ENVIRONMENTAL ASSESSMENT FOR POTASH JUNCTION TO ROADRUNNER 345-KILOVOLT TRANSMISSION LINE PROJECT, EDDY AND LEA COUNTIES, NEW MEXICO

DRAFT

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BLM

Environmental Assessment for Potash Junction to Roadrunner 345-Kilovolt Transmission Line Project, Eddy and Lea Counties, New Mexico

Prepared for

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List of Acronyms

AMSL .....Above Mean Sea Level
AUM .....Animal Unit Month
BMP .....Best Management Practice
CCN .....Certificate of Convenience and Necessity
COE .....Corps. Of Engineers
DOE .....Department of Energy
EA .....Environmental Assessment
ELF .....Extremely Low Frequency
EMF .....Electro-Magnetic Field
EPA .....Environmental Protection Agency
FLPMA .....Federal Land Policy and Management Act
GPS .....Global Positioning Satellite
ITP .....Integrated Transmission Plan
MBTA .....Migratory Bird Treaty Act
mg/L .....Milligrams per Liter
MW .....Megawatts
NEPA .....National Environmental Protection Act
NIEHS .....National Institute of Environmental Health Sciences
NIH .....National Institutes of Health
NMDA .....New Mexico Department of Agriculture
NMPRC .....New Mexico Public Regulatory Commission
NMRPTC .....New Mexico Rare Plant Technical Council
NTC .....Notice to Construct
NWMA .....Noxious Weeds Management Act
NWR .....National Wildlife Refuge
POD .....Plan of Development
RFD .....Reasonable Foreseeable Development
RMP .....Resource Management Plan
ROW .....Right of Way
SLO .....State Land Office
SMA .....Special Management Area
SPS .....Southwestern Public Service Company
USFWS .....United States Fish and Wildlife Service
UTEP .....University of Texas El Paso
VRM .....Visual Resource Management
WIPP .....Waste Isolation Pilot Plant

1.0 Purpose and Need

1.1 Background

The applicant, Southwestern Public Service Company (SPS), a wholly owned subsidiary of Xcel Energy, Inc., is proposing to construct a single circuit, 345-kilovolt (kV) electric transmission line approximately 41 miles in length between the proposed Roadrunner Substation in Lea County, New Mexico (NM) and the existing Potash Junction Substation in Eddy County, NM.

The design voltage for this project is 345 kV and the operating voltage will be at 230 kV. The proposed project will provide increased reliability and support load growth for SPS's southeastern New Mexico transmission grid service area.

The Potash Junction Substation is located southeast of Carlsbad, near U.S. 62; the new Roadrunner Substation is northwest of Jal (Appendix A). This proposed transmission line project would include a ~3.5 acre expansion of the Potash Junction Substation, an approximately 6 acre area for the new Roadrunner Substation and the building of approximately 41 miles of new 345 kV line. The proposed route between Potash Junction Substation and the new Roadrunner Substation is depicted in Appendix A.

SPS contracted with TRC Environmental Corporation (TRC) to assist with the routing of the transmission lines and to prepare the environmental assessment for the proposed transmission line. The Environmental Assessment (EA) has been completed in compliance with the National Environmental Policy Act (42 USC § 4321 et seq.), in addition, an application for a Certificate of Convenience and Necessity (CCN) will be submitted to the New Mexico Public Regulation Commission (NMPRC). This EA identifies environmental resources that may be affected by the Proposed Action, assesses potential impacts and describes appropriate mitigation measures.

1.2 Purpose and Need for Action

Xcel Energy has applied for the legal use of, and access across, public lands managed by BLM by grant of an ROW. The BLM's mandate for multiple use of public lands includes development of energy resources in a manner that conserves the multitude of other resources found on public lands. The need for the action is established by the BLM's responsibility under the Federal Land Policy and Management Act (FLPMA) to respond to an application for a right-of way (ROW) grant for use of federal land. The BLM will decide whether to grant the ROW, and if so, under what terms and conditions.

1.3 Conformance with Applicable Land Use Plan(s)

The Proposed Action is in conformance with the 1988 Carlsbad Resource Management Plan, as amended by the 1997 Carlsbad Approved Resource Management Plan Amendment and the 2008 Special Status Species Approved Resource Management Plan Amendment. TRC consulted with various agencies, which are listed in Chapter 4.

1.4 Relationship to Statutes, Regulations or Other Plans

Legislation considered in the preparation of the EA includes the Clean Air Act (42 USC 7401 et seq.), Clean Water Act (33 USC 1251 et seq.), Endangered Species Act (42 USC 1531 et seq.), National Historic Preservation Act (16 USC 470 et seq.), 36 CFR Part 800 (Protection of Historic and Cultural Properties), 36 CFR Part 60 (National Register of Historic Places) and Resource Conservation and Recovery Act (RCRA), 42 USC 6901 et seq., as amended by the Hazardous and Solid Waste Amendments of 1984).

1.5 Scoping, Public Involvement and Issues

The BLM held two public meetings to inform the general public and hear their concerns and questions on July 9, 2013 at 1 p.m. and 6 p.m., in Carlsbad, NM. Invitations were issued to concerned parties on the BLM mailing list (available from the BLM Carlsbad Field Office). In addition, several state and federal agencies were contacted. This list is available in Appendix B.

Two members of the public expressed concern about the karst and need for a karst survey. These comments were addressed by incorporation of a 100 percent karst survey of the proposed right-of-way. In general, frequent consultations with the BLM, the lead agency on this project, led to the development of the various alternatives:

- Alternative A was initially proposed. Upon receiving feedback from the Mosaic Potash Mine that the line would go over unstable mine tailings with the potential for unstable karst underneath, Alternative B was proposed, which avoids the Mosaic Potash Mine tailings.
- Alternative B traverses a region with higher potential for karst features.
- Alternative C was proposed to avoid the karst regions identified.
- The Proposed Alternative largely follows Alternative C, except for four regions. The key differences are:
    a) a shift to the west by ~0.04 miles over a ~2.5 mile segment in T22S, R30E, sections 16, 21 and 28, to minimize visual effects on Livingston Ridge,
    b) a minor route adjustment (maximum 0.07 miles deviation from Route C, over a distance of ~1.25 miles) to avoid crossing over oil well pads in T23S, 31E, sections 32, 33 and in T24S, 31E, Sections 3, 4, 10, 11 & 14,
    c) another route adjustment (maximum deviation 0.5 miles from Route C, for ~5 miles) to avoid an oil well pad in T23S, 31E, sections 1 and 12
    d) a shift of ~0.03 miles to the north of Route C (T24S, 32E,sections 21, 22 & 23, for ~3 miles) to avoid a soon to be constructed power distribution line (Appendix A).

All alternatives barring the No Action alternative include the expansion of the existing Potash Junction Substation (~3.5 additional acres) and the construction of a new Roadrunner Substation in T24S, R33E, Section 13 (~6 acres).

2.0 Description of Alternatives, Including Proposed Action

2.1 Proposed Action

Southwestern Public Service Company (SPS) proposes to build a 345 kV electrical transmission power line, which would initially be energized at 230 kV, from the Potash Junction Substation in Eddy County, NM to the new Roadrunner Substation, in Lea County, NM. The majority of the route (approximate 29 miles) will be on lands administered by the BLM. Approximately 10.2 miles of the route will be on lands administered by the New Mexico State Land Office (SLO) and approximately 1.1 miles will occur on privately owned land.

The transmission line will be comprised of approximately 500 structures. Each structure will be a self-weathering steel H-frame installed on concrete foundation, unless designed differently to address effects to the visual landscape (Figure 2.1). These structures measure 50-80 feet in height, and will be between 450 and 650 feet apart depending on topography. Steel H-frame structures provide a horizontal circuit configuration, and require a temporary disturbance area of 2425 square feet, and a minimum ground clearance beneath the conductor of 23 feet. The ROW will have a permanent width of 150 feet. The total disturbed area is anticipated to be about 750 acres. These design features apply equally to all four Alternatives described in this section.

The primary existing component of this project is the Potash Junction substation at the northwest end of the transmission line (NAD83 Zone 13 597210 mE, 3596967 mN) which will be expanded to accommodate the additional energy. Additional components which have not been constructed yet will include the planned Roadrunner substation at the eastern end of the transmission line (NAD83 Zone 13 638280 mE, 3564801 mN), substation supply lines, permanent access roads which will mostly be along the ROW, and temporary staging areas.

2.2 Construction Phase

Construction of this transmission line will be conducted in a sequential set of tasks performed by multiple crews. These tasks are: initial stakeout, vegetation management, structure site clearing and excavation, structure assembly, and wire pulling. Table 2.1 outlines the typical vehicle specifications which are expected to participate in the construction activities. These numbers are estimates, and conditions during construction will dictate the equipment allocation. The work force is estimated to include approximately 100 personnel.

Table 2.1 Typical Specifications of Vehicles Expected on this Project.

