian (ca. 11,500 to ca. 8, 600 years ago) – The Paleoindian Period in the Texas Panhandle has been further subdivided into the Clovis, Folsom, and Late Paleoindian phases based on distinctive projectile point types. The Clovis Period extended from approximately 11,500 to 11,000 years ago during the terminal Late Pleistocene. Thirteen Clovis-period occupation sites have been identified on the Llano Estacado, however, only three have in situ deposits; the Blackwater Draw #1 (Clovis type-site) in New Mexico, the Miami site northeast of Amarillo, and the Lubbock Lake occupation west of Lubbock. Each of these sites contained Clovis-type spear points found in association with mammoth remains indicating that the Clovis population was relying on the animals as an important food base. At the Lubbock Lake site south of the study area, at least six species of extinct megafauna were found exhibiting evidence that the sites were used as butchering or primary kill sites (Johnson and Holliday 2004).

Clovis cultures hunted big game out of base camps for short periods of time, but were highly mobile. Archaeological evidence suggests that groups camped in caves or under rock overhangs during the majority of the year and likely constructed simple shelters out of animal skins, brush, and other readily available natural resources during the winter months (Derrick 2008).

The transition from the Clovis to Folsom Period was marked by a significant climatic and environmental change which continued into Late Paleoindian times. Average summer temperatures warmed while the average winter temperatures dropped with sustained freezing periods. Perennial streams persisted in the lower reaches of most draws and ponds and marshes surrounded by lush vegetation began to form in the upper end of the draws. During this period, large bison thrived and congregated around the playas where food was plentiful the bison became the mainstay diet of the Folsom people (Johnson and Holliday 2004).

The Folsom population increased as indicated by the sharp rise in the number of archaeological sites dating to this period (ca. 10,800 to 10,300 years ago). It also appears from archaeological assemblages at sites such as Lipscomb, Lake Theo, and Lubbock Lake that Folsom people were occupying established camp sites for longer periods of time. Many

of these campsites were in close proximity to the water sources frequented by the bison (Johnson and Holliday 2004).

The Late Paleoindian period (ca. 10,000 to 8,500 years ago) is characterized by a warming and drying trend that began during the Folsom Period. Available water tended to collect in playa basins and salinas (Johnson and Holliday 2004). The Late Paleonindian Period includes both the Plainview (ca. 10,000 years ago) and Firstview (8,600 years ago) occupational phases.

Plainview occupations in good stratigraphic context are known from five sites on, or near, the Llano Estacado. The Plainview type site is located in an abandoned stream channel in Running Water Draw west of Floydada. This site represents at least two large-scale bison kill events with Plainview type lanceolate points intermixed with deep bone beds. Other sites with Plainview points intermixed with substantial bison remains and stratified on top of Folsom age deposits include Ryan's site in Yellowhouse Draw west of Lubbock Lake, Lubbock Lake, Lake Theo, and Mark's Beach in Blackwater Draw west of Plainview. These sites indicate that the Plainview phase was generally a continuation of the earlier Folsom culture. This is represented in the archaeological record by a modified spear point that lacked the characteristic fluting present on the Clovis and Folsom points. The Firstview phase appears to be a later cultural manifestation of the Plainview occupation. Bison hunting near the marshes and playas remained the primary subsistence activity and the period is represented by a modified version of the Plainview points. Sites within the Llano Estacado with a Firstview component include; San Jon and Blackwater Locality #1 in eastern New Mexico and Lubbock Lake (Johnson and Holliday 2004).

Archaic Period (ca. 8,500 to 2,000 years ago) – The Archaic Period in the Texas Panhandle spans the greatest length of time of any of the Native American occupational periods. This 6,500 year period is further divided into Early, Middle, and Late subperiods based on variations in the style of stone tools. Comparatively little is known about the Early Archaic (ca. 8,000 to 6,000 years ago). Only two sites with Early Archaic components have been excavated in the Llano Estacado region; Lubbock Lake, and San Jon in New Mexico.

These sites indicate an increased reliance on plant foods and smaller game, although bison continued to be a major part of the diet (Johnson and Holliday 2004, Dillehay 1974).

By the Middle Archaic, environmental conditions were significantly drier and hotter than during the Early Archaic. Many of the ponds and marshes had dried up and the range vegetation was deteriorating. Water wells discovered at three sites dating to the Middle Archaic (Blackwater Draw Locality #1, Mustang Springs, and Marks Beach) indicate that Middle Archaic populations were finding alternate means of procuring and storing water. Despite the harsh conditions, archaeological evidence indicates that Lubbock Lake had a relatively intensive occupation throughout the period. Multiple activity areas representing camping, bison kill/butchering locales, and ovens likely used for plant processing are found around the lake (Johnson and Holliday 2004).

By around 4,500 years ago, the climate began to shift back to relatively cooler and wetter conditions marking a transition to the Late Archaic period. Range conditions improved and mixed-grass prairie replaced the desert plains grasslands. Localized marshlands returned and springs once again dotted the landscape. Playas and salinas held seasonal to year around water. The more hospitable environment supported an ever increasing population as evidenced by the thousands of archaeological sites dating to this period in sharp contrast to the few sites dating to the Early and Middle periods (Johnson and Holliday 2004, Hughes 1991). During the Late Archaic, the primary mode of subsistence was bison hunting, although there is evidence for hunting smaller game animals as well using wild plants. Site types dating to the Late Archaic include campsites, rockshelters, and bison kill and butchering sites. Projectile points consisted primarily of barbed dart points which were significantly smaller than the large spear points used during the Paleoindian period (Hughes 1991).

Late Prehistoric or Ceramic Period (ca. 2,000 to 500 years ago) – The Late Prehistoric period represented a time of greater residential stability and cultural innovation. Although hunting and gathering remained the primary mode of subsistence in the region, a hospitable environment and secure resource base allowed for a transition towards a village-gardener lifestyle where populations tended to remain in one place for longer periods of time. One of

the hallmarks of the period was the introduction of Mogollon brownware and Woodland cordmarked pottery around 1,800 years ago. The bow and arrow was also introduced during this period along with small barbed arrow points and later side-notched triangular points. Pithouses were common on the south plains of the panhandle early in the period and then made a transition to surface residential structures around 800 years ago. There is also some evidence for limited agriculture. Preferred campsite locations were near active or abandoned stream channels as they were during the Archaic (Hughes 1991).

Three Late Prehistoric culture complexes occur on the Llano Estacado: Lake Creek on the northern edge, Palo Duro on the eastern edge, and Eastern Jornada on the southwest margins. The complex closest to the current study area was the Palo Duro which overlapped parts of eastern Swisher and Hale counties (Boyd 2004).

The Palo Duro complex lasted from ca. 1,800 to 1,000 years ago and ranged from roughly Potter and Carson counties to the north, Borden and Scurry counties to the south, Hale and Swisher counties to the west and Hall and Motley counties to the east. Artifact assemblages typical of the Palo Duro include small arrow points (Deadman's and Scallorn), Brownware ceramics, slab metates, cobble manos, mortars and pestles, ovate knives, and some bone tools. Site types are generally small open campsites, rockshelters, or pithouses along the eastern margin of the Texas Panhandle (Cruse 1992).

The second part of the Late Prehistoric (ca. 1,000 to 800 years ago) is characterized by an intermingling of Puebloan trade pottery and Plains lithic tool types indicating that trade networks had been developed throughout the region. Sites were also exhibiting a much greater variety in the species of animal bones and number of grinding implements indicating a broadened resource base with a greater dependency on processed plant foods. Intentional human burials were also common by this time (Boyd 2004).

Historic – One of the earliest accounts of Euroamerican contact with the Native population occurred as Spanish explorer Francisco Vasquez de Coronado crossed the northern Llano Estacado and Panhandle Plains between 1540 and 1542. His expedition was undoubtedly followed by subsequent expeditions as evidenced by the glass trade beads, European-made

ceramics and metal arrow points found in archaeological assemblages dating to the mid and late 1500s. Modern horse remains are also occasionally found in early historic period sites, some with evidence they had been butchered as a game animals (Johnson and Holliday 2004).

The first substantial Euroamerican occupation of the Texas Panhandle began in the 1870s when professional buffalo hide hunters entered the Panhandle from Kansas. Obvious Native American resentment resulted, and resentful warriors led the Second Battle of Adobe Walls on a buffalo hunter's trading post at Adobe Walls in what is now Hutchinson County in June of 1874. Although the attack failed to overrun the post, the Natives were successful in interrupting the hide trade when the hunters and merchants fled the region for the safety of Dodge City (Rathjen 2011). This altercation resulted in government intervention and the onset of the Red River War of 1874-1875. The war resulted in the relocation of the Southern Plains Indians to reservations in what is now Oklahoma (TSHA 2011).

After the Native American relocation, the Texas Panhandle was opened to full blown Euroamerican settlement. The first to arrive were the Pastores, or sheepmen, typically of Hispanic descent from New Mexico. Numerous groups of Pastores moved onto the Llano Estacado over the next several years and established small settlements consisting of local plazas surrounded by adobe houses. Despite the success of the sheep industry, it quickly gave way to large scale corporate cattle ranching (Rathjen 2011).

In 1880, the first of the major cattle companies to invest in the Texas Panhandle was the Prairie Cattle Company from Scotland that purchased the LIT ranch near Tascosa. It quickly added to the initial herd of 14,000 cattle and 250 horses and by 1882 had expanded the operation to nearly 100,000 head (Anderson 2011). The Capitol Freehold Land and Investment Company was another European conglomerate to invest heavily in the Texas Panhandle cattle industry. Unfortunately, the very success of the cattle ranching industry made it also very vulnerable. Overstocking, bad investments, and unusually severe winters and periods of drought proved to be too much adversity for some ranching organizations to overcome. Those that persevered became a foundation for an industry that remains integral to the economy of the Panhandle today (Rathjen 2011).

The 1880s saw the coming of the Rock Island and Santa Fe Railroad which joined the Fort Worth & Denver Railway in providing a region-wide rail network. Railroad promoters successfully marketed the Texas Panhandle as a rich opportunity for farming and by the early 1900s irrigation techniques had been developed that allowed for productive farming of wheat and cotton. Unfortunately, much like the cattle industry, over investment and production in marginal lands best left for grazing spelled disaster for many during the dust bowl of the 1930s.

At the same time that the agricultural industry was rising and falling, another lucrative economic opportunity was developing. In the early 1920s, the Amarillo Oil Company began drilling for oil. Dixon Creek Oil struck a massive reserve during the mid 1920s in Hutchinson County, Texas and the oil and natural gas industry has thrived in the Panhandle for the past 90 years (Rathjen 2011).

Hale County – The first permanent settlers arrived in the region during the early 1880s as cattle ranchers and farmers who purchased large tracts of land in the northwest corner of the county. In 1886, Z.T. Maxwell settled near two hackberry groves on a military trail established through the region during the Red River War. The town of Plainview eventually grew around Maxwell's homestead and was designated the county seat when Hale County was organized in 1888. Maxwell's original homestead site is designated with a Texas Historical Marker.