Vehicle Type	Number anticipated	Gross weight (tons)
Pickup truck	15	3.5
Boom truck	6	16.5
Tractor trailer	10	40
Tracked vehicle	4	20

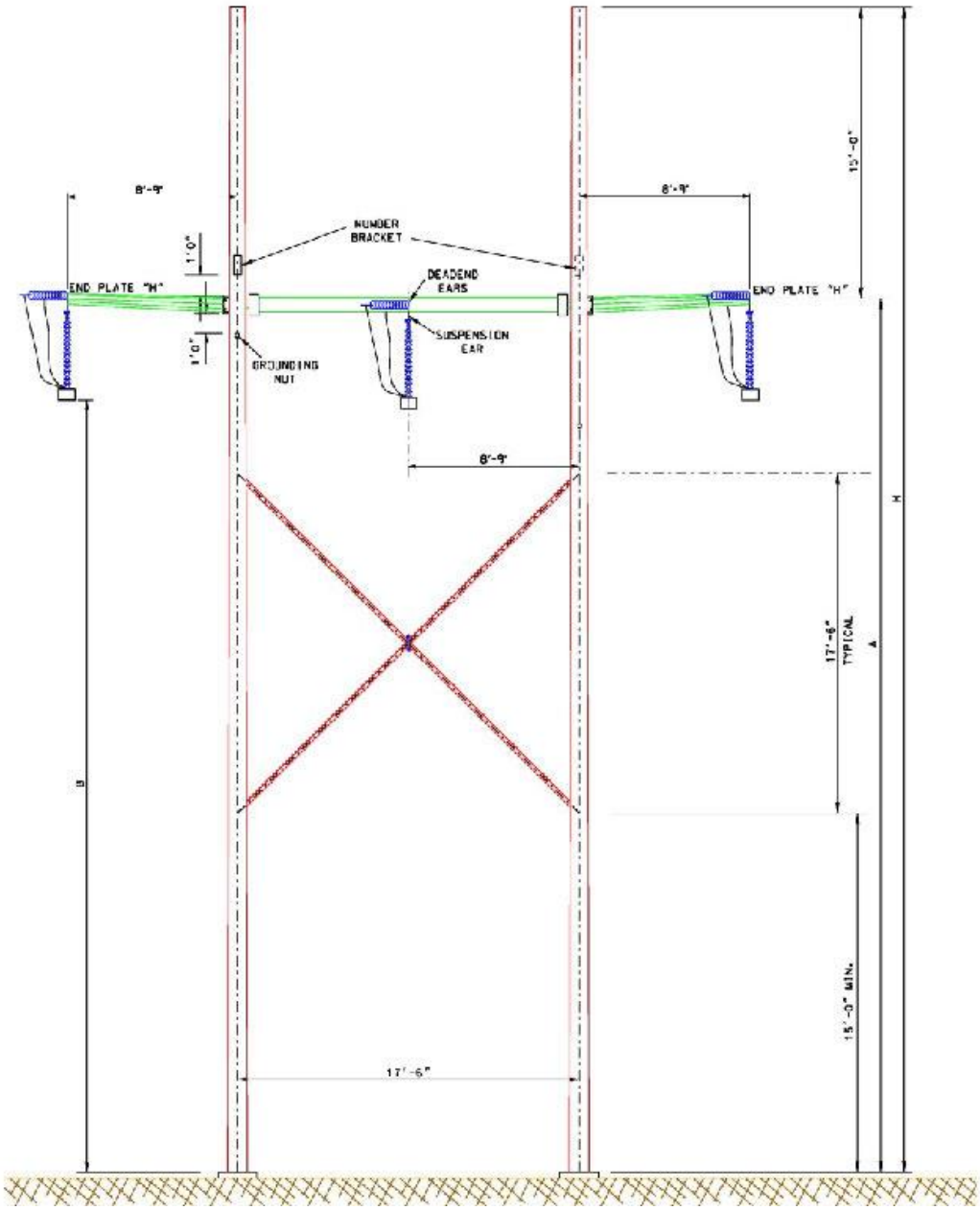

Figure 2.1 Measured diagram of typical wooden K-frame structure

Access will primarily be along existing county and paved roads, but a new road will be necessary within the ROW. In some locations due to steep slopes, broken terrain, or drainage crossings, the existing roads may require improvement—grading, widening, or installing culverts. New roads will result in a permanent disturbance for the life of the transmission line. SPS will construct and maintain all roads in accordance with the February 1995 BLM New Mexico Roads Policy, Memorandum NM-95-031. Areas of planned road construction or modification were part of the cultural and biological resource surveys outlined below in Sections 3.10–3.13. Where fences must be cut for gate installation or other construction activities, brace posts will be installed in order to maintain adjacent wire tension. Any fences damaged during construction will be repaired immediately. All new or existing gates will remain closed and locked at all times except when attended.

Initial stakeout of the ROW will be accomplished by a registered land surveyor. Each structure location will be staked with labeled lath highlighted by high-visibility tape and paint.

Treatment of vegetation within the ROW will include the selective removal or trimming of trees to prevent contact with the transmission line conductors. “Danger trees” which are 20 feet or more in height and which upon falling would come within ten feet of a structure will be removed completely. Tree removal is anticipated to be minimal due to the nature of the vegetation communities in the Project Area and the method of construction used.

Each structure location will be the center of a temporary disturbance area of 2425 square feet. Within this area, grading may be accomplished using mechanical earthmoving equipment in order to provide sufficient space for subsequent operations. This grading may not be necessary at all locations, provided the local surface is level and compact enough to allow movement by rubber-tire vehicles. Grading will be monitored by an archaeologist or biologist where required due to nearby significant resources.

Subsequent disturbance at each structure site will include excavation for, and pouring of, a concrete foundation. Excavations may be made using mechanized equipment, blasting, pneumatic, or hand methods. The excavation area and respective buffer zones will be surveyed for cultural resources. Excavation will be monitored by an archaeologist where required due to nearby significant cultural resources.

Erection crews will assemble each structure on site, including supports, braces, insulators and other appurtenant equipment, and place it in the foundation using cranes or large boom trucks. The structure will be plumbed and the hole backfilled. The shield wires and conductors will then be installed in sections that are dependent on wire reel length, and at structure dead-end locations.

To facilitate wire pulling, reels of groundwire and conductor will be delivered to sites spaced about every two miles along the ROW. These locations will require sufficiently level areas of approximately 50 feet by 250 feet (12,500 square feet) and easy vehicular access. Reasonable efforts will be made to select locations that will not require grading or removal of vegetation. Tension-stringing methods, where the conductor is not allowed to touch or drag on the ground, will be employed using ground equipment. After the conductors are pulled in, they will be pulled to a specified tension and attached to the insulators.

All construction activities will be carried out in safe and healthful working conditions as outlined by the Occupational Health and Safety Administration’s guidelines.

2.3 Project Construction and Operation Design Features

2.3.1 Resource Values and Environmental Concerns

The affected environment of the Project area is described in detail in this environmental assessment prepared for the Project. The proposed ROW was designed to minimize anticipated areas of critical environmental concern, including but not limited to, noise, water, vegetation, wildlife, threatened or endangered species, karst, visual resource areas, shorebird habitat, unstable soils, recreation activities, and known cultural resource sites. As a result, no conflicts with resources or public health and safety are expected. Table 2.2 lists the environmental protection measures which will be exercised during construction.

Table 2.2 Standard Environmental Protection Measures

Project Mitigation Practice	
Aesthetics	
A-1	The contractor shall exercise care to preserve the natural landscape and shall conduct construction operations (including all construction related activities within and along the right-of-way, SPS's designated access roads and staging areas) so as to prevent any unnecessary damage to, or destruction of, natural features.
Air Quality	
AQ-1	The contractor shall utilize such practicable methods and devices as are reasonably available to control, prevent and otherwise minimize atmospheric emissions or discharges of air contaminants.
AQ-2	Construction related dust disturbance shall be controlled by the periodic application of water to all disturbed areas along the right-of-way and access roads.
AQ-3	Vehicles and equipment showing excessive emission of exhaust gases due to poor engine adjustments or other inefficient operating conditions shall not be operated until corrective adjustments or repairs are made.
Biological Resources	
BR-1	Vegetation shall be preserved and protected from damage by construction operations to the maximum extent practicable. Removal of brush and trees will be limited to those necessary for construction of the line and/or pose a threat to safe and reliable operation and maintenance of the line, or as otherwise determined by SPS. There will be no clear cutting within the right-of-way unless specifically approved in writing by SPS.
BR-2	To minimize the spread of noxious weeds, construction crews will clean all equipment and vehicles (power or high pressure) of all mud, dirt and plant parts before entering the construction area. The contractor will be responsible for control of noxious weeds in the area proposed for construction. SPS shall conduct a noxious weed survey to identify: a) noxious weed species present; b) locations of infestations; c) acreage infested; and d) density of plants. Gravel and fill to be used must come from a weed free source(s). Gravel pits and fill sources will be inspected to identify weed-free sources.
BR-3	The contractor shall not cross any wetland and riparian areas, unless specifically approved in writing by BLM and SPS.
BR-4	On completion of the work, all work areas, except any permanent access roads/trails, shall be regraded, as required, so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural revegetation, provide for proper drainage and prevent erosion.
BR-5	All construction materials and debris shall be removed from the project area in a timely manner.
BR-6	Should any previously unknown populations of Federally Endangered Species be discovered during surveys prior to construction, contractor will inform BLM and SPS to assure compliance with the Endangered Species Act (ESA), and consultation with the U.S. Fish and Wildlife Service and ensuing mitigation can proceed to ensure timely completion of the proposed project.
Cultural Resources	
CR-1	Should any previously unknown historic/prehistoric sites or artifacts be encountered during construction, all land altering activities at that location will be immediately suspended and the discovery left intact until such time that the land management agency or owner is notified and appropriate measures taken to assure compliance the National Historic Preservation Act and other pertinent cultural resources legislation.
Fire Prevention/Control	
FP-1	Construction vehicles shall be equipped with government approved spark arresters.

Project Mitigation Practice	
FP-2	The contractor shall maintain in all construction vehicles a current list of local emergency response providers and methods of contact/communication.
Land Use	
LU-1	The contractor shall limit movement of crews, vehicles and equipment on the right-of-way and approved access roads to minimize damage to property and disruption of normal land use activity.
LU-2	The contractor shall maintain all fences and gates during the construction period. Any fence or gate damaged during construction will be repaired immediately by the contractor.
LU-3	The contractor shall eliminate, at the earliest opportunity, all construction ruts that are hazardous to agricultural operations and/or movement of vehicles and equipment. Such ruts shall be leveled, filled and graded, or otherwise eliminated in an approved manner. Damage to ditches, tile drains, culverts, terraces, local roads and other similar land use features shall be corrected as necessary by the contractor. The land and facilities shall be restored as nearly as practicable to their original condition.
Noise	
N-1	Construction vehicles and equipment shall be maintained in proper operating condition and shall be equipped with manufacturers' standard noise control devices or better (e.g. mufflers, engine enclosures).
Soils	
S-1	All soils compacted by movement of construction vehicles and equipment, shall be 1.) loosened and leveled through harrowing or disking to approximate pre-construction contours and 2.) reseeded with certified weed-free native grasses and mulched (except in cultivated fields). The specific seed mix(s) and rate(s) of application will be determined by the BLM.
S-2*	Excavated material not used in the backfilling of poles shall be spread around each pole or transported off-site to a SPS approved disposal location. Disturbed areas shall then be regraded to approximate pre-construction contours and reseeded as specified in S-1.
Traffic	
T-1	The contractor shall make all necessary provisions for conformance with federal, state and local traffic safety standards and shall conduct construction operations so as to offer the least possible obstruction and inconvenience to public traffic
Water Quality	
WQ-1*	Construction activities shall be performed by methods that prevent entrance or accidental spillage of solid matter, contaminants debris, and other objectionable pollutants and wastes into flowing streams or dry water courses, lakes and underground water sources. Such pollutants and wastes include, but are not restricted to, refuse, garbage, cement, concrete, sanitary waste, industrial waste, radioactive substances, oil and other petroleum products, aggregate processing tailings, mineral salts and thermal pollution.
WQ-2	Borrow pits shall be so excavated that water will not collect and stand therein. Before being abandoned, the sides of borrow pits shall be brought to stable slopes, with slope intersections shaped to carry the natural contour of adjacent, undisturbed terrain into the pit or borrow area, giving a natural appearance. Waste piles shall be shaped to provide a natural appearance.
WQ-3	Dewatering work for structure foundations or earthwork operations adjacent to, or encroaching on, streams or water courses shall not be performed without prior approval by BLM or the applicable land managing agency.
WQ-4	Excavated material or other construction materials shall not be stockpiled or deposited near or on stream banks, lake shorelines or other water course perimeters where they can be washed away by high water or storm runoff or can in any way encroach upon the actual water source itself.
WQ-5	Waste waters from construction operations shall not enter streams, water courses or other surface waters without use of such turbidity control methods as settling ponds, gravel-filter entrapment dikes, approved flocculating processes that are not harmful to fish, recirculation systems for washing of aggregates or other approved methods. Any such waste waters discharged into surface waters shall be essentially free of settleable material. Settleable material is defined as that material that will settle from the water by gravity during a 1-hour quiescent period.
Aesthetics	
A-1	The contractor shall exercise care to preserve the natural landscape and shall conduct construction operations (including all construction related activities within and along the right-of-way, SPS's designated access roads and staging areas) so as to prevent any unnecessary damage to, or destruction of, natural features.

Project Mitigation Practice	
Air Quality	
AQ-1	The contractor shall utilize such practicable methods and devices as are reasonably available to control, prevent and otherwise minimize atmospheric emissions or discharges of air contaminants.
AQ-2	Construction related dust disturbance shall be controlled by the periodic application of water to all disturbed areas along the right-of-way and access roads.
AQ-3	Vehicles and equipment showing excessive emission of exhaust gases due to poor engine adjustments or other inefficient operating conditions shall not be operated until corrective adjustments or repairs are made.
Biological Resources	
BR-1	Vegetation shall be preserved and protected from damage by construction operations to the maximum extent practicable. Removal of brush and trees will be limited to those necessary for construction of the line and/or pose a threat to safe and reliable operation and maintenance of the line, or as otherwise determined by SPS. There will be no clear cutting within the right-of-way unless specifically approved in writing by SPS.
BR-2	To minimize the spread of noxious weeds, construction crews will clean all equipment and vehicles (power or high pressure) of all mud, dirt and plant parts before entering the construction area. The contractor will be responsible for control of noxious weeds in the area proposed for construction. SPS shall conduct a noxious weed survey to identify: a) noxious weed species present; b) locations of infestations; c) acreage infested; and d) density of plants. Gravel and fill to be used must come from a weed free source(s). Gravel pits and fill sources will be inspected to identify weed-free sources.
BR-3	The contractor shall not cross any wetland and riparian areas, unless specifically approved in writing by BLM and SPS.
BR-4	On completion of the work, all work areas, except any permanent access roads/trails, shall be regraded, as required, so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural revegetation, provide for proper drainage and prevent erosion.
BR-5	All construction materials and debris shall be removed from the project area in a timely manner.
BR-6	Should any previously unknown populations of the Federally Endangered Todsen's pennyroyal be discovered during surveys prior to construction, contractor will inform BLM and SPS to assure compliance with the Endangered Species Act (ESA), and consultation with the U.S. Fish and Wildlife Service and ensuing mitigation can proceed to ensure timely completion of the proposed project.
Cultural Resources	
CR-1	Should any previously unknown historic/prehistoric sites or artifacts be encountered during construction, all land altering activities at that location will be immediately suspended and the discovery left intact until such time that the land management agency or owner is notified and appropriate measures taken to assure compliance the National Historic Preservation Act and other pertinent cultural resources legislation.
Fire Prevention/Control	
FP-1	Construction vehicles shall be equipped with government approved spark arresters.
FP-2	The contractor shall maintain in all construction vehicles a current list of local emergency response providers and methods of contact/communication.
Land Use	
LU-1	The contractor shall limit movement of crews, vehicles and equipment on the right-of-way and approved access roads to minimize damage to property and disruption of normal land use activity.
LU-2	The contractor shall maintain all fences and gates during the construction period. Any fence or gate damaged during construction will be repaired immediately by the contractor.
LU-3	The contractor shall eliminate, at the earliest opportunity, all construction ruts that are hazardous to agricultural operations and/or movement of vehicles and equipment. Such ruts shall be leveled, filled and graded, or otherwise eliminated in an approved manner. Damage to ditches, tile drains, culverts, terraces, local roads and other similar land use features shall be corrected as necessary by the contractor. The land and facilities shall be restored as nearly as practicable to their original condition.
Noise	
N-1	Construction vehicles and equipment shall be maintained in proper operating condition and shall be equipped with manufacturers' standard noise control devices or better (e.g. mufflers, engine enclosures).

Project Mitigation Practice	
Soils	
S-1	All soils compacted by movement of construction vehicles and equipment, shall be 1.) loosened and leveled through harrowing or disking to approximate pre-construction contours and 2.) reseeded with certified weed-free native grasses and mulched (except in cultivated fields). The specific seed mix(s) and rate(s) of application will be determined by the BLM.
S-2*	Excavated material not used in the backfilling of poles shall be spread around each pole or transported off-site to a SPS approved disposal location. Disturbed areas shall then be regraded to approximate pre-construction contours and reseeded as specified in S-1.
Traffic	
T-1	The contractor shall make all necessary provisions for conformance with federal, state and local traffic safety standards and shall conduct construction operations so as to offer the least possible obstruction and inconvenience to public traffic
Water Quality	
WQ-1*	Construction activities shall be performed by methods that prevent entrance or accidental spillage of solid matter, contaminants debris, and other objectionable pollutants and wastes into flowing streams or dry water courses, lakes and underground water sources. Such pollutants and wastes include, but are not restricted to, refuse, garbage, cement, concrete, sanitary waste, industrial waste, radioactive substances, oil and other petroleum products, aggregate processing tailings, mineral salts and thermal pollution.
WQ-2	Borrow pits shall be so excavated that water will not collect and stand therein. Before being abandoned, the sides of borrow pits shall be brought to stable slopes, with slope intersections shaped to carry the natural contour of adjacent, undisturbed terrain into the pit or borrow area, giving a natural appearance. Waste piles shall be shaped to provide a natural appearance.
WQ-3	Dewatering work for structure foundations or earthwork operations adjacent to, or encroaching on, streams or water courses shall not be performed without prior approval by BLM or the applicable land managing agency.
WQ-4	Excavated material or other construction materials shall not be stockpiled or deposited near or on stream banks, lake shorelines or other water course perimeters where they can be washed away by high water or storm runoff or can in any way encroach upon the actual water source itself.
WQ-5	Waste waters from construction operations shall not enter streams, water courses or other surface waters without use of such turbidity control methods as settling ponds, gravel-filter entrapment dikes, approved flocculating processes that are not harmful to fish, recirculation systems for washing of aggregates or other approved methods. Any such waste waters discharged into surface waters shall be essentially free of settleable material. Settleable material is defined as that material that will settle from the water by gravity during a 1-hour quiescent period.