Although settlers continued to arrive in Hale County, many enticed by the railroad's promotion of an agricultural haven, making a living proved difficult. Many had purchased single sections of school land under a state promotion. However, drought and insect plagues decimated their small crops and they were forced into cattle-raising which simply wasn't profitable on the small, 360-acre parcels – particularly with giant cattle corporations operating in the Panhandle at the same time. The "Four Section Act" of 1895 helped to solve this problem by allowing the purchase of four contiguous sections of land which made cattle ranching more feasible. By the 1900s, cattle ranching was the center of the region's economy (Rathjen 2011).

Farming expanded greatly after a branch line of the Santa Fe Railroad was built through Hale County in 1907. In 1900, there were 259 small farms operating in the county and by 1910 there were 731 farms growing sorghum, corn, and wheat. In 1911, the county's first motor-driven irrigation well was drilled promising a steady water supply which attracted eastern capital to the area. The Texas Land and Development Company purchased about 60,000 acres around Plainview in 1913 and developed farm tracts, planted fruit trees, grapes, and shade trees, and established an experimental farm staffed with agricultural experts. By selling developed tracts to farmers the Company played an important part in the development of Hale County. By 1920 farming, poultry-raising, and sheep and cattle ranching were all contributing significantly to the local economy. The 1920s also experienced a cotton boom which more than doubled the population of Hale County (Rathjen 2011).

The Great Depression impacted many farmers and ranchers alike during the 1930s, and many lost their land. With the discovery of oil, the development of the manufacturing industry, and resurgence in agribusiness, the Hale County population grew. Today the county's economy continues to be largely based on agriculture.

Swisher County – Much of the early history of Swisher County paralleled that of Hale County. Until the Red River War in 1874 and 1875, the region remained the homeland of the Comanches. Although few battles were fought in Swisher County, the U.S. Army was able to overcome the Natives at the Battle of Palo Duro Canyon and remove them to reservations in Oklahoma. Once the Indian groups had been driven from the Llano Estacado, the buffalo hunters moved in to exterminate what was left of the bison herds (Abbe and Leffler 2011).

With the prairies cleared of the Comanches and bison, the area opened up to Euroamerican settlement. One of the first settlers was Charles Goodnight. In 1883, he expanded his JA Home Ranch into the northeastern part of Swisher County from the Palo Duro Canyon. This expansion led to the establishment of Goodnight's Tule Ranch which occupied the entire eastern part of the county (Abbe and Leffler 2011).

More settlers were attracted by the ranching industry and moved into the region. By 1890 a county government was established and the small settlement of Tulia (named after the Tule Ranch) was chosen as the county seat. The population increased over the next 10 years as stock-farmers used the plentiful shallow ground water. By 1900, there were over 180 ranches and small farms in the county (Abbe and Leffler 2011).

In 1906, a Santa Fe Railroad branch line reached Swisher County from Amarillo and was completed to Plainview and later extended to Lubbuck. The new railroad spurred economic development in Swisher County by easing immigration and connecting the county to national markets. When the line was completed to Lubbock there were 510 stock farms and ranches in the county and crop farming of sorghum, wheat, and corn had become firmly established. Although cattle ranching remained an important part of the local economy during the 1920s, poultry raising and crop farming were quickly surpassing it as the primary industry. The Dust Bowl and Great Depression took a toll on agriculture ventures and the number of farms dropped significantly by 1940 (Abbe and Leffler 2011).

The Ozark Trail, a network of highways stretching from Arkansas and Missouri through Louisiana, Kansas, Oklahoma, to New Mexico, crossed the plains of the Texas Panhandle in 1920 and represented the region's first improved road system. Though initially consisting of just graded dirt roads, the Trail eventually evolved into a sophisticated road system which would include State Highway 86 and U.S. Highway 385 (now U.S. Highway 87 or Interstate 27). Road construction on the new highway system during the 1940s alleviated some of the economic hardship experienced during the Great Depression (Abbe and Leffler 2011).

The demand for agricultural products, and more importantly the development of large-scale irrigation in the area during the 1940s led to a resurgence in the farming industry and the population of Swisher County once again experienced growth. However, with technological advances and agricultural consolidation from the 1950s through the 1980s, fewer individuals were able to make a living and the county population began to decline. Despite the decline in the number of residents, over 400,000 acres were under cultivation of cotton, corn, wheat, and sorghum in the 1980s making it one of the state's most heavily farmed areas. Today

the majority of Swisher County's population resides in small towns including Tulia, Happy, and Kress (Abbe and Leffler 2011).

3.7.2 Records Review

The study area is located within the Plains Cultural Resource Planning Area as shown in Figure 3-4. Historical and archaeological data from the Texas Historical Sites Atlas (THSA) (THSA 2011) and the Texas Archaeological Sites Atlas (TASA) (TASA 2011) were reviewed online to identify the locations of previously documented cultural resources and previously conducted cultural resource investigations within the study area boundaries. Shapefiles of this data were requested from the THC and used to create maps depicting the locations of the cultural resources and previous investigations.

A review of the THSA and TASA files indicated that there are no previously recorded archaeological sites within the study area. One architectural resource, the United Methodist Church in Kress is designated with a Texas Historical Marker. The Kress Cemetery is also within the study area boundary and it has been designated as a Historic Texas Cemetery. There are no National Historic Landmarks, Recorded Texas Historic Landmarks, State Archaeological Landmarks or additional cemeteries within the study area.

Site probability within the study area was assessed separately for prehistoric and historic sites because the economic and social reasons for selecting particular locations for use or settlement would vary. Native American subsistence was more dependent on close proximity to natural features such as drainages, arroyos, and playa basins that would provide water and attract game animals. Nearby terraces and topographic high points that would provide flats for camping and expansive landscape views affording a hunting or defensive advantage are also considered to have a high probability for containing prehistoric archaeological sites.

Technological advances during the historic period (e.g., wheeled vehicles, well drilling) allowed populations to move farther away from major water sources where they tended to congregate in small settlements connected by a network of roads and trails.

Areas of high probability for prehistoric sites were defined in consultation with THC Section 106 reviewers and review of the Geological Atlas of Texas - Plainview mapsheet (BEG 1992). Secondary terraces along existing and extinct stream channels have a high probability for containing prehistoric cultural resources as do playa margins. Areas where there are intact Holocene-era sediments, arroyos, and the edge of terraces above floodplains are also likely to have a high probability for containing prehistoric cultural resources. Both plowed fields and unplowed areas can have an equally high probability for prehistoric archaeological sites depending on soil depth. High probability areas for prehistoric resources were delineated on topographic maps and are taken into consideration during the development of the preliminary alternative routes.

Historic archaeological sites are also likely to be found near water sources in close proximity to existing or historic town sites and roads. Architectural sites and cemeteries are also more likely to be located within or near historic communities.

3.7.3 Previous Investigations

A review of the TARL records indicated that four cultural resource investigations have been previously conducted within the study area. These investigations consisted of small linear surveys conducted along Segment K and west of Segment K2, and two block acreage surveys near the southern edge of the study area boundary (see Figure 2-3 in Appendix C).

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4.0 ENVIRONMENTAL IMPACTS OF THE ALTERNATIVE ROUTES

Evaluation of the potential impacts of the 11 alternative routes identified in Section 2.0 (see Table 2-3) was conducted by tabulating the data of the evaluation criteria for each alternative route segment and alternative route (Tables 4-1 and 4-2). The data were used for quantitative analysis for comparison of the potential impacts of each alternative route as discussed in this section. Additionally, through the identification of key evaluation criteria as discussed in Section 6.0, public input, and a consensus process that consisted of POWER environmental specialists, POWER further compared the potential impacts and provided a recommendation of the route that it believes best addresses the requirements of PURA and PUC Substantive Rules (see Section 6.0).

The alternative routes were compared with respect to potential impacts to community values, park and recreational areas, cultural resources, aesthetics, and environmental integrity. The results of the analysis are provided in Table 4-2. This section provides a summary and discussion of the comparison of the 11 alternative routes.

4.1 IMPACTS ON PHYSIOGRAPHY AND GEOLOGY

Construction of the proposed transmission line is not anticipated to have any significant adverse effects on the physiographic or geologic features/resources of the area. Erection of the monopole structures will require the excavation and/or minor disturbance of small quantities of near-surface materials, but should have no measurable impacts on the geologic resources or features along any of the alternative routes. No geologic hazards are anticipated to be created. No geologic hazards including hazardous waste sites were identified within the study area.

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TABLE 4-1
ENVIRONMENTAL DATA FOR ROUTE EVALUATION (SEGMENTS)
KISER TO KRESS 115-kV TRANSMISSION LINE PROJECT
1/29/2012