*The primary type of industrial waste for this project will be excess concrete from pouring foundations. All concrete not used shall be removed from the ROW surface. No washings from the concrete trucks will be permitted on the ROW surface. Concrete trucks may wash out in the dirt piles from the excavation as long as it is contained within the dirt pile and then removed from the ROW with the dirt pile. A continuous clean-up crew will be in operation from beginning to end of the project, so that the waste dirt and concrete will be disposed of in a timely manner. Other wastes which typically derive from the operation of heavy machinery will be prevented from entering flowing streams or dry water courses, lakes and underground water sources. Waste water will be submitted to turbidity control methods (e.g. settling ponds) prior to discharge into surface waters.

Upon identification of the Proposed Route, SPS contracted cultural and biological resource surveys to identify any additional concerns. The summarized results of these surveys are found in Sections 3.10 – 3.13. The cultural resources surveys were conducted to comply with the National Historic Preservation Act of 1966, as amended (16 USC 470 et sec PL 89-665), and the Archaeological Resource Protection Act of 1974 (16 USC 470, PL 96-95). Identification and evaluation of historic properties, and land assessments and resolution of adverse effect was determined through consultation between the BLM, NM State Historic Preservation Officer (SHPO), and any other required consulting parties, pursuant to Section 106 of the National Historic Preservation Act and implementing regulations (36 CFR 800).

In the event that bones or prehistoric or historic archaeological material are uncovered during construction or earth-disturbing activities, SPS shall cease work immediately, protect the remains from further disturbance, and notify the appropriate land owner. On BLM land, if skeletal remains or associated funerary objects are found, SPS shall immediately cease activities in the area of discovery, protect the remains, and notify the BLM pursuant to 43 CFR Section 10.5 (e) within 24 hours of discovery. BLM will determine the nature and extent of the remains and determine appropriate treatment of the remains in consultation with tribes under NAGPRA. Construction will resume only after clearance is provided by BLM.

If bones are found on State Trust Land, SPS shall immediately notify local law enforcement and the Office of the Medical Investigator (OMI) pursuant to 18-6-11.2C (Cultural Properties Act NMSA 1978). In accordance with 18-6-11.2C and/or 36 CFR 800.13(b) (Protection of Historic Properties), SPS shall notify the SHPO or the State Archeologist immediately. The SLO and the SHPO will determine the necessary steps to evaluate significance, document, protect or remove the material or remains, in compliance with the law. Construction will resume only after clearance is provided by the SLO and the SHPO.

If the inadvertent discovery is comprised of archaeological material not associated with skeletal remains, SPS shall cease work immediately, protect the find, and notify the relevant land management agency or owner pursuant to the Antiquities Act of 1906 (34 Stat. 225; 16 U.S.C. Secs. 431-433). Construction will resume only after clearance is provided by the land management agency.

Indirect impacts will be controlled by limiting access to cultural resources, educating employees about the significance of cultural resources and implementing a strict management policy restricting the causal collection of artifacts from the project area. All construction and monitoring personnel will be briefed on protective measures implemented for cultural resources and the importance of resource preservation.

The biological resources surveys were conducted to comply with the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), the Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712), and the requirements of the Bureau of Land Management Manual 6840 - Special Status Species Management. They were aimed at locating any sensitive biological populations prior to construction, e.g. lesser prairie chicken and sand dune lizard. Locations of existing noxious weed populations were also noted during the pre-construction survey of the approved route.

2.3.2 Stabilization and Rehabilitation

Stabilization and rehabilitation activities, weather permitting, will be ongoing throughout construction and will be undertaken as soon as construction activities are completed in a particular area. All disturbed areas including temporary access roads, cut and fill slopes, staging areas, and the ROW will be regraded to approximate the pre-construction contours and the excavated material will be compacted using hand or mechanical tampers as appropriate. Drainage structures and similar improvements will be removed.

All disturbed areas will be reseeded and fertilized. If a grass seeder is not used and grass is planted by the broadcast method, the seeding rate will be doubled to obtain a good grass stand. Optimal timing for revegetation success will be dependent on soil moisture conditions and weather: Mid-July to mid-August is usually optimal, in order to coincide with seasonal monsoons. Immediately before or after seeding, mulching material will be applied to control erosion and protect the new seedlings.

All damaged fences and gates will be repaired. Access roads or trails will be blocked or reclaimed, as necessary, to prevent future access by the public.

2.3.3 Noxious Weeds and Invasive Species

Noxious weed populations identified in the ROW will be treated by SPS with BLM-approved chemicals.

2.3.4 Operations and Maintenance Phase

Inspection of the transmission line will be accomplished by SPS on an annual basis using both aerial and ground patrols. Aerial patrols will utilize currently extant airfields. Ground patrols will be conducted via wheeled vehicles where possible, and foot patrols in areas where roads do not exist or are not open to traffic.

As needed, maintenance activities will include repairing damaged structures, insulators, and conductors.

In order to minimize the risk of fire associated with this transmission line, SPS will trim trees which pose a clearance or safety hazard to standard operations. This activity will be performed in coordination with the land managing agency or landowner in the case of private property. This vegetation management will balance fire hazard and electrical clearance requirements with the maintenance of vegetative screening.

Appropriate signage and long term access for these activities will be provided via gates which SPS will install and maintain.

Future decommissioning of this transmission line will include removal of conductors, and structures. At that time, SPS will consult with BLM about the removal of foundations. In order to limit further disturbances, it may prove beneficial at that time to not remove foundations; however SPS will follow BLM directions in this regard. All materials will be removed from the ROW. The ROW and access used for regular maintenance activities will be stabilized and rehabilitated following the procedures laid out in Section 2.1.6 above.

2.4 Proposed Action Description

Proposed Action (Preferred Alternative)

The Proposed Action differs from the alternatives detailed below in that it minimizes the length of the transmission line over regions with potential for karst, avoids unstable mine tailings from the Mosaic Potash Mine and reduces visual impacts on Livingston Ridge. The proposed route commences at the proposed Roadrunner Substation in Lea County near the intersection of Vaca Lane and Highway 128 (Jal Highway). The proposed Roadrunner Substation would be approximately 5-10 acres in size, located just north of Highway 128, in T24S, R33E, Section 13. The project corridor parallels the north side of Highway 128 for ~1.1 miles before crossing the road at a perpendicular angle. It continues generally west and northwest for ~17.5 miles, offset approximately one mile south of Highway 128. After which it turns north for ~2.2 miles, then turns generally northwest and parallels Highway 128 for ~1.8 miles and offset to the south west by 0.10 mile. The corridor crosses Highway 128 at an angle and then proceeds northwest for ~5 miles. The project corridor proceeds in a northerly direction across rangeland for ~2.2 miles. It then proceeds in a north, northwesterly and westerly direction for ~6.3 miles, crossing flat to rolling terrain. The project corridor crosses Highway 128 at a perpendicular angle. The project corridor then turns generally north for ~4.3 miles and crosses Highway 31 at a perpendicular angle. The corridor continues roughly northwest for ~2 miles until it turns north for 4 miles to terminate at the existing Potash Junction Substation. As the line travels north, Highway 31 travels north by northwest and then northwest to re-approach the project corridor (Appendix A).

2.5 No Action

Under the No Action alternative, the BLM would not issue an ROW and the transmission line, expansion to the Potash Junction Substation and proposed Roadrunner Substation would not be built. Current environmental, land use and socio-economic conditions would continue. Potash extractive industries would strain the power resources and could cause local brown-outs.

2.6 Alternatives Analyzed in Detail

2.6.1 Alternative A

The Alternative A corridor is ~41 miles in length. The corridor commences at the proposed Roadrunner Substation, approximately 5-10 acres in size, in Lea County near the intersection of Vaca Lane and Highway 128 and parallels the north side of Highway 128 for ~1.1 miles before crossing the road at a perpendicular angle to continue generally west and northwest for ~23 miles and offset approximately one mile south of Highway 128. It turns north and crosses Highway 128 at a perpendicular angle approximately one half mile west of Nash Draw Road and proceeds in a northerly direction across rangeland for ~3.75 miles. The segment is west of, and near the base of Livingston Ridge. The project corridor then proceeds in a westerly direction for approximately four miles and crosses the salt flat, in close proximity to mine tailings from the Mosaic Potash Mine. The project corridor then turns generally north for approximately 8 miles, and crosses Highway 31 at a perpendicular angle. The corridor continues roughly northwest for ~2 miles until it turns north for 4 miles to terminate at the existing Potash Junction Substation. As the line travels north, Highway 31 travels north by northwest and then northwest to re-approach the project corridor. (Appendix A).

2.6.2 Alternative B

The Alternative B corridor is ~41 miles in length. This alternative was chosen to avoid the mine tailings from the Mosaic Potash Mine, mentioned in section 2.3.1. The corridor commences at the proposed Roadrunner Substation in Lea County, approximately 5-10 acres in size, near the intersection of Vaca Lane and Highway 128. The project corridor parallels the north side of Highway 128 for ~1.1 miles before crossing the road at a perpendicular angle and then continues generally west and northwest for ~23 miles and offset approximately one mile south of Highway 128. The project corridor turns north and crosses Highway 128 at a perpendicular angle approximately one half-mile west of Nash Draw Road and proceeds in a northerly direction across rangeland for ~3.75 miles. The segment is west of, and near the base of Livingston Ridge. It then proceeds in a westerly direction for approximately one mile, crossing flat to rolling terrain and then then north for ~2.75 miles, then west three miles, crossing Highway 128 at a perpendicular angle, avoiding the area of the salt flat. The project corridor then turns generally north for approximately five miles and crosses flat to slightly rolling rangeland. The corridor crosses Highway 31 at a perpendicular angle. The corridor continues roughly northwest for ~2 miles until it turns north for 4 miles to terminate at the existing Potash Junction Substation. As the line travels north, Highway 31 travels north by northwest and then northwest to re-approach the project corridor. (Appendix A).

2.6.3 Alternative C

The Alternative C corridor is ~41 miles in length. This alternative was chosen to minimize the length of the line to be constructed over regions with potential for karst. The corridor commences at the proposed Roadrunner Substation, approximately 5-10 acres in size, in Lea County near the intersection of Vaca Lane and Highway 128. The project corridor parallels the north side of Highway 128 for ~1.1 miles before crossing the road at a perpendicular angle and then continues generally west and northwest for ~17.5 miles and offset approximately one mile south of Highway 128. It then turns north for ~2.2 miles then turns generally northwest and parallel Highway 128 for ~1.8 miles and offset to the southwest by 0.10 mile. The corridor crosses Highway 128 at an angle and then proceeds north 0.7 mile, then northwest for ~4.4 miles. The project corridor proceeds in a northerly direction across rangeland for ~2.2 miles. The segment is west of, and near the base of Livingston Ridge. The project corridor then proceeds in a north, northwesterly and westerly direction for ~6.3 miles, crossing flat to rolling terrain. The project corridor crosses Highway 128 at a perpendicular angle, avoiding the area of the salt flat. The project corridor then turns generally north for ~4.3 miles and crosses flat to slightly rolling rangeland. It crosses Highway 31 at a perpendicular angle. The corridor continues roughly northwest for ~2 miles until it turns north for 4

miles to terminate at the existing Potash Junction Substation. As the line travels north, Highway 31 travels north by northwest and then northwest to re-approach the project corridor (Appendix A).

Table 2.3 Differences between Discussed Alternatives

Alternative	Defining Factors
Proposed Action	Minimizes distance of line over possible karst. Avoids mine tailings; avoids cultural sites and minimizes visual impacts. Avoids significant effects to plants/wildlife including T, E & S species.
No Action	No negative effect (karst, plants/wildlife, visual resources, etc.) No benefit to socio-economic factors, infrastructure, power availability for industry. Potential negative cumulative effect if power demand is met by less efficient sources and distribution of energy.
Alternative A	Does not avoid geologically unstable Mosaic Potash mine tailings. Does not minimize distance of line over possible karst region (Nash Draw).
Alternative B	Avoids geologically unstable Mosaic Potash mine tailings. Does not minimize distance of line over possible karst region (Nash Draw)
Alternative C	Minimizes distance of line over possible karst. Avoids mine tailings. Does not minimize visual impacts. Avoids significant effects to plants/wildlife including T, E & S species.

3.0 Affected Environment and Environmental Impacts

3.1 Karst

3.1.1 Affected Environment

The proposed project is located in gypsum karst terrain, a landform that is characterized by underground drainage through solutionally enlarged conduits. Gypsum karst terrain may contain sinkholes, sinking streams, caves, and springs. Sinkholes leading to underground drainages and voids are common. These karst features, as well as occasional fissures and discontinuities in the bedrock, provide the primary sources for rapid recharge of the groundwater aquifers of the region (Vine 1963).

The BLM categorizes all areas managed by the Carlsbad Field Office as having either low, medium, high or critical cave potential based on geology, occurrence of known caves, density of karst features, and potential impacts to fresh water aquifers. This project occurs within a High Karst Zone in Nash Draw and Medium Karst Zone throughout the remainder of its length. The proposed line through Nash Draw is located within 150 feet of a known cave and sinking ephemeral stream. The karst zones are defined as follows:

High Karst Zone –in known soluble rock types and contain a high frequency of significant caves and karst features such as sinkholes, bedrock fractures that provide rapid recharge of karst aquifers, and springs that provide riparian habitat.

Medium Karst Zone – in known soluble rock types but may have a shallow insoluble overburden. These areas may contain isolates karst features such as caves and sinkholes. Groundwater recharge may not be wholly dependent on karst features but the karst features still provide the most rapid aquifer recharge in response to surface runoff.

Field notes from the on-site inspection indicate that sinkholes, caves, and at least one sinking ephemeral stream exist in the Nash Draw portion of the proposed action. No springs were observed. Unknown features may also exist. Due to these factors, this action is subject to mitigation measures designed to adequately protect known and potential cave/karst resources.

Sinkholes and cave entrances collect water and can accumulate rich organic materials and soils. This, in conjunction with the stable microclimate near cave entrances, support a high diversity and density of plant life which provides habitat for a higher diversity and density of wildlife such as raptors, rodents, mammals, and reptiles.

The interior of the caves support a large variety of troglobitic, or cave environment-dependent species. The troglobitic species have adapted specifically to the cave environment due to constant temperatures, constant high humidity, and total darkness. Some of the caves in the area contain bat colonies. Many of the caves in this area also contain fragile cave formations known as speleothems.

The affected area is largely in a karst setting. Nash Draw is a relatively young geologic feature, having been formed during the last 500,000 years. The valley resulted from uplift and exposure of the Rustler formation during a wetter climate that characterized the Pleistocene in the area. The soluble nature of the Rustler resulted in rapid solutional weathering of the evaporitic rock. Dissolution continues to this day, as evidenced by numerous sinkholes, caves and sinking streams, found in Nash Draw. Solution is most pronounced in areas of exposure of the gypsum deposits in the Forty-Niner and Tamarisk members. These areas are illustrated in Attachment 1, Sheets 1–54 (Appendix C).

There are ongoing natural and anthropogenic processes that could cause changes to the geologic and hydrologic environment under the No Action alternative. Sinkholes will continue to open and surface waters will continue to erode the overburden and possibly open new sinkholes. Existing caves will continue to enlarge and experience collapse. Ongoing anthropogenic processes including oil well drilling, mining and associated activities could trigger cave collapse or disrupt groundwater flow and cause sinkhole development.

Indirect impacts of karst development include subsurface piracy of surface streams outside the corridor into karst features that could exacerbate sinkhole development. Groundwater withdrawal from nearby underground mines or impacts from oil well drilling could also lead to karst development elsewhere.

A field reconnaissance was conducted in October 2013 to map karst features along the line of the Proposed Action. TRC returned to the site in December 2013 to conduct additional reconnaissance on a short relocation to avoid a spur of Livingston Ridge (Figure 1, Appendix C). The surveys were conducted under the supervision of a geologist experienced in the identification of karst features. All karst features located within 300 feet of the proposed transmission line were identified and located using a global positioning system (GPS). A summary of that activity is included as Attachment 1, Sheets 1–54 (Appendix C). For more details, see Wedekind and Papez 2014**.**

The table below outlines the significant features found during the field reconnaissance and their potential for impact to the geology or topography.

Table 3.1 Significant karst features and potential impacts

Karst Feature	Potential Impact	Number of Occurrences	Recommended Action
Small open sinkholes in dolines and arroyos	Increased siltation in runoff	7	Proper use of silt fences during construction. Silt dams and vegetated earthen berms if deemed necessary in consultation with the BLM.
Large sinkholes	Increased siltation in runoff	2	Proper use of silt fences during construction. Silt dams and vegetated earthen berms if deemed necessary in consultation with the BLM.
Large sinkholes	Collapse	2	Maintain at least 100 feet setback distance from feature for any vehicles or equipment. Use flagging to demarcate area.
Small cavities in caliche	Habitat loss	14	Do not pile excavated material over or in features
Exposed soluble bedrock	Higher potential for sinkhole development	17	Awareness issue. Avoid practices that may increase runoff to such areas.

3.1.2 Impacts from No Action Alternative

Direct and Indirect Impacts

The No Action alternative will have no impact on the karst in the region as no construction activities would occur. No grading or excavation would occur and there would be no vehicular traffic.

Cumulative Impacts

There will be no cumulative impacts that would occur to karst in the region under the No Action alternative.

Mitigation Measures

No mitigation measures would be required as there would be no impact to karst.