	EVALUATION CRITERIA	SEGMENT																										
	Land Use	**A**	**A2**	**B**	**C**	**D2**	**E1**	**E3**	**G2**	**G3**	**H1**	**I1**	**I3**	**J**	**J2**	**J3**	**K**	**K2**	**L2**	**L3**	**M1**	**M2**	**M3**	**N**	**N1**	**N2**	**O**	**O2**
1.	Length of alternative route (feet)	21,207	5,261	9,508	31,604	2,649	10,572	10,662	20,153	2,165	6,544	28,528	13,055	6,657	8,160	5,191	16,781	8,168	7,956	1,055	10,458	5,162	529	13,439	20,998	3,120	4,335	1,316
2.	Length of alternative route (miles)	4.0	1.0	1.8	6.0	0.5	2.0	2.0	3.8	0.4	1.2	5.4	2.5	1.3	1.5	1.0	3.2	1.5	1.5	0.2	2.0	1.0	0.1	2.5	4.0	0.6	0.8	0.2
3.	Total number of habitable structures[1] within 300 feet of ROW centerline	2	3	0	1	0	2	0	7	1	0	1	0	0	9	0	5	17	66	0	0	11	2	1	2	1	0	0
4.	Length of ROW parallel and adjacent to apparent property boundaries[2]	15,166	4,973	5,211	23,619	2,649	10,026	5,675	18,094	2,005	6,058	23,608	9,813	6,203	4,205	5,191	14,744	651	206	1,055	10,458	4,094	529	12,661	20,830	2,130	4,005	1,316
5.	Length of ROW using existing compatible ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7,636	0	0	0	0	0	0	0	0	0
6.	Length of ROW parallel and adjacent to existing transmission line ROW	0	0	0	6,659	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.	Length of ROW parallel and adjacent to existing pipelines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8.	Total length of route parallel and adjacent to existing corridors (including apparent property boundaries)	15,166	4,973	5,211	30,278	2,649	10,026	5,675	18,094	2,005	6,058	23,608	9,813	6,203	4,205	5,191	14,744	651	206	1,055	10,458	4,094	529	12,661	20,830	2,130	4,005	1,316
9.	Percentage of route parallel and adjacent to existing corridors (including apparent property boundaries)	72%	95%	55%	96%	100%	95%	53%	90%	93%	93%	83%	75%	93%	51%	100%	88%	8%	3%	100%	100%	79%	100%	94%	99%	68%	92%	100%
10.	Number of parks/recreational areas[3] within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11.	Length of ROW through cropland	7,922	4,727	7,157	12,852	928	5,620	4,379	9,424	1,278	1,417	1,174	4,247	5,853	6,077	0	10,360	1,035	443	685	4,954	1,817	529	6,224	13,076	1,083	3,007	927
12.	Length of ROW through pasture/rangeland	9,359	68	1,238	14,156	0	4,021	3,662	5,985	727	3,480	8,821	7,817	0	1,787	5,191	4,036	6,212	5,185	285	5,178	2,576	0	5,453	7,664	1,439	431	309
13.	Length of ROW through land irrigated by traveling systems (rolling or pivot type)	3,627	0	780	3,148	1,608	0	2,417	4,156	0	1,380	6,704	767	684	0	0	1,682	0	0	0	0	0	0	1,320	0	0	808	0
14.	Number of pipeline crossings	1	1	1	1	1	1	0	0	0	1	1	0	0	2	0	0	0	0	0	1	1	0	0	1	0	0	1
15.	Number of transmission line crossings	2	1	1	2	0	0	1	0	0	0	0	1	0	1	0	1	1	1	0	1	0	0	1	1	0	0	0
16.	Number of railroad crossings	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17.	Number of Interstate, U.S. and State highway crossings	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
18.	Number of farm-to-market (FM) and ranch road (RR) crossings	1	0	1	0	0	0	1	5	0	1	1	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0
19.	Number of cemeteries within 1,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1
20.	Number of private airstrips within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21.	Number of heliports within 5,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22.	Number of FAA registered airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline	0	1	1	1	0	1	0	0	0	0	0	0	1	1	0	1	1	1	1	0	1	1	1	1	1	1	1
23.	Number of FAA registered airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24.	Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0
25.	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	2	1	0	1	1	0	0	1	0	0
	Aesthetics																											
26.	Estimated length of ROW within foreground visual zone[4] of Interstate, U.S. and State highways	0	0	0	13,505	0	8,565	0	0	0	0	0	0	0	574	0	2,461	0	0	0	0	5,162	0	0	0	3,120	4,335	1,316
27.	Estimated length of ROW within foreground visual zone[4] of FM roads	5,032	0	4,452	3,103	0	0	5,150	16,825	0	5,152	4,317	0	2,461	0	0	16,781	5,893	6,677	0	0	0	0	0	0	0	3,043	0
28.	Estimated length of ROW within foreground visual zone[4] of parks/recreational areas[3]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ecology																											
29.	Length of ROW across NWI mapped wetlands	1,485	0	0	1,325	0	0	766	926	0	449	0	835	0	0	0	1,286	1,239	0	0	0	598	0	462	0	147	0	0
30.	Length of ROW across known habitat of federally listed endangered or threatened species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31.	Length of ROW across open water (lakes, ponds)	0	0	0	196	0	0	0	0	0	0	129	0	0	65	0	182	0	0	0	0	246	0	0	0	115	0	0
32.	Length of ROW across playa lakes	955	0	0	1,154	0	0	961	992	0	286	1,082	631	0	0	0	1,333	791	0	0	0	0	0	981	0	0	0	0
33.	Number of stream crossings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
34.	Number of river crossings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35.	Length of ROW parallel (within 100 feet) to streams or rivers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	315	0	0
36.	Length of ROW across 100-year floodplain	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cultural Resources																											
37.	Number of recorded historic or prehistoric sites crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38.	Number of additional recorded historic or prehistoric sites within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1
39.	Number of National Register listed or determined eligible sites crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40.	Number of additional National Register listed or determined eligible sites within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41.	Length of ROW through areas of high archaeological/historic site potential	2,991	0	1,792	2,155	0	0	0	0	0	1,420	4,533	1,459	0	0	638	0	0	0	0	0	1,099	0	2,379	4,512	0	607	642

[1]Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230 kV or less.

[2] Apparent property boundaries created by existing roads, highway, or railroad ROW are not "double-counted" in the length of ROW parallel to apparent property boundaries criteria.

[3] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church.

[4] One-half mile, unobstructed.

Note: All length measurements in feet unless noted otherwise. All linear measurements were obtained from aerial photography flown in October 2010, with the exception of high probability areas for archaeological historical/resources which were measured from the USGS Topographic Quadrangles.

TABLE 4-1
ENVIRONMENTAL DATA FOR ROUTE EVALUATION (SEGMENTS)
KISER TO KRESS 115-kV TRANSMISSION LINE PROJECT
1/29/2012

	EVALUATION CRITERIA	SEGMENT													
	Land Use	**P**	**P2**	**Q1**	**S1**	**S2**	**T**	**T2**	**U2**	**V**	**V2**	**W**	**W2**	**Y**	**Y1**
1.	Length of alternative route (feet)	5,982	7,383	13,146	2,354	5,104	15,047	4,121	1,906	5,744	8,712	5,582	2,523	6,562	19,119
2.	Length of alternative route (miles)	1.1	1.4	2.5	0.4	1.0	2.8	0.8	0.4	1.1	1.6	1.1	0.5	1.2	3.6
3.	Total number of habitable structures[1] within 300 feet of ROW centerline	0	1	1	1	1	2	0	0	1	1	2	0	2	5
4.	Length of ROW parallel and adjacent to apparent property boundaries[2]	0	7,057	12,099	2,354	4,531	12,131	0	1,906	5,744	8,259	2,472	2,300	6,197	14,836
5.	Length of ROW using existing compatible ROW	0	0	0	0	0	0	0	0	0	0	1,415	0	0	0
6.	Length of ROW parallel and adjacent to existing transmission line ROW	0	0	0	0	0	0	0	0	0	0	694	0	0	0
7.	Length of ROW parallel and adjacent to existing pipelines	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8.	Total length of route parallel and adjacent to existing corridors (including apparent property boundaries)	0	7,057	12,099	2,354	4,531	12,131	0	1,906	5,744	8,259	3,166	2,300	6,197	14,836
9.	Percentage of route parallel and adjacent to existing corridors (including apparent property boundaries)	0%	96%	92%	100%	89%	81%	0%	100%	100%	95%	57%	91%	94%	78%
10.	Number of parks/recreational areas[3] within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11.	Length of ROW through cropland	5,835	2,838	10,424	2,354	0	9,616	0	0	0	5,887	0	1,629	1,248	13,875
12.	Length of ROW through pasture/rangeland	0	3,962	0	0	4,900	3,825	4,121	1,780	5,724	2,737	4,541	0	5,047	3,155
13.	Length of ROW through land irrigated by traveling systems (rolling or pivot type)	0	0	2,413	0	0	1,360	0	0	0	0	0	644	0	1,088
14.	Number of pipeline crossings	1	1	0	0	1	1	0	0	0	0	1	0	0	1
15.	Number of transmission line crossings	0	0	1	0	0	0	0	0	0	0	0	0	0	0
16.	Number of railroad crossings	0	1	0	0	0	0	0	0	0	0	0	0	0	0
17.	Number of Interstate, U.S. and State highway crossings	0	1	0	0	0	0	0	0	0	0	0	0	0	0
18.	Number of farm-to-market (FM) and ranch road (RR) crossings	0	0	1	0	0	0	0	0	0	0	0	0	0	0
19.	Number of cemeteries within 1,000 feet of the ROW centerline	1	0	0	0	0	0	0	0	1	0	0	0	0	0
20.	Number of private airstrips within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21.	Number of heliports within 5,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22.	Number of FAA registered airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline	1	0	0	0	1	1	1	1	1	1	1	1	1	0
23.	Number of FAA registered airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24.	Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25.	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	0	1	0	0	1	0	0	0	1	0	1	0	0	0
	Aesthetics														
26.	Estimated length of ROW within foreground visual zone[4] of Interstate, U.S. and State highways	2,507	2,797	0	0	0	2,421	0	0	5,744	0	0	0	0	456
27.	Estimated length of ROW within foreground visual zone[4] of FM roads	0	0	7,905	0	2,473	0	0	0	0	0	5,158	0	0	0
28.	Estimated length of ROW within foreground visual zone[4] of parks/recreational areas[3]	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ecology														
29.	Length of ROW across NWI mapped wetlands	0	0	0	0	0	0	0	0	815	0	0	0	0	1,455
30.	Length of ROW across known habitat of federally listed endangered or threatened species	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31.	Length of ROW across open water (lakes, ponds)	0	0	0	0	204	0	0	0	0	0	0	0	0	117
32.	Length of ROW across playa lakes	0	0	503	0	0	0	0	0	1,024	0	0	0	0	756
33.	Number of stream crossings	0	0	0	0	1	0	0	0	0	0	1	0	0	0
34.	Number of river crossings	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35.	Length of ROW parallel (within 100 feet) to streams or rivers	0	326	0	0	0	0	0	0	0	0	0	0	0	0
36.	Length of ROW across 100-year floodplain	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cultural Resources														
37.	Number of recorded historic or prehistoric sites crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38.	Number of additional recorded historic or prehistoric sites within 1,000 feet of ROW centerline	1	0	0	0	0	0	0	0	1	0	0	0	0	0
39.	Number of National Register listed or determined eligible sites crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40.	Number of additional National Register listed or determined eligible sites within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41.	Length of ROW through areas of high archaeological/historic site potential	0	0	0	0	1,200	0	75	0	0	2,208	2,594	96	3,916	1,915

[1]Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230 kV or less.

[2] Apparent property boundaries created by existing roads, highway, or railroad ROW are not "double-counted" in the length of ROW parallel to apparent property boundaries criteria.

[3] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church.

[4] One-half mile, unobstructed.

Note: All length measurements in feet unless noted otherwise. All linear measurements were obtained from aerial photography flown in October 2010, with the exception of high probability areas for archaeological historical/resources which were measured from the USGS Topographic Quadrangles.