3.1.3 Impacts from the Proposed Action

Direct and Indirect Impacts

A possibility exists for slow subsidence or sudden collapse of a sinkhole, cave passage, or void during power line construction operations, associated safety hazards and potential for increased environmental impact. Opening a new entrance into a cave system can change air flow patterns, temperatures, insurgencies, mineral development, and biological community and may cause other undetermined effects on the cave ecosystem. Encountering a void would also have adverse impacts on the stability of the power pole and may result in the subsequent failure of that pole.

Direct impacts to the karst environment may occur in the project area due to vehicular traffic during construction and the placement of new structures. Traffic would be minimal after completion of the construction and generally limited to maintenance along the right-of-way. The impact would be minimal and is restricted to the possibility that vehicle weight may trigger soil collapse into an existing void.

Compared to other alternatives, the Proposed Action (Figure 1, Appendix C) follows a diagonal route across Quahada Ridge and Nash Draw; then steps up onto Livingston Ridge and across the Los Medanos sand dunes. Compared to the other build route alternatives, the Proposed Action has the least amount of line (~7.3 miles, ~133 acres) crossing the area of greatest concern for potential karst collapse (Nash Draw). The Proposed Action however, passes near a large observed collapse with exposed fractured gypsum bedrock and a cave entrance in Nash Draw and also crosses large areas of caliche that include small collapse features that could result in a pole failure or pose a slightly increased safety concern. The POD indicates that the eventual ~41 mile power line including the ~150 foot wide right-of-way would have a footprint of ~750 acres (Cribbin and Vaughan 2013).

Cumulative Impacts

Approval of the use of this corridor by the BLM may result in more applications for use of this route across Nash Draw since it will be creating a corridor across previously untouched areas. Some of these other uses might be less compatible with karst and might not have been approved prior to the new corridor created if this route is chosen.

Mitigation Measures

Construction access routes will be routed around sinkholes and other karst features to avoid or lessen the possibility of encountering near surface voids and to minimize changes to runoff or possible leaks and spills from entering karst systems. Power lines will be adjusted (by spacing of poles) to avoid cave and karst features. The BLM Carlsbad Field Office will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction and no further construction will be done until clearance has been issued by the Authorized Officer. Special restoration stipulations or realignment may be required.

The visible karst features throughout this route have been mapped (barring a short segment in T 23S, R30E, Sections 1 and 12, which will be surveyed prior to any construction) and the features have been

located in the field and will be avoided to the extent practicable. The large collapse in Nash Draw will be spanned with structures placed as far away as practicable from the collapse in either direction along the line. Silt fencing will be used to mitigate runoff into open karst features and signage and temporary fencing/flagging will discourage casual traffic into these sensitive areas. Silt dams and vegetated earthen berms with seeding/re-vegetation will be used in consultation with the BLM if permanent mitigation is deemed necessary in consultation with the BLM.

All karst features have been mapped and logged via GPS and will be avoided to the extent practicable. Any existing karst or newly discovered karst feature that poses a risk of injury or vehicular damage will be flagged and/or fenced to prevent an accidental fall or entry by a vehicle. Maintenance roads and smaller power lines will be routed around or spanned over, as will sinkholes and other karst features, when practical. The design engineers will adjust pole spacing of the larger power lines to avoid cave and karst features. Turnout ditches and drainage leadoffs will not be constructed in such a manner as to increase or decrease the natural flow of water into or out of cave or karst features. Excavations and borings will be completed as quickly as possible to minimize the possibility of precipitation or runoff being directed into the subsurface. No other mitigation measures should be needed.

3.1.4 Impacts from Alternative A

Direct and Indirect Impacts

Compared to other alternatives, Alternative A (Figure 1) follows the longest route (~12.2 miles and ~223 acres) across the highly soluble Tamarisk member of the Rustler Formation within Nash Draw. This route also crosses an area covered with tailings from the Mosaic Potash/United Salt facilities (located at Section 1 and 12 of T22S R29E). Aerial photographs show evidence of sinkhole development in the tailings. Alternative A, however, avoids most areas of caliche. The longer route across soluble bedrock results in an increased potential impact of karst collapse and/or sinkhole development compared to other routes. Overall, there would be little impact from construction of the line along this right-of-way other than a slight possibility of the collapse of a sinkhole, cave passage, or void during construction operations, with associated safety hazards and potential for increased environmental impact. Opening a new entrance into a cave system or causing collapse of an existing cave can change the air flow patterns, temperature insurgencies, mineral development and biological community and may cause other undetermined effects on the cave ecosystem. Encountering a void would also have adverse impacts on the stability of the power pole and may result in the subsequent failure of that pole. Soil disturbance during construction could cause additional erosion of surface soil through wind and precipitation. Loss of surface cover can increase the chance of overland flow and sinkhole formation. The POD indicates that the eventual ~41 mile power line including the ~150 foot wide right-of-way would have a footprint of ~750 acres (Cribbin and Vaughan 2013).

Cumulative Impacts

Approval of the use of this corridor by the BLM may result in more applications for use of this route across Nash Draw since it will create a corridor across previously untouched areas. Some of these other uses might be less compatible with karst but might not have been approved prior to the new corridor created if this route is chosen.

Mitigation Measures

Construction access routes will be routed around sinkholes and other karst features to avoid or lessen the possibility of encountering near surface voids and to minimize changes to runoff or possible leaks and spills from entering karst systems. Power lines will be adjusted (by spacing poles) to avoid cave and karst features. The BLM Carlsbad Field Office, will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction and no further construction will be

done until clearance has been issued by the Authorized Officer. Special restoration stipulations or realignment may be required.

Though the visible karst features through some portions of this route have been mapped, significant portions of the route remain to be surveyed and mapped. If this route were selected for construction, those surveys would be completed prior to construction, allowing the features to be relocated in the field and avoided to the extent practicable. Silt fencing will be used to mitigate runoff into open karst features and signage and temporary fencing/flagging will discourage casual traffic into these sensitive areas. Silt dams and vegetated earthen berms with seeding/re-vegetation will be used in consultation with the BLM if permanent mitigation is deemed necessary.

All karst features will have been mapped and logged via GPS and will be avoided to the extent practicable. Any existing or newly discovered karst features that pose a risk of injury or vehicular damage will be flagged and/or fenced to prevent an accidental fall or entry by a vehicle. Maintenance roads and smaller power lines will be routed around, or spanned over, as will sinkholes and other karst features when practical. The design engineers will adjust pole spacing of the larger power lines to avoid cave and karst features. Turnout ditches and drainage leadoffs will not be constructed in such a manner as to increase or decrease the natural flow of water into or out of cave or karst features. Excavations and borings will be completed as quickly as possible to minimize the possibility of precipitation or runoff from being directed into the subsurface. Seeding the disturbed area with local vegetation will be done in consultation with BLM.

3.1.5 Impacts from Alternative B

Alternative B (Figure 1, Appendix C) follows a long route across the highly soluble Tamarisk member of the Rustler Formation within Nash Draw. This route avoids the area covered with tailings in Alternative A.

Direct and Indirect Impacts

Alternative B has more distance than the Proposed Alternative across soluble bedrock (~11.8 miles, ~215 acres), resulting in an increased potential impact of potential karst collapse and/or sinkhole development compared to the proposed route. Overall, there is little impact from the alternative other than a slight possibility of the collapse of a sinkhole, cave passage, or void during construction operations, with associated safety hazards and potential for increased environmental impact. Opening a new entrance into a cave system or causing collapse of an existing cave can change the air flow patterns, temperatures insurgencies, mineral development and biological community and may cause other undetermined effects on the cave ecosystem. Encountering a void would also have adverse impacts on the stability of the power pole and may result in the subsequent failure of that pole. Soil disturbance during construction could cause additional erosion of surface soil through wind and precipitation. Loss of surface cover can increase the chance of overland flow and sinkhole formation. The Plan of Development (POD) indicates that the eventual ~41 mile power line including the ~150 foot wide right-of-way would have a footprint of ~750 acres (Cribbin and Vaughan 2013).

Cumulative Impacts

Approval of the use of this corridor by the BLM may result in more applications for use of this route across Nash Draw since it will be creating a corridor across previously untouched areas. Some of these other uses might be less compatible with karst but might not have been approved prior to the creation of the new corridor if this route is chosen.

Mitigation Measures

Construction access routes will be routed around sinkholes and other karst features to avoid or lessen the possibility of encountering near surface voids and to minimize changes to runoff or possible leaks and spills from entering karst systems. Power lines will be adjusted (spacing of poles) to avoid cave and karst

features. The BLM Carlsbad Field Office, will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction and no further construction will be done until clearance has been issued by the Authorized Officer. Special restoration stipulations or realignment may be required.

While the karst features through some portions of this route have been mapped, significant portions of the route remain to be surveyed and mapped. If this route were selected for construction, those surveys would be completed prior to construction and the known features would be relocated in the field so they could be avoided to the extent practicable. Silt fencing will be used to mitigate runoff into open karst features and signage and temporary fencing/flagging will discourage casual traffic into these sensitive areas. Silt dams and vegetated earthen berms with seeding/re-vegetation will be used in consultation with the BLM if permanent mitigation is deemed necessary in consultation with the BLM.

All karst features will be mapped and logged via Global Positioning Satellite (GPS) so they may be avoided. Any existing karst or new karst feature that poses a risk of injury or vehicular damage will be flagged and/or fenced to prevent an accidental fall or entry by a vehicle. Maintenance roads and smaller power lines will be routed around or spanned over, as will sinkholes and other karst features when practical. The design engineers will adjust pole spacing to avoid cave and karst features. Turnout ditches and drainage leadoffs will not be constructed in such a manner as to increase or decrease the natural flow of water into or out of cave or karst features. Excavations and borings will be completed as quickly as possible to minimize the possibility of precipitation or runoff being directed into the subsurface. Seeding the disturbed area with local vegetation will be done in consultation with BLM.

3.1.6 Impacts from Alternative C

Compared to Alternative A and Alternative B, Alternative C (Figure 1, Appendix C) follows the shortest route (~7.3 miles, ~132 acres) across the highly soluble Tamarisk member of the Rustler Formation within Nash Draw (area with potential for karst collapse). The route is very similar to the Proposed Action except it traverses a small promontory of Livingston Ridge. Alternative C, however, crosses large areas of caliche that include small collapse features that could result in a pole failure or pose a slightly increased safety concern. The POD indicates that the eventual ~41 mile power line including the ~150 foot wide right-of-way would have a footprint of ~750 acres (Cribbin and Vaughan 2013).

Direct and Indirect Impacts

The Alternative C route across soluble bedrock results in the same potential of impact of karst collapse and/or sinkhole development as the Proposed Alternative. Overall, there is little impact from the alternative other than a slight possibility of the collapse of a sinkhole, cave passage, or void during construction operations, with associated safety hazards and potential for increased environmental impact. Opening a new entrance into a cave system or causing collapse of an existing cave can change the air flow patterns, temperatures insurgencies, mineral development and biological community and may cause other undetermined effects on the cave ecosystem. Encountering a void would also have adverse impacts on the stability of the power pole and may result in the subsequent failure of that pole. Soil disturbance during construction could cause additional erosion of surface soil through wind and precipitation. Loss of surface cover can increase the chance of overland flow and sinkhole formation.

Cumulative Impacts

Approval of the use of this corridor by the BLM may result in more applications for use of this route across Nash Draw since it will be creating a corridor across untouched areas. Some of these other uses might be less compatible with karst but might not have been approved prior to the creation of the new corridor created if this route is chosen.

Mitigation Measures

The best mitigation strategy for karst environments is through minimizing the potential for disturbance to karst or collapse. Construction activities that could disturb karst environments are minimized under this route because the length of the route over known karst areas among the four alternatives. The visible karst features throughout this route having been mapped and the features have been located in the field and avoided to the extent practicable. The large collapse in Nash Draw will be spanned with structures placed as far away as practicable from the collapse in either direction along the line. Silt fencing will be used to mitigate runoff into open karst features and signage and temporary fencing/flagging will discourage casual traffic into these sensitive areas. Silt dams and vegetated earthen berms, with seeding/re-vegetation will be used in consultation with the BLM if permanent mitigation is deemed.

The BLM Carlsbad Field Office will be consulted if any subsurface drainage channels, cave passages, or voids are penetrated during construction and no further construction will be done near that location until clearance has been issued by the Authorized Officer. All karst features will be mapped and logged via GPS so they may be avoided. Any existing or newly discovered karst feature that poses a risk of injury or vehicular damage will be flagged and/or fenced to prevent an accidental fall or entry by a vehicle. Maintenance roads and smaller power lines will be routed around, or spanned over sinkholes and other karst features when practical. The design engineers will adjust pole spacing to avoid cave and karst features. Turnout ditches and drainage leadoffs will not be constructed in such a manner as to increase or decrease the natural flow of water into or out of cave or karst features. Excavations and borings will be completed as quickly as possible to minimize the possibility of precipitation or runoff being directed into the subsurface. Seeding the disturbed area with local vegetation will be done in consultation with BLM.

3.2 Geology

Most of the project is located in southeastern Eddy County with a small portion in southwestern Lea County, NM. These counties are located in the southeast corner of the state and border on Texas. The area is characterized by flat to gently rolling hills and mesas, bisected by occasional intermittent streams. The Pecos River, which flows from north to south through the center of Eddy County, is the major regional drainage. This portion of Lea County is largely a flat upland mesa and an important part of the Delaware Basin oil field, (Reasonable Foreseeable Development (RFD) Scenario for the BLM New Mexico Pecos District).

The proposed transmission line begins, at the Potash Junction Substation, on a broad upland called Quahada Ridge, crosses a valley called Nash Draw, then climbs over Livingston Ridge and stays in an upland dune field known as Los Medanos until it ends at the proposed Roadrunner Substation (Figure 1, Appendix C). The transmission line is proposed to cross the northern corner of Nash Draw. Nash Draw is a surface depression, about 20 miles long and 5–12 miles wide. The draw is a broad valley bounded by Quahada Ridge on the west and Livingston Ridge on the east that forms a drainage basin for Laguna Grande de la Sal, a natural playa lake. Surface drainage is to the southwest to the lake. Elevations in this portion of the drainage range from 3100 feet amsl (above mean sea level) in the base of the draw to 3300 feet on Livingston Ridge, a prominent escarpment with over 100 feet of relief. Most of the draw is rolling and incised by dry arroyos with broad areas of sand dunes stabilized by vegetation. Within the draw are numerous small topographic depressions with 10–20 feet of relief. These depressions are often more thickly vegetated than most of the area because the internal surface drainage is poor and precipitation is ponded after heavy rains. The Los Medanos area is an active oil field with areas of sand dunes interspersed with exposed caliche.

Nash Draw is floored by soluble bedrock of the Rustler Formation, a rather heterogeneous deposit of Late Permian sandstone, siltstone, limestone, dolostone and evaporites - mostly gypsum, anhydrite and halite that vary widely from 250 to 670 feet in thickness. Thicker deposits within the Rustler are also named, they include: the Forty-niner member, a massive, white gypsum unit; the Magenta member, a pink

dolomite with laminated anhydrite; and the Tamarisk member, another massive white gypsum unit. Livingston Ridge is rimmed by the Dewey Lake Formation, a Triassic sequence of dark reddish brown siltstone, sandstone and shale that conformably overlies the Rustler Formation. The Rustler dips very gently to the east (Vine 1963).

The bedrock is often overlain by light reddish brown Quaternary aeolian sand, usually forming dunes. The dunes are mostly vegetated with mesquite and creosote bush. The route also traverses some alluvial fan deposits on the slopes of Livingston Ridge. Quaternary caliche is present in parts of the valley, with caliche prevalent on the top of Livingston Ridge and an outlier called Forty-Niner Ridge, where the deposit is known as the Mescalero caliche (Powers et al. 2006). The caliche appears locally as nodular regolith at the surface or as thick-bedded travertine that forms the caprock for the ridge.

3.2.1 Affected Environment

A field reconnaissance was conducted in October 2013 to confirm the local geology and map karst features along the line of the Proposed Action. TRC returned to the site in December 2013 to conduct additional reconnaissance on a short relocation to avoid a spur of Livingston Ridge as well as subsequent visits to survey three more short relocations in close proximity to the existing survey area, in regions that were not regarded as high karst risk (Figure 1, Appendix C). The reconnaissance was conducted under the supervision of an experienced geologist. Results of the karst survey are presented in the next section of this report.

3.2.2 Impacts from No Action alternative

Direct and Indirect Impacts

The No Action alternative will have no impact on the geology or topography as no construction activities would occur. No grading or excavation would occur and there would be no vehicular traffic.

Cumulative Impacts

There will be no cumulative impacts that would occur to topography and geology under the No Action alternative.

Mitigation Measures

No mitigation measures would be required as there would be no impact to the geology.

3.2.3 Impacts from the Proposed Action

Compared to other alternatives, the Proposed Action (Figure 1, Appendix C) follows a diagonal route across Quahada Ridge and Nash Draw; then steps up onto Livingston Ridge and across the Los Medanos sand dunes.

Direct and Indirect Impacts

Increased traffic during construction could result in an increase in runoff and sediment flows into the local arroyos. The proposed action will have no impact to the topography or local geology. Soil disturbance during construction could cause additional erosion of surface soil through wind and precipitation. Loss of surface cover can increase the chance of overland flow. The POD indicates that the eventual ~41 mile power line including the ~150 foot wide right-of-way would have a footprint of ~750 acres (Cribbin and Vaughan 2013).

Cumulative Impacts

The proposed action will have no cumulative impact to the topography or local geology. There are ongoing surface activities that include vehicular traffic that include ranching and recreation. These activities may also increase erosion and add to sediment flows to intermittent surface streams.

Mitigation Measures

Silt fences and/or berms will be placed in areas that could drain to the arroyos. Excavations and borings will be completed as quickly as possible to minimize the possibility of precipitation or runoff being directed into the subsurface. No other mitigation measures should be needed.

3.2.4 Impacts from Alternative A

Compared to other alternatives, Alternative A (Figure 1) follows the longest route (~12.2 miles and ~223 acres) across the Tamarisk member of the Rustler Formation within Nash Draw. This route also crosses an area covered with tailings from the Mosaic Potash/United Salt facilities (located at Section 1 and 12 of T22S R29E). Mine tailings are not suitable for pole placement. Alternative A avoids the largest areas of caliche. Overall, there would be few impacts from construction of the line along this right-of-way.