TABLE 4-2
ENVIRONMENTAL DATA FOR ROUTE EVALUATION (ROUTES)
KISER TO KRESS 115-kV TRANSMISSION LINE PROJECT
1/29/2012

	EVALUATION CRITERIA	ROUTE										
	Land Use	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1.	Length of alternative route (feet)	147,998	128,712	146,610	137,875	130,817	140,957	138,560	140,786	158,534	126,316	124,754
2.	Length of alternative route (miles)	28.0	24.4	27.7	26.1	24.7	26.7	26.2	26.7	30.0	23.9	23.6
3.	Total number of habitable structures[1] within 300 feet of ROW centerline	46	31	37	34	39	95	76	81	85	97	31
4.	Length of ROW parallel and adjacent to apparent property boundaries[2]	119,654	102,490	108,067	108,446	95,945	116,696	103,446	111,781	124,969	93,264	92,779
5.	Length of ROW using existing compatible ROW	1,415	0	1,415	0	0	7,636	9,051	7,636	7,636	7,636	0
6.	Length of ROW parallel and adjacent to existing transmission line ROW	7,353	0	694	0	0	0	7,353	0	0	6,659	0
7.	Length of ROW parallel and adjacent to existing pipelines	0	0	0	0	0	0	0	0	0	0	0
8.	Total length of route parallel and adjacent to existing corridors (including apparent property boundaries)	127,007	102,490	108,761	108,446	95,945	116,696	110,799	111,781	124,969	99,923	92,779
9.	Percentage of route parallel and adjacent to existing corridors (including apparent property boundaries)	86%	80%	74%	79%	73%	83%	80%	79%	79%	79%	74%
10.	Number of parks/recreational areas[3] within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0
11.	Length of ROW through cropland	50,479	60,157	57,362	73,520	75,934	55,420	52,742	53,274	57,874	60,396	73,813
12.	Length of ROW through pasture/rangeland	64,507	51,555	58,635	45,172	40,954	52,815	66,292	54,532	66,106	47,368	34,891
13.	Length of ROW through land irrigated by traveling systems (rolling or pivot type)	14,816	11,119	13,285	13,833	8,702	14,130	11,161	14,288	16,808	10,518	10,310
14.	Number of pipeline crossings	8	7	10	7	7	7	8	7	9	7	7
15.	Number of transmission line crossings	5	8	6	7	6	5	8	5	7	6	6
16.	Number of railroad crossings	1	1	1	1	1	1	1	1	1	1	1
17.	Number of Interstate, U.S. and State highway crossings	2	2	2	1	1	2	2	2	1	2	2
18.	Number of farm-to-market (FM) and ranch road (RR) crossings	7	6	5	4	4	10	3	8	5	3	4
19.	Number of cemeteries within 1,000 feet of the ROW centerline	0	1	1	0	1	0	1	1	0	0	1
20.	Number of private airstrips within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0
21.	Number of heliports within 5,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0
22.	Number of FAA registered airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline	2	2	2	2	2	2	2	2	2	2	2
23.	Number of FAA registered airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0
24.	Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline	1	1	1	1	1	1	1	1	1	1	1
25.	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	3	3	4	2	3	4	4	4	4	4	3
	Aesthetics											
26.	Estimated length of ROW within foreground visual zone[4] of Interstate, U.S. and State highways	25,799	14,029	8,998	11,442	17,846	14,755	25,073	8,424	11,560	26,829	8,880
27.	Estimated length of ROW within foreground visual zone[4] of FM roads	40,812	45,697	35,056	26,453	28,334	54,568	33,509	37,205	28,801	28,351	28,334
28.	Estimated length of ROW within foreground visual zone[4] of parks/recreational areas[3]	0	0	0	0	0	0	0	0	0	0	0
	Ecology											
29.	Length of ROW across NWI mapped wetlands	4,088	4,273	3,063	5,407	4,737	2,810	3,073	1,535	3,162	4,144	4,069
30.	Length of ROW across known habitat of federally listed endangered or threatened species	0	0	0	0	0	0	0	0	0	0	0
31.	Length of ROW across open water (lakes, ponds)	775	501	513	321	386	761	515	448	398	828	436
32.	Length of ROW across playa lakes	4,019	4,219	4,101	4,947	5,016	3,407	3,249	3,055	4,265	3,374	3,992
33.	Number of stream crossings	3	2	3	1	1	2	3	2	1	2	2
34.	Number of river crossings	0	0	0	0	0	0	0	0	0	0	0
35.	Length of ROW parallel (within 100 feet) to streams or rivers	326	641	641	0	0	326	641	641	0	326	641
36.	Length of ROW across 100-year floodplain	0	0	0	0	0	0	0	0	0	0	0
	Cultural Resources											
37.	Number of recorded historic or prehistoric sites crossed by ROW	0	0	0	0	0	0	0	0	0	0	0
38.	Number of additional recorded historic or prehistoric sites within 1,000 feet of ROW centerline	0	1	1	0	1	0	1	1	0	0	1
39.	Number of National Register listed or determined eligible sites crossed by ROW	0	0	0	0	0	0	0	0	0	0	0
40.	Number of additional National Register listed or determined eligible sites within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0
41.	Length of ROW through areas of high archaeological/historic site potential	17,338	10,350	19,068	10,693	9,494	12,077	13,286	14,554	15,369	10,988	9,494

[1]Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230 kV or less.

[2] Apparent property boundaries created by existing roads, highway, or railroad ROW are not “double-counted” in the length of ROW parallel to apparent property boundaries criteria.

[3] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church.

[4] One-half mile, unobstructed.

Note: All length measurements in feet unless noted otherwise. All linear measurements were obtained from aerial photography flown in October 2010, with the exception of high probability areas for archaeological historical/resources which were measured from the USGS Topographic Quadrangles.

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4.2 IMPACTS ON SOIL

4.2.1 Soils

Activities associated with the construction, operation, and maintenance of electrical transmission lines typically do not adversely impact soils when appropriate mitigative measures are implemented during the construction phase. Potential impacts to soils include erosion, compaction, and conversion of prime farmland soils.

The highest risk for soil erosion and compaction is primarily associated with the construction phase of a project. In accordance with SPS standard construction specifications, ROW clearing of woody vegetation including trees, brush, and undergrowth would be conducted within the primary ROW area (70 feet wide). Areas with vegetation removed would have the highest potential for soil erosion and the movement of heavy equipment along the cleared ROW creates the greatest potential for soil compaction. Prior to construction, SPS would develop a SWPPP to minimize potential impacts associated with soil erosion, compaction, and off ROW sedimentation. Implementation of this plan would incorporate temporary and permanent BMPs to minimize soil erosion on the ROW during significant rainfall events. The SWPPP would also establish the criteria for mitigating soil compaction and re-vegetation to ensure adequate soil stabilization during the construction and post construction phases. The native herbaceous layer of vegetation would be maintained, to the extent practical, during construction and most cleared areas with a low erosion potential would be allowed to re-vegetate with native herbaceous species. Areas with a high erosion potential, including steep slopes and areas with shallow topsoil, may require seeding and/or implementation of permanent BMPs (i.e., soil berms or interceptor slopes) to stabilize disturbed areas and minimize soil erosion potential during the post construction phase. The ROW will be inspected during and post construction to ensure that potential high erosion areas are identified and appropriate BMPs are implemented and maintained.

4.2.2 Prime Farmland

The NRCS replied to the project consultation letter: “This project should have no significant adverse impact on the environment or natural resources in the areas. We do not require any permits, easements, or approvals for activities such as this” (see Appendix A).

Typically, the construction of a transmission line is not considered a conversion of prime farmlands. While the study area may contain Prime and other Important Farmland Soils, the project would be considered exempt from the Farmland Protection Policy Act. No conversions of prime or state important soils are anticipated related to project activities for any of the alternative routes.

Potential impacts to soils, primarily erosion and compaction, would be minimized with the development and implementation of a SWPPP. The magnitude of potential soil impacts are considered equivalent for all of the alternative routes.

4.3 IMPACTS ON WATER RESOURCES

4.3.1 Surface Waters

Only one named surface water, Rock Draw, was identified within the study area. Alternative Routes utilizing Segments M2, N2, S2, or W will cross this stream. Additional surface waters identified include numerous ephemeral playa lakes. No major lakes, rivers or reservoirs are crossed by any of the alternative routes. SPS proposes to span all surface waters and playa lakes crossed by any of the alternative routes. None of the surface waters identified within the study area exceed the typical span widths (500 to 800 feet) of the 115-kV transmission line monopole design. Monopole structures would be located outside of the ordinary high water marks at stream crossings. Hand-cutting of woody vegetation within the ordinary high water marks would be implemented to minimize impacts. The shorter understory and herbaceous layers of vegetation would remain, where allowable, and BMPs would be implemented in accordance with the SWPPP to reduce the potential for sedimentation outside of the ROW.

Playa lake crossing lengths range from 3,055 feet for Alternative Route 8, to 5,016 feet for Alternative Route 5. The length of ROW across playa lakes for the remaining alternative routes is described below in ascending order:

- Alternative Route 7 with 3,249 feet;
- Alternative Route 10 with 3,374 feet;
- Alternative Route 6 with 3,407 feet;
- Alternative Route 11 with 3,992 feet;
- Alternative Route 1 with 4,019 feet;
- Alternative Route 3 with 4,101 feet;
- Alternative Route 2 with 4,219 feet;
- Alternative Route 9 with 4,265 feet; and
- Alternative Route 4 with 4,947 feet;

The length of each route parallel (within 100 feet) to streams (Rock Draw) ranged from zero feet for Alternative Routes 4, 5, and 9, to 641 feet for Alternative Routes 2, 3, 7, 8, and 11. Alternative Routes 1, 6, and 10 parallel Rock Draw for 326 feet.

Open waters crossed by the alternative routes are attributed to crossing the playa lakes. Alternative route lengths crossing open waters range from 321 feet for Alternative Route 4, to 828 feet for Alternative Route 10. SPS plans to span all surface waters, therefore no direct impacts to these surface waters are anticipated for any of the alternatives. The length of ROW across playa lakes for the remaining alternative routes is described below in ascending order:

- Alternative Route 5 with 386 feet;
- Alternative Route 9 with 398 feet;
- Alternative Route 11 with 436 feet;
- Alternative Route 8 with 448 feet;
- Alternative Route 2 with 501 feet;
- Alternative Route 3 with 513 feet;

- Alternative Route 7 with 515 feet;
- Alternative Route 6 with 761 feet; and
- Alternative Route 1 with 775 feet.

The FEMA mapped floodplain area is associated with Rock Draw and several of the playa lakes located throughout the study area. Engineering considerations should alleviate the potential of construction activities to adversely impact the floodplain and proper monopole placement would minimize any flow impedance during a major flooding event. If monopole structures are to be located within the flood hazard area, then SPS will coordinate with the appropriate floodplain administrator for Hale and Swisher counties.

4.3.2 Ground Water

Construction, operation, and maintenance of the proposed transmission line are not anticipated to adversely affect groundwater resources within the study area. During construction activities, another potential impact to both surface water and groundwater resources is related to potential fuel and/or other chemical spills. As a component of the SWPPP, standard operating procedures and spill response specifications relating to petroleum product storage, refueling, and maintenance activities of equipment are provided to avoid and minimize potential contamination to water resources.

4.4 IMPACTS ON ECOSYSTEMS

4.4.1 Terrestrial Vegetation

Potential impacts to vegetation would result from clearing the ROW of woody vegetation and/or mowing/clearing herbaceous vegetation. These activities facilitate ROW access for monopole construction, line stringing, and future maintenance activities. The proposed ROW width for the 115-kV transmission line is 70 feet. Removal of woody vegetation within the ROW would be limited to establish the required conductor to ground clearances, and to facilitate construction and future maintenance operations. Mowing and/or shredding of herbaceous vegetation may be required within grasslands or pasturelands. Future ROW

maintenance activities may include periodic mowing and/or herbicide applications to maintain an herbaceous vegetation layer within the ROW.

Impacts to vegetation would be limited to a 70-foot wide ROW that is necessary for the construction, operation, and maintenance of the proposed transmission line. ROW clearing activities would be completed while minimizing the impacts to existing groundcover vegetation when practical. All the alternative routes primarily cross areas of pastureland, cropland, or grassland which are currently maintained in an herbaceous vegetation stratum. The construction of any of the alternative routes is not anticipated to alter the current vegetation composition or use by wildlife as cover and forage.

4.4.2 Aquatic/Hydric

NWI mapped wetland types identified within the study area include PEM and Pf mapped wetlands that are associated with the playa lakes and Rock Draw. Measurements (linear feet) were taken at the intersections of each proposed alternative route with NWI mapped wetland areas and at surface water crossings. This methodology established a conservative estimate of potential impacts accounting for any unmapped wetland areas associated with the surface water crossings. Alternative route lengths crossing mapped wetlands ranged from 1,535 for Alternative Route 8, to 5,407 feet for Alternative Route 4. The length of ROW across NWI mapped wetlands for the remaining alternative routes is described below in ascending order:

- Alternative Route 6 with 2,810 feet;
- Alternative Route 3 with 3,063 feet;
- Alternative Route 7 with 3,073 feet;
- Alternative Route 9 with 3,162 feet;
- Alternative Route 11 with 4,069 feet;
- Alternative Route 1 with 4,088 feet;
- Alternative Route 10 with 4,144 feet;
- Alternative Route 2 with 4,273 feet; and
- Alternative Route 5 with 4,737 feet.

Overall, none of the alternative routes are anticipated to have a significant impact on mapped wetlands. SPS plans to span all wetlands areas. Many of the mapped wetlands identified within the study area (playa lakes) are not anticipated to be jurisdictional under the USACE since they are considered isolated if they do not have an interconnection with waters of the U.S.

4.4.3 Endangered and Threatened Plant Species

No USFWS or TPWD special status plant species were listed for Hale County. The mud plantain was listed as rare for Swisher County by TPWD. It is associated with the margins of the playa lakes. As previously mentioned, SPS plans to span all the playa lakes; therefore, no potential impacts are anticipated to this species from the construction of any of the alternative routes. Construction of any of the alternative routes is not anticipated to adversely impact any threatened, endangered, or rare plant species.

4.4.4 Wildlife

The primary impacts of construction activities on terrestrial wildlife species are typically associated with temporary disturbances from construction activities and with the removal of vegetation (habitat modification/fragmentation). Increased noise and equipment movement during construction may temporarily displace mobile wildlife species from the immediate workspace area. These impacts are considered short-term and normal wildlife movements would be expected to resume after construction is completed. Potential long-term impacts include those resulting from habitat modifications and/or fragmentation.

Construction activities may also impact small, immobile, or fossorial (living underground) animal species through incidental takes or the alteration of local habitats. Incidental takes of these species may occur due to equipment or vehicular movement on the ROW by direct impact or due to the compaction of the soil if the species is fossorial. Potential impacts of this type are not typically considered significant and are not likely to have an adverse effect on any species' population dynamics.

If ROW clearing occurs during the nesting season, potential impacts could occur within the ROW area related to potential takes of migratory bird eggs and/or nestlings. Increases in noise and equipment activity levels during construction could also potentially disturb breeding or other activities of species nesting in areas immediately adjacent to the ROW. SPS proposes to complete all ROW clearing and construction activities compliant with the MBTA to avoid or minimize these potential impacts.

Transmission lines also can present additional hazards to birds due to electrocutions and/or collisions. Measures can be implemented to minimize these risks with transmission line engineering designs. The electrocution risk to birds should not be significant since the engineering design distance between conductors, conductor to structure, or conductor to ground wire for the proposed 115-kV transmission line is greater than the wingspan of any bird typically within the area (i.e., greater than eight feet). The monopole structures and lines could be a collision hazard to birds in flight, especially if the line is located near playa lakes. These lakes are seasonally inundated and support large numbers of migrating waterfowl throughout the region. The USFWS and TPWD both recommend the installment of bird flight diverters or markers on the lines to reduce the collision risk while adjacent to playa lakes or surface waters (refer to Appendix A).

Construction of the proposed transmission line is not anticipated to directly adversely impact wildlife and fisheries within the study area. While highly mobile animals may temporarily be displaced from habitats near the ROW during the construction phase, normal movement patterns should return after project construction is complete.

4.4.5 Endangered and Threatened Wildlife

None of the alternative routes cross any known critical habitat for federally listed species. Review of the TXNDD database did not indicate any previous occurrences of any federally listed special status species or listed state species. The TXNDD report did document several occurrences of swift fox within the Running Water Draw area, but construction of the transmission line is not anticipated to adversely impact this species. No other known occurrences of special status species or rare natural communities listed were identified

within the study area. No potential impacts are anticipated to listed species from the construction of any of the alternative routes.

It should be noted that the TXNDD database is not a conclusive measure of the potential for a special status species to occur within the study area. Only a field survey of the PUC-approved route can measure the suitability of the habitat and determine the likelihood of the presence of listed species. In addition, only a species specific survey within areas of suitable habitat can determine the presence/absence of a listed species within those areas. After the PUC approves a route, SPS will complete a habitat suitability survey of the route to determine the likelihood for listed species presence and may have additional consultations with USFWS and TPWD, as necessary. Mitigative measures to avoid and/or minimize the risk of incidental takes may be required during construction and maintenance activities.

4.5 IMPACTS ON AQUATIC ECOSYSTEMS

Potential impacts to aquatic systems would include effects of erosion, siltation, and sedimentation. Vegetation clearing of the ROW may result in increased suspended solids entering surface waters traversed by the transmission line. Increases in suspended solids may adversely affect aquatic organisms that require relatively clear water for foraging and/or reproduction. Implementation of the SWPPP would minimize these potential impacts.

Physical aquatic habitat loss or alteration could result wherever riparian vegetation is removed or construction is planned within a playa lake. Increased levels of siltation or sedimentation may also potentially impact downstream areas primarily affecting filter feeding benthic and other aquatic invertebrates. SPS plans to span all playa lakes and surface waters and no significant adverse impacts are anticipated to any aquatic habitats crossed or adjacent to the ROW for any of the alternative routes.

4.6 IMPACTS ON SOCIOECONOMICS

Construction and operation of the proposed transmission line is not anticipated to result in a significant change in the population or employment rate within the study area. Construction

workers for the project would likely commute to the work site on a daily or weekly basis instead of permanently relocating to the area. The temporary workforce increase would likely result an increase in local retail sales due to purchases of lodging, food, fuel, and other merchandise for the duration of construction activities. No additional staff would be required for line operations and maintenance.

4.6.1 Community Values

Potential impacts to community resources can be classified into direct and indirect effects. Direct effects are those that would occur if the location and construction of a transmission line results in the removal or loss of public access to a valued resource. Indirect effects are those that would result from a loss in the enjoyment or use of a resource due to the characteristics (primarily aesthetic) of the proposed transmission line, structures or ROW. Impacts on community values, whether direct or indirect, can be more accurately gauged as they affect recreational areas or resources and the visual environment of an area (aesthetics). Impacts in these areas are discussed in detail in Sections 4.7.2 and 4.7.5 of this report.

4.7 IMPACTS ON LAND USE, RECREATION, AND AESTHETICS

4.7.1 Land Use

The magnitude of potential impacts to land use resulting from the construction of a transmission line is determined by the amount of land (land use type) temporarily or permanently displaced by the actual ROW and by the compatibility of the facilities with adjacent land uses. During construction, temporary impacts to land uses within the ROW may occur due to the movement of workers, equipment, and materials through the area. Construction noise and dust, as well as temporary disruptions of traffic flow, may also temporarily affect local residents and businesses in the area immediately adjacent to the ROW. Coordination between SPS, their contractors, and landowners regarding ROW access and construction scheduling should minimize these disruptions.

The evaluation criteria considered to compare potential land use impacts include overall route length, route length parallel to existing linear corridors (including apparent property boundaries), route proximity to habitable structures, potential impacts to parks and recreational areas, and route length across different land use types. An analysis of the existing land use adjacent to the proposed ROW is required to evaluate potential impacts. The following sections discuss the potential impacts to land use associated with the 11 alternative routes.

4.7.1.1 Alternative Route Length

The total length of the alternative routes range from 23.6 miles for Alternative Route 11, to 30.0 miles for Alternative Route 9. The differences in total route lengths reflect the direct or indirect path of each alternative route between the project endpoints. The length of the alternative routes also reflects the effort to parallel apparent property boundaries, and other existing linear features. A summary of the total lengths for the remaining alternative routes is provided below:

- Alternative Route 10 at 23.9 miles;
- Alternative Route 2 at 24.4 miles;
- Alternative Route 5 at 24.7 miles;
- Alternative Route 4 at 26.1 miles;
- Alternative Route 7 at 26.2 miles;
- Alternative Route 6 at 26.7 miles;
- Alternative Route 8 at 26.7 miles;
- Alternative Route 3 at 27.7 miles; and
- Alternative Route 1 at 28.0 miles.

4.7.1.2 Compatible ROW

P.U.C. SUBST. R. 25.101(b)(3)(B) requires that the PUC consider whether new transmission line routes are within and/or are parallel to existing compatible ROWs, apparent property lines, or other natural features. POWER evaluated and compared the alternative routes on

the length of the routes that utilize or parallel these features. The use of existing compatible ROW typically minimizes the potential impacts to environmental and land use issues to the greatest extent feasible by requiring less new ROW, less clearing of vegetation and fewer new impacts to existing land uses since the area is already disturbed. Routes which parallel linear features typically minimize impacts by reducing habitat fragmentation and providing access.

Alternative Segment L2 is proposed to overbuild an existing 69-kV transmission line using existing compatible ROW. A portion of Alternative Segment W is also proposed as a 69-kV overbuild. The width of the existing transmission line ROWs in this area vary. The new ROW will likely require some clearing in addition to the existing cleared areas of transmission line ROWs in these areas. Alternative routes using existing compatible ROW include: Routes 1 and 3 (1,415 feet); Routes 6, 8, 9, and 10 (7,636 feet); and Route 7 (9,051 feet). The remaining alternative routes do not utilize any existing compatible ROW.

The alternative routes parallel apparent property boundaries to the extent feasible in the absence of other existing linear corridors. Alternative routes that parallel apparent property boundaries range from 124,969 feet for Alternative Route 9, to 92,779 feet for Alternative Route 11. The remaining alternative route lengths paralleling apparent property boundaries are summarized below:

- Alternative Route 1 at 119,654 feet;
- Alternative Route 6 at 116,696 feet;
- Alternative Route 8 at 111,781 feet;
- Alternative Route 4 at 108,446 feet;
- Alternative Route 3 at 108,067 feet;
- Alternative Route 7 at 103,446 feet;
- Alternative Route 2 at 102,490,
- Alternative Route 5 at 95,945 feet; and
- Alternative Route 10 at 93,264 feet.

The alternative routes with lengths paralleling existing transmission line ROW range from 7,353 feet for Alternative Routes 1 and 7, to 694 feet for Alternative Route 3. The only remaining route that parallels an existing transmission line ROW is Route 10 with 6,659 feet. The remaining alternative routes (2, 4, 5, 6, 8, 9, and 11) do not include any portion of their length as a parallel or adjacent to existing transmission line ROW.

Typically, a more representative account for the consideration of whether new transmission line routes are parallel to existing compatible ROWs, apparent property lines, or other natural features is demonstrated with the percentage of each total route length parallel to these features. These percentages were calculated for each alternative route and range from 86% for Alternative Route 1, to 73% for Alternative Route 5. The remaining percentages of total route lengths paralleling existing linear features are described below:

- Alternative Route 6 at 83%;
- Alternative Routes 2 and 7 at 80%;
- Alternative Routes 4, 8, 9, and 10 at 79%; and
- Alternative Routes 3 and 11 at 74%.

4.7.1.3 Urban/Residential Areas

Typically, one of the most important measures of potential land use impacts is the number of habitable structures located in the vicinity of each alternative route. Habitable structure information for each alternative route is shown in Table 4-3 (see Appendix D). POWER determined the number and distance of habitable structures located within 300 feet of each alternative route centerline through the review of aerial photography and during reconnaissance surveys.

The number of habitable structures within 300 feet of each the alternative route centerlines ranges from 31 (for Alternative Routes 2 and 11) to 97 (for Alternative Route 10). Alternative routes that incorporate Segment L2 (Routes 6 through 10) have the highest number of habitable structures located within 300 feet of their centerlines. It should be noted that the portion of Segment L2 that has the higher density of habitable structures

within 300 feet is proposed as an overbuild within the existing 69-kV transmission line ROW. The remaining alternative routes with habitable structures located within 300 feet of their centerlines are described below:

- Alternative Route 4 with 34 habitable structures;
- Alternative Route 3 with 37 habitable structures;
- Alternative Route 5 with 39 habitable structures;
- Alternative Route 1 with 46 habitable structures;
- Alternative Route 7 with 76 habitable structures;
- Alternative Route 8 with 81 habitable structures;
- Alternative Route 9 with 85 habitable structures; and
- Alternative Route 6 with 95 habitable structures.

4.7.1.4 Cropland, Pasture Land, and Traveling Irrigation

Cropland, pasture/rangeland, and areas with traveling irrigation were identified within the study area. Alternative route lengths crossing cropland range from 50,479 feet for Alternative Route 1, to 75,934 feet for Alternative Route 5. The remaining alternative routes with lengths through cropland are described below:

- Alternative Route 7 with 52,742 feet;
- Alternative Route 8 with 53,274 feet;
- Alternative Route 6 with 55,420 feet;
- Alternative Route 3 with 57,362 feet;
- Alternative Route 9 with 57,874 feet;
- Alternative Route 2 with 60,157 feet;
- Alternative Route 10 with 60,396 feet
- Alternative Route 4 with 73,520 feet; and
- Alternative Route 11 with 73,813 feet.

Alternative route lengths crossing pasture/rangeland range from 34,891 feet for Alternative Route 11, to 66,292 feet for Alternative Route 7. The remaining alternative routes with lengths through pasture/rangeland are described below:

- Alternative Route 5 with 40,954 feet,
- Alternative Route 4 with 45,172 feet;
- Alternative Route 10 with 47,368 feet;
- Alternative Route 2 with 51,5554 feet;
- Alternative Route 6 with 52,815 feet;
- Alternative Route 8 with 54,532 feet;
- Alternative Route 3 with 58,635 feet;
- Alternative Route 1 with 64,507 feet; and
- Alternative Route 9 with 66,106 feet.

Because SPS is not proposing to fence along the ROW or otherwise physically isolate the ROW from adjacent lands, there should be no long-term or significant displacement of current grazing activities or hay/crop production within croplands or pasturelands.

Alternative route lengths crossing land irrigated by traveling irrigation systems range from 8,702 feet for Alternative Route 5, to 16,808 feet for Alternative Route 9. The remaining alternative routes with lengths through land with traveling irrigation systems are described below:

- Alternative Route 11 with 10,310 feet,
- Alternative Route 10 with 10,518 feet;
- Alternative Route 7 with 11,161 feet;
- Alternative Route 2 with 11,119 feet;
- Alternative Route 3 with 13,285 feet;
- Alternative Route 4 with 13,833 feet;
- Alternative Route 6 with 14,130 feet;
- Alternative Route 8 with 14,288 feet; and
- Alternative Route 1 with 14,816 feet.

SPS is very experienced with routing, constructing, and maintaining transmission lines within croplands with traveling irrigation systems. Routing within these areas was restricted to the field edges and SPS will use careful structure placement to facilitate spanning these areas to minimize potential impacts. Additional consideration, during the design phase, may include the placement of all insulators to one side of the pole in order to provide maximum clearance from each water well to the conductor wire depending on site specific conditions. In addition, to the extent permitted under the final order, SPS will work closely with the landowners along the route approved by the PUC to minimize potential impacts to existing traveling irrigation systems.

4.7.2 Parks and Recreational Areas

As previously mentioned, the study area contains one recreation area which is a park. None of the alternative routes are located within 1,000 feet of this park. No adverse impacts to the recreational areas (including aesthetic impacts) are anticipated from the construction of any of the alternative routes.

4.7.3 Transportation/Aviation

4.7.3.1 Transportation

Potential impacts to transportation could include temporary disruption of traffic and/or conflicts with future proposed roadway and/or utility improvements. Traffic disruptions would include those associated with the movement of equipment and materials to the ROW and slightly increased traffic flow and/or periodic congestion during the construction phase of the proposed project. Due to the rural nature of the study area, these impacts are typically considered minor, temporary, and short-term. No future roadway or utility expansion projects were identified within the study area.

Alternative routes crossing farm-to-market and ranch roads ranged from three crossings for Alternative Routes 7 and 10, to ten crossings for Alternative Route 6. The number of farm-to-market and ranch road crossings for the remaining alternative routes is described below:

- Alternative Routes 4, 5, and 11 with four crossings;
- Alternative Routes 3 and 9 with five crossings;
- Alternative Route 2 with six crossings;
- Alternative Route 1 with seven crossings; and
- Alternative Route 8 with eight crossings.

Alternative Routes 4, 5, and 9 each cross Interstate 27 once. These crossings are associated with Segment E1. The remaining Alternative Routes 1, 2, 3, 6, 7, 8, 10, and 11 each have two crossings (Interstate 27 and U.S. Highway 87). SPS will coordinate with TxDOT to obtain all crossing permits necessary prior to construction of the route approved by the PUC.

4.7.3.2 Aviation

According to FAA regulations, Part 77 (FAA 2008), the construction of a transmission line requires FAA notification if structure heights exceed the height of an imaginary surface extending outward and upward at a slope of 100:1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of a public or military airport having at least one runway longer than 3,200 feet. The FAA also requires notification if the tower structure height exceeds a 50:1 slope for a horizontal distance of 10,000 feet from the nearest runway of a public or military airport where no runway is longer than 3,200 feet in length, and if the tower structure height exceeds a 25:1 slope for a horizontal distance of 5,000 feet for heliports.

Two FAA registered public airstrips with runways longer than 3,200 feet, Hale County Airport and Joe Vaughn Spraying, were identified within 20,000 feet of the alternative routes (see Table 4-4). There are no FAA registered or non-FAA registered private airstrips with runways shorter than 3,200 feet identified within 10,000 feet of the routes. No FAA

registered or private heliports were identified within the 5,000 feet of any of the alternative route centerlines. All known airstrip locations are shown on Figure 2-3 in Appendix C.

Upon PUC route approval, SPS will complete an additional review during the engineering design phase to determine if FAA notification is required.

TABLE 4-4 AIRSTRIP RUNWAY LOCATIONS

Airstrip	Nearest Segment	Distance from Nearest Segment (feet)*	Direction from Nearest Segment	Estimated Runway Length (feet)*
Hale County Airport – FAA	K2	12,001	SW	5,997; 4,000
Joe Vaughn Spraying – FAA	C	5,341	E	3,900

*Source: FAA 2009, POWER; Aerial Photo and USGS Interpretation

4.7.4 Communication Towers

There is one AM radio transmitter located within 10,000 feet of all of the alternative routes (see Figure 2-3 in Appendix C). There are several FM radio transmitter, microwave relay station, cellular tower, or other similar electronic facilities located within 2,000 feet of all of the alternative routes (see Figure 2-3 in Appendix C). Alternative Routes 3, 6, 7, 8, 9, and 10 each have four of these communication facilities located within 2,000 feet of their centerlines. Alternative Routes 1, 2, 5, and 11 each have three of these facilities, and Alternative Route 4 has two located within 2,000 feet. The distance of each communication tower from the nearest segment was measured using GIS and aerial photograph review (see Table 4-5). None of the alternative routes are anticipated to adversely impact any of the communication facilities.

TABLE 4-5 ELECTRONIC COMMUNICATION FACILITIES

Tower	Nearest Segment	Distance from Nearest Segment (feet)*	Direction from Nearest Segment
142 - AM	K2	6,775	W
143 - Cell	K2, M3	843	NW

TABLE 4-5 ELECTRONIC COMMUNICATION FACILITIES

Tower	Nearest Segment	Distance from Nearest Segment (feet)*	Direction from Nearest Segment
144 - FM	L2	1,751	E
145 - FM	H1	420	S
146 - Cell	S2	81	E
147 - ASR	N2	728	SE

*Source: POWER; Aerial Photo, USGS Interpretation, and FCC

4.7.5 Aesthetics

Aesthetic impacts, or impacts to visual resources, occur when the ROW, lines and/or structures of a transmission line system create an intrusion into, or substantially alter, the character of the existing view. The significance of the impact is directly related to the quality of the view, in the case of natural scenic areas, or to the importance of the existing setting in the use and/or enjoyment of an area, in the case of valued community resources and recreational areas.

Construction of the proposed 115-kV transmission line could have both temporary and permanent aesthetic effects. Temporary impacts would include views of the actual assembly and erection of the tower structures. Permanent impacts from the project would involve the views of the ROW, tower structures, and lines.

Since no rare, unique, pristine, very high quality landscapes or landscapes protected by legislation or from most forms of development exist within the study area, potential aesthetic impacts were evaluated by tabulating the linear feet of each alternative route that would be located within the foreground visual zone (within one-half mile with unobstructed views) of parks/recreational areas, Interstate, U.S., and State Highways, and farm-to-market roads.

None of the alternative routes are within the foreground visual zone of a park or recreational area. No potential direct or aesthetic impacts to these resources are anticipated for any of the alternative routes.

Alternative Route 10 has the longest length within the foreground visual zone of Interstate 27 and U.S. Highway 87 with approximately 26,829 feet. Alternative Route 8 has the shortest length (8,424 feet) within the same foreground visual zone. Factors detracting from these potential aesthetic impacts include existing distribution and 69-kV transmission lines adjacent to these roadways.

The alternative route with the longest length within the foreground visual zone of farm-to-market roads is associated with Alternative Route 6, approximately 54,568 feet. Alternative Route 4 has the shortest length, approximately 26,453 feet within the same foreground visual zone. Factors detracting from these potential aesthetic impacts include existing distribution and 69-kV transmission lines adjacent to these roadways.

4.8 IMPACTS ON CULTURAL RESOURCES

Any construction activity has the potential to adversely impact cultural resources. Adverse impacts may be either direct or indirect, and may occur through changes to the historically significant architectural and archaeological characteristics of the resource. Changes to the environment or setting surrounding the resource may also adversely affect the historically significant qualities of the resource. Standardized methods for identifying, evaluating, and mitigating impacts to cultural resources have been established for federally funded and permitted projects. Those methods are typically applied for purposes of compliance with Section 106 of the National Historic Preservation Act (NHPA). This process requires identification of historically significant (i.e., National Register-listed or eligible) cultural resources and assessment of impacts caused by that action. Where impacts to historically significant resources may occur, further planning measures are typically implemented to avoid, minimize, or mitigate adverse impacts. Similar regulations and processes have been developed under the Antiquities Code of Texas for projects that cross Texas state-owned or controlled property. As currently planned, the proposed project will not be federally funded or permitted and none of the alternative routes cross state-owned or controlled property. Therefore, no portion of the project would require cultural resource identification surveys or impact assessments prior to construction.

4.8.1 Direct Impacts

Construction activities associated with any proposed project may adversely impact cultural resources when they alter the integrity of the characteristics that contribute to a property's significance. As defined by the standards of the NRHP, these characteristics typically include location, design, setting, materials, workmanship, feeling, and association. Activities associated with the construction, operation, and maintenance of transmission lines could directly impact significant cultural resources. For example, earth moving activities during construction typically have the highest potential to directly impact cultural resources by either destruction of all or part of a property, or alteration of the setting. Direct visual impacts may occur when transmission line structures are built near significant cultural resources such as intact segments of historical trails, buildings, or landscapes that derive at least part of their significance from an unaltered historical setting. Archeological sites such as lithic scatters that do not typically derive their significance from the setting in which they are located are unlikely to be directly visually impacted.

4.8.2 Indirect Impacts

Indirect impacts, including vandalism and accidental disturbance, may result from increased pedestrian or vehicular access to cultural resources via new access or maintenance roads. Minimal indirect impacts are anticipated for this project because a majority of the alternative routes are located within previously disturbed areas paralleling roadways, active agricultural fields, or other developed areas. No increases in pedestrian or vehicular access to cultural resources are expected as a result of the construction of any of the alternative routes.

4.8.3 Mitigation

The preferred form of mitigation for adverse impacts to cultural resources is avoidance during the routing process or rerouting if significant (e.g., National Register-eligible or listed, or Texas State Archaeological Landmarks) are identified prior to construction. Mitigation measures for direct impacts may include implementing a program for data recovery excavations if an archaeological site cannot be avoided. Reductions in visual impacts to

significant buildings and landscapes may also be accomplished by using berms or vegetation screens.

4.8.4 Summary of Cultural Resource Impacts

A review of the THSA and TASA records indicated that there has only been one systematic survey along any of the segments (Segment K). In 2008, the TxDOT conducted an intensive survey of just under one mile along Segment K which parallels Ranch Road 145. The records review did not indicate any National Historic Landmarks, Recorded Texas Historic Landmarks, or State Archaeological Landmarks recorded within the study area. There is one Texas Historical Marker identified within the study area. This marker is placed at the United Methodist Church in Kress. The Kress Cemetery is within the study area and it has been designated as a Historic Texas Cemetery. Neither of these cultural resources is crossed by any of the alternative routes. No adverse aesthetic impact to the historical marker is anticipated because the Methodist Church is within the developed area of Kress.

Six of the alternative routes include segments that are located within 1,000 feet of the Kress Cemetery: Alternative Routes 2, 3, 5, 7, 8, and 11. Adverse aesthetic impacts to the cemetery may occur if the line is constructed along Segments P or L3. No potential indirect impacts as a result of increased public access are anticipated because the majority of alternative routes are located near existing roads, in active agricultural fields, or near developed areas.

POWER reviewed THC official records, which revealed that only one systematic cultural resource survey has been conducted along portions of Alternative Routes 2 and 6 associated with Segment K. Systematic surveys have not been conducted for the remaining route segments or for any lengths of the other alternative routes; therefore, the potential for undiscovered cultural resources does exist along all alternative routes. A review of geological and topographical maps identified several high probability areas (HPAs) within the study area where unrecorded prehistoric resources have a higher probability to occur. The HPAs identified included playa lake margins, and the floodplain and secondary terraces adjacent to Rock Draw. To facilitate the data evaluation and alternative route comparison,

each HPA was mapped using GIS and the length of each alternative route crossing these areas was tabulated (see Tables 4-1 and 4-2).

Segment I1 has the longest lengths of HPA crossings, at 4,533 feet. HPAs along this alternative route encircle playa margins in two locales. Alternative Routes 1, 3, 6, 8, and 9 include this segment. Alternative Route 3 has the longest length crossing HPAs, at approximately 19,068 feet. Alternative Routes 5 and 11 have the shortest lengths crossing HPAs, at approximately 9,494 feet each. The route lengths crossing HPAs for the remaining alternative routes are listed below:

- Alternative Route 2 at 10,350 feet;
- Alternative Route 4 at 10,693 feet;
- Alternative Route 10 at 10,988 feet;
- Alternative Route 6 at 12,077 feet;
- Alternative Route 7 at 13,286 feet;
- Alternative Route 8 at 14,554 feet;
- Alternative Route 9 at 15,369 feet; and
- Alternative Route 1 at 17,338 feet.

5.0 PUBLIC INVOLVEMENT ACTIVITIES

5.1 CORRESPONDENCE WITH AGENCIES/OFFICIALS

In April 2011, POWER contacted the following local, state, and federal agencies and officials by letter to solicit comments, concerns, and information regarding potential environmental impacts, permits, or approvals for the construction of the proposed 115-kV transmission line in Hale and Swisher counties, Texas. A map of the study area was included with each letter. Sample copies of the letters and agency responses received as of the filing of this report are included in Appendix A.

Federal

- U.S. Army Corps of Engineers (USACE) – Fort Worth and Tulsa Districts
- U.S. Environmental Protection Agency (EPA)
- U.S. Fish and Wildlife Service (USFWS)
- Federal Aviation Administration (FAA)
- Federal Emergency Management Agency (FEMA)
- Natural Resource Conservation Service (NRCS)

State

- Railroad Commission of Texas (RRC)
- Texas Commission on Environmental Quality (TCEQ) – Lubbock Regional Director
- Texas Department of Transportation (TxDOT) – Aviation Division, Environmental Affairs Division, Planning and Programming, and Lubbock District
- Texas General Land Office (GLO)
- Texas Historical Commission (THC)
- Texas Parks and Wildlife Department (TPWD)
- Texas Water Development Board (TWDB)

Local

- Hale County Farm Bureau
- Hale County Historical Commission
- Hale County Officials (Judges and Commissioners)
- Swisher County Farm Bureau
- Swisher County Historical Commission
- Swisher County Officials (Judges and Commissioners)
- City of Plainview Officials
- City of Kress Officials
- Plainview Independent School District
- Kress Independent School District

POWER reviewed and considered each agency response received (see Appendix A). Where appropriate, POWER incorporated the comments received into the constraints mapping process, sensitivity analysis, development of the alternative routes, and data tabulation analysis. A total of thirteen agency response letters were received. A brief summary of the comments from those agencies is below:

- Once a route has been approved by the PUC, the FAA will require specific route information and an application to review the final route to determine potential impacts to navigable airspace.
- The NRCS stated that the project should have no significant adverse impact on the environment or natural resources in the area and they do not require any permits, easements, or approvals for the proposed project.
- The Swisher County Historical Commission stated that we needed to contact the THC.
- The THC stated that they will need the specific route in order to determine whether a survey is needed.

- The TCEQ stated the project area is within counties which are unclassified or in attainment of the National Ambient Air Quality Standards for all six criteria air pollutants. Standard dust mitigation techniques should control any minimal dust or particulate emissions. They requested prevention of surface and groundwater contamination be addressed.
- TPWD provided recommendations to consider during the route development of a new transmission line. These recommendations included the use of existing facilities, whenever possible, or routing a new transmission line along existing utility ROWs to reduce habitat fragmentation. TPWD provided a summary of the CWA, MBTA and the Texas Parks and Wildlife Code, Section 68.015. TPWD provided recommendations for compliance with these federal and state regulations. TPWD provided a review of water resources, TXNDD database records and vegetation types occurring within the study area. TPWD recommended avoiding the Texas horned lizard (habitat, burrows and harvester ant mounds) and recommends a biological monitor be present during construction. TPWD recommended avoiding potential impacts to the Ferruginous hawk, Western burrowing owl, black-tailed prairie dog, swift fox and prairie dog towns. TPWD recommended surveys be completed for prairie dog towns and associated species within the study area and alternative routes should be developed to avoid these features. TPWD recommended minimization of impacts to native vegetation and that mitigation should include revegetation of disturbed areas with native plant species. TPWD also recommended that SPS prepare a mitigation plan for habitat impacts that could not be avoided or minimized. The mitigation plan should address all impacts to species and habitats covered under federal law and state resource habitat types not covered under federal or state laws. A minimum replacement ratio of 1:1 was recommended. TPWD requested a copy of the EA for review and comment prior to the submittal of the CCN application to the PUC.
- The TWDB stated that the transmission line would not conflict with any recommended water management strategies in the regional or state water plans.
- TxDOT Aviation Division stated that there are two public use airports in or near the study area, Joe Vaughn Spraying Airport and Hale County Airport.

- TxDOT Lubbock District stated that they had no current projects and no plans for major construction projects within the study area.
- The Texas GLO stated that when a final route has been determined to please contact them.
- The USACE stated that they will need additional information in order to consider the application complete. Once a route has been approved by the PUC additional coordination may be required.
- The USFWS provided a list of threatened and endangered species, wetlands and wildlife habitat. They also included a document titled "General Recommendations for Avoiding and/or Minimizing Environmental Impacts from Utility Construction."

5.2 PUBLIC MEETING

SPS held a public open house at the Plainview Independent School District's Education Complex Boardroom from 5:30 P.M. to 7:30 P.M. on August 11, 2011. The intent of the meeting was to solicit comments from citizens, landowners, and public officials concerning the proposed project. The meetings had the following objectives:

- Promote a better understanding of the proposed project including the purpose, need, and potential benefits and impacts;
- Inform and educate the public with regard to SPS' routing procedures, schedule, and decision-making process; and
- Ensure that the decision-making process accurately identifies and considers the values and concerns of the public and community leaders.

Public involvement contributed to the evaluation of issues and concerns by SPS and POWER. Letters were sent inviting potentially affected landowners to the meeting whose property was within 300 feet of each preliminary alternative route segment centerline. A total of 372 letters were mailed. The letter stated the location, time, and purpose of the meeting. An example of the letter is included in Appendix B.

At the meeting, rather than a formal presentation in speaker-audience format, SPS and POWER staff manned information stations devoted to a particular aspect of the project. The

stations had maps, illustrations, drawings, or text displays explaining each particular topic. Interested citizens and property owners were encouraged to visit each station in order, so that the entire process could be explained in the general sequence of project development. The information station format is advantageous because it allows attendees to process information in a more relaxed manner and allows them to focus on their particular area of interest and ask specific questions. More importantly, the one-on-one discussions with SPS/POWER staff encouraged more interaction from those citizens who might be hesitant to participate in a speaker-audience format.

At the first station, SPS and POWER staff greeted and signed visitors in and also provided a questionnaire, a study area and preliminary segments map, and a Frequently Asked Questions (FAQ) sheet. The questionnaire solicited comments on the project, as well as an evaluation of the information presented at the open house. The FAQ sheet provided answers to frequently asked questions about the project. Copies of the questionnaire, map, and FAQ sheet are included in Appendix B. Completed questionnaires were received either at the meeting or later mailed to SPS. The following is a description of the meeting and a summary of questionnaires received.

A total of 33 people signed in as attending the public open house meeting and 18 individuals submitted questionnaires. Following the open house meeting, seven additional questionnaires were received by SPS.

The most important considerations for most respondents who completed questionnaires included proximity to residences, mechanized agriculture, and agricultural wells.

The questionnaires also provided space for respondents to include any general comments or remarks. The following comments, remarks, and concerns are representative of those documented by landowners:

> "We propose that Segment C3 be moved further north, away from existing residences."

"Proximity of power lines to residences should be of top concern in regard to the project overall."

"Concerned with crossing irrigated agriculture land."

"Concerned with interference with pivots and farming operations."

"N2 would be within 250' of our home (front side) destroy the value of our property."

"I am very concerned w/E going over my home, but all of the other listed lines go over land that I farm."

"Concern for magnetic fields and effect on pivots."

"G2 would come both in front and to the side of our home. We don't like the interference of the TV and radio. It would detract from our property."

5.3 PROJECT WEBSITE

SPS established a specific project link for the Kiser – Kress 115-kV Transmission Line Project on its Power for the Plains website, *http://www.powerfortheplains.com/projects/kiser-kress/index.asp*, to further provide information to the public. The website explains the proposed project, addresses the need for the project, and states who has approval authority for the project. The website also provides a project diagram and the aerial overview map, along with two enlarged aerial maps that were presented at the public meeting.

6.0 ROUTE SELECTION

The purpose of this study was to delineate and evaluate alternative routes for SPS' proposed transmission line between SPS' proposed Kiser Substation in Hale County and the existing Kress Substation in Swisher County. POWER completed the environmental analysis of 11 alternative routes (Section 4.0), the results of which are shown in Table 4-2. The environmental evaluation was a comparison of 11 alternative routes from a strictly environmental/land use and cultural resource viewpoint based upon the measurement of 41 environmental/land use and cultural resource criteria, and the consensus opinion of POWER's group of evaluators. POWER used this information to select a route for recommendation that provided the best balance between land use, environmental, and cultural resource factors. SPS used this information along with engineering, construction, maintenance, and operational factors to recommend a route that best addressed the requirements of PURA and PUC Substantive Rules. POWER's evaluation is discussed below.

6.1 POWER'S ENVIRONMENTAL EVALUATION

POWER used a consensus process to evaluate the potential environmental/land use and cultural resource impacts of the alternative routes. POWER professionals with expertise in different environmental disciplines (ecology, land use, and archeology) evaluated the 11 alternative routes based on environmental/land use and cultural resource conditions present along each route. This evaluation was based on data collected for 41 separate environmental criteria, comments from local, state, and federal agencies, and field reconnaissance of the study area. Each POWER technical expert independently analyzed the routes and the environmental data presented in Table 4-2. The evaluators then met as a group and discussed their independent results. The group as a whole determined the relationship and relative sensitivity among the major environmental/land use and cultural resource factors. The group then ranked the 11 alternative routes based strictly upon the environmental/land use and cultural resource data considered.

The evaluators believed that all 11 alternative routes were viable and acceptable from an overall environmental/land use and cultural resource perspective. The evaluators each ranked the alternatives from 1st to 11th (1st having the least potential impact and 11th the greatest potential impact) from the perspective of their own area of expertise. In ranking the advantages and disadvantages of each route, the evaluators considered the competing advantages and disadvantages of each route among the various criteria. For example, routes that pass through cultivated areas have higher land use impacts but lower ecological impacts. The results of this ranking are summarized in Table 6-1

TABLE 6-1
POWER'S ENVIRONMENTAL RANKING OF ALTERNATIVE ROUTES

	RANKING				
Alternative Route	**Land Use Specialist**	**Ecology Specialist**	**Cultural Resources Specialist**	**Project Manager**	**Consensus**
Route 1	6	7	9	7	6
Route 2	2	8	6	2	2
Route 3	5	6	11	6	5
Route 4	3	10	1	3	3
Route 5	4	11	3/4	5	4
Route 6	9	4	5	9	9
Route 7	7	2	7	4	7
Route 8	8	1	10	8	8
Route 9	10	9	8	11	11
Route 10	11	3	2	10	10
Route 11	1	5	3/4	1	1

The land use evaluation placed the greatest importance on proximity to habitable structures, overall length of the route, length paralleling existing transmission line and other ROWs, and ROW through land irrigated by traveling systems. Comparing the 11 alternative routes from a land use perspective, Route 11 was selected as the best route, followed in order by Route 2, Route 4, Route 5, Route 3, Route 1, Route 7, Route 8, Route 6, Route 9, and Route 10.

The ecology evaluation was based primarily on potential impacts to playa lakes and associated wetlands crossed due to their importance for wildlife including migratory birds. The ecologist ranked Route 8 as having the least-potential ecological impact followed by Route 7, Route 10, Route 6, Route 11, Route 3, Route 1, Route 2, Route 9, Route 4, and Route 5.

The cultural resources evaluation considered the amount of area having a high probability for the occurrence of a cultural resource site crossed and a historic site within 1,000 feet of the ROW centerline. Route 4 was identified as the best route from a cultural resources perspective, followed by Route 10, Route 11, Route 5, Route 6, Route 2, Route 7, Route 9, Route 1, Route 8, and Route 3.

The POWER project manager also ranked the alternative routes, considering all of the criteria. Proximity to habitable structures, utilization of and paralleling of existing ROW/apparent property lines, the overall length of the alternative routes, as well as the length of ROW through land irrigated by traveling systems were considered the more important factors given the nature of the study area. Natural features identified along the ROW, such as wetlands, playa lakes, and open water, can be spanned to minimize potential impacts. Other common transmission line engineering practices will be used to further minimize impacts to these features. Route 11 was selected by the POWER Project Manager as the best-balanced route considering all the criteria reviewed, followed by Route 2, Route 4, Route 7, Route 5, Route 3, Route 1, Route 8, Route 6, Route 10, and Route 9.

Based on group discussion of the relative value and importance of each set of criteria (human, cultural, and natural resources) for this specific project, it was the consensus of the group that the number of habitable structures located within 300 feet of the ROW centerline, overall length of the route, and crossing playa lakes, were the primary factors in their decision for selecting the route and ranking the alternate routes. Secondary factors included paralleling existing ROW and property lines, and cultural resource HPAs. Following the evaluation by discipline, the group of POWER evaluators discussed the relative importance and sensitivity of the various criteria as they applied to all of the alternative routes and the study area. Among these alternatives, and considering the environmental/land use and

cultural resource data in Table 4-2, it was the decision of the group that land use criteria should be the primary route selection factor.

Following this decision, the group selected Route 11 as the route that best addresses PURA and PUC routing criteria and then agreed on a ranking for the remaining alternatives, starting with the alternate route with the least impacts. The result of their discussion and decision is presented in Table 6-1. Following Route 11, the routes were ranked as follows: Route 2, Route 4, Route 5, Route 3, Route 1, Route 7, Route 8, Route 6, Route 10, and Route 9 in order of preference. The decision to recommend this route was based primarily on the following advantages for Route 11 among the objective criteria. Route 11:

- is the shortest route, at 23.6 miles;
- is tied with Route 2 for having the fewest number of habitable structures (31) located within 300 feet of its centerline;
- has the second lowest total length of ROW within cropland areas with pivot or mobile irrigation with 10,310 feet;
- has the least length of ROW through pasture/rangeland;
- is tied with Route 5 for having the second shortest length of ROW within the foreground visual zone of highways and farm-to-market roads;
- is ranked sixth in the ROW lengths crossing NWI mapped wetlands;
- parallels existing linear features for 74% of its length, which is ranked fifth along with Route 3; and
- has one of the shortest ROW lengths crossing HPAs for historical resources with 9,494 feet, which is tied with Route 5.

And, like each of the primary alternative routes, Route 11:

- is not located within 1,000 feet of any parks/recreational areas;
- is not located within 10,000 feet of any private airstrips;
- is not located within 5,000 feet of any heliports;
- is not located within 10,000 feet of an FAA registered airport having no runway more than 3,200 feet in length;
- is not located within a foreground visual zone of parks/recreational areas;

- crosses no known/occupied habitat of federally endangered or threatened species; and
- crosses no NRHP-listed or -eligible sites.

POWER's Project Manager reviewed all of the data and evaluations produced by the task managers and concurred with the rankings and recommendations for the alternative routes. Therefore, based upon its evaluation of this particular project an its experience and expertise in the field of transmission line routing, POWER recommends Alternative Route 11 from an overall environmental/land use and cultural resource perspective and the remaining routes as alternatives. Considering all pertinent factors, it is POWER's opinion that these routes best satisfy the criteria specified in PURA § 37.056(c)(4) for consideration in the granting of CCNs.

It is important to note that the PUC recently modified its CCN application requirements in Docket No. 39125 requiring the applicant to specify an alternative route which is believed to best address the requirements of PURA and the PUC Substantive Rules. The specification and inclusion of this route within the CCN application does not guarantee its approval by the PUC. It is included to facilitate the PUC administrative approval process, but all routes and route segments are available for selection and approval by the PUC.

6.2 SPS ROUTE SELECTION

To select its route for the proposed Kiser - Kress Project, SPS based its review on potential environmental impacts, land use, engineering constraints, maintenance and construction considerations, public input/community values, estimated costs, system operations, and landowner/agency concerns and preferences. Based on this review and evaluation, SPS determined that each of the alternative routes was feasible and acceptable from an engineering and cost perspective. Following consideration of each of the above factors, SPS has selected Alternative Route 11 as the route they believe best addresses the requirements of PURA and PUC Substantive Rules for granting a CCN. Refer to Appendix E to review the map of alternative routes (Figure 6-1) and segment descriptions that will be mailed to all landowners along the segments at the time SPS files the CCN Application.

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7.0 LIST OF PREPARERS

This EA and Alternative Route Analysis was prepared for SPS by POWER. A list of the POWER employees with primary responsibilities for the preparation of this document is presented below.

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