Direct and Indirect Impacts

Increased traffic during construction could result in an increase in runoff and sediment being carried into the local arroyos. The proposed action will have no impact to the topography or local geology. Soil disturbance during construction could cause additional erosion of surface soil through wind and precipitation. Loss of surface cover can increase the chance of overland flow. The POD indicates that the eventual ~41 mile power line including the ~150 foot wide right-of-way would have a footprint of ~750 acres (Cribbin and Vaughan 2013).

Cumulative Impacts

There are ongoing surface activities including ranching and recreation that rely vehicular traffic. These activities may also increase erosion and sediment flows into intermittent surface streams.

Mitigation Measures

Silt fencing and/or berms will be used to mitigate runoff into arroyos. Turnout ditches and drainage leadoffs will not be constructed in such a manner as to increase or decrease the natural flow of water into or out arroyos. Excavations and borings will be completed as quickly as possible to minimize the possibility of precipitation or runoff being directed into the subsurface. Seeding the disturbed area with local vegetation will be done in consultation with BLM.

3.2.5 Impacts from Alternative B

Alternative B (Figure 1, Appendix C) follows a long route across the Tamarisk member of the Rustler Formation within Nash Draw. This route avoids the area covered with tailings in Alternative A.

Direct and Indirect Impacts

Overall, there is little impact from Alternative B relative to the other alternatives. Soil disturbance during construction could cause additional erosion of surface soil through wind and precipitation. Loss of surface cover can increase the chance of overland flow and erosion. The POD indicates that the eventual ~41 mile power line including the ~150 foot wide right-of-way would have a footprint of ~750 acres (Cribbin and Vaughan 2013).

Cumulative Impacts

There are ongoing surface activities that include vehicular traffic that include ranching and recreation. These activities may also increase erosion and sediment flows into intermittent surface streams.

Mitigation Measures

Silt fencing and/or berms will be used to mitigate runoff into arroyos. Turnout ditches and drainage leadoffs will not be constructed in such a manner as to increase or decrease the natural flow of water into or out arroyos. Excavations and borings will be completed as quickly as possible to minimize the possibility of precipitation or runoff being directed into the subsurface. Seeding the disturbed area with local vegetation will be done in consultation with BLM.

3.2.6 Impacts from Alternative C

Compared to Alternative A and Alternative B, Alternative C (Figure 1, Appendix C) follows the shortest route (~7.3 miles, ~132 acres) across the Tamarisk member of the Rustler Formation within Nash Draw. The route is very similar to the Proposed Action except it traverses a small promontory of Livingston Ridge. This promontory is very steep and could result in increased erosion along the slopes during construction. Alternative C, however, crosses large areas of caliche, where erosion is less likely. The POD indicates that the eventual ~41 mile power line including the ~150 foot wide right-of-way would have a footprint of ~750 acres (Cribbin and Vaughan 2013).

Direct and Indirect Impacts

Soil disturbance during construction could cause additional erosion of surface soil through wind and precipitation. Loss of surface cover can increase the chance of overland flow and erosion.

Cumulative Impacts

There are ongoing surface activities that include ranching and recreation that rely on vehicular traffic. These activities may also increase erosion and sediment flows into intermittent surface streams.

Mitigation Measures

Silt fencing and/or berms will be used to mitigate runoff into arroyos. Turnout ditches and drainage leadoffs will not be constructed in such a manner as to increase or decrease the natural flow of water into or out arroyos. Excavations and borings will be completed as quickly as possible to minimize the possibility of precipitation or runoff being directed into the subsurface. Seeding the disturbed area with local vegetation will be done in consultation with BLM.

3.3 Hydrology

3.3.1 Affected Environment

The Pecos River drains most of Eddy County. The only perennial tributaries to the Pecos River are Cottonwood Creek, Black River and the Delaware River. All of these tributaries enter the Pecos River from the west. There are no significant tributaries east of the Pecos River; almost all drainage east of the river is to enclosed basins (Hendrickson and Jones 1952). The primary hydrological feature in the project area is Nash Draw. Nash Draw is a broad basin with numerous intermittent streams that drains to Laguna Grande de la Sal, a natural playa.

Groundwater in Eddy and Lea counties occurs in consolidated Permian and Triassic age rocks and in relatively unconsolidated Tertiary and Quaternary sediments. There are many aquifers providing groundwater in Eddy County, but not all of this water is acceptable for human consumption due to high

concentrations of dissolved solids (generally over 1000 mg/L with areas exceeding 35,000 mg/L). Well depths range from 20 feet near the Pecos River to 800 feet in areas of the Guadalupe Mountains. Average well depth is approximately 200 feet in most areas (BLM 1994). Groundwater flow west of the Pecos River is generally eastward; and east of the Pecos River, it is south and southwestward. Discharges from the aquifer included human and livestock use, irrigation and industrial use (mainly potash mining). Sinkholes, sinking streams, caves and springs, as well as occasional fissures and discontinuities in the bedrock, provide the primary sources for aquifer recharge in the region. Eddy County aquifers are also recharged directly through infiltration of precipitation or indirectly by surface waters percolating down from streams, ponds, reservoirs and irrigated land. The primary aquifers east of the Pecos River are: the Chalk Bluff and Castile Formations, Salado and Rustler Formations, Quahada Ridge, Dockum group, Ogallala Formation and alluvium. Playa inundation in the region primarily depends on precipitation and runoff (Bartuszevige et al. 2012).

There are numerous groundwater wells in the project area. No groundwater wells were seen within the proposed transmission line corridor. Water well records indicate production wells in the area are generally deeper than 250 feet below ground surface with the water level measured below 125 feet.

3.3.2 Impacts from No Action Alternative

Direct and Indirect Impacts

The No Action alternative will have no impact on the hydrology as no construction activities would occur.

Cumulative Impacts

There will be no cumulative impacts that would occur under the No Action alternative.

Mitigation Measures

No mitigation measures would be required as there would be no impact to groundwater.

3.3.3 Impacts from the Proposed Action

Direct and Indirect Impacts

No significant impacts to groundwater are anticipated. No water would be obtained from or discharged into groundwater because of the project. There is a possibility of siltation and runoff into open karst features.

Cumulative Impacts

There will be no cumulative impacts that would occur as a result of the Proposed Action.

Mitigation Measures

Silt fencing will be used to mitigate runoff into open karst features. Silt dams and vegetated earthen berms with seeding/re-vegetation will be used in consultation with the BLM if permanent mitigation is deemed necessary.

3.3.4 Impacts from Alternative A

Direct and Indirect Impacts

No impacts to groundwater are anticipated. No water would be obtained from or discharged into groundwater because of the project. There is a possibility of siltation and runoff into open karst features.

Cumulative Impacts

There will be no cumulative impacts that would occur as a result of Alternative A.

Mitigation Measures

Silt fencing will be used to mitigate runoff into open karst features.

3.3.5 Impacts from Alternative B

Direct and Indirect Impacts

No impacts to groundwater are anticipated. No water would be obtained from or discharged into groundwater because of the project. There is a possibility of siltation and runoff into open karst features.

Cumulative Impacts

There will be no cumulative impacts that would occur as a result of Alternative B.

Mitigation Measures

Silt fencing will be used to mitigate runoff into open karst features. Silt dams and vegetated earthen berms with seeding/re-vegetation will be used in consultation with the BLM if permanent mitigation is deemed necessary in consultation with the BLM.

3.3.6 Impacts from Alternative C

Direct and Indirect Impacts

No impacts to groundwater are anticipated. No water would be obtained from or discharged into groundwater because of the project. There is a possibility of siltation and runoff into open karst features.

Cumulative Impacts

There will be no cumulative impacts that would occur as a result of Alternative C.

Mitigation Measures

Silt fencing will be used to mitigate runoff into open karst features. Silt dams and vegetated earthen berms with seeding/re-vegetation will be used in consultation with the BLM if permanent mitigation is deemed necessary in consultation with the BLM.

3.4 Climate and Air Quality

3.4.1 Affected Environment

Over the course of a year, the temperature typically varies from 29°F to 96°F and is rarely below 19°F or above 105°F. The warm season lasts from May 17 to September 10 with an average daily high temperature above 88°F. The hottest day of the year is June 23, with an average high of 96°F and low of 67°F. The average high temperature increases from 58°F in January by about 5-10 degrees per month until June and July, when the average high is 95°F. Similarly, the average high drops by 5-10°F per month until December. The average rainfall is highest between May and October, when it ranges from 1.16 to 2.11 inches per month, followed by lower monthly precipitation (0.81 to 0.51 inches) from October to March. April sees a slight increase in precipitation as the effects of the annual summer monsoon commence.

The cold season lasts from November 21 to February 16 with an average daily high temperature below 63°F. The coldest day of the year is January 4, with an average low of 29°F and high of 56°F. The

probability that precipitation will be observed at this location varies throughout the year. Precipitation is most likely around August 25, occurring in 39 percent of days. Precipitation is least likely around April 4, occurring in 17 percent of days.

June is the average warmest month. The highest recorded temperature was 114°F in 1994. January is the average coolest month. The lowest recorded temperature was -16°F in 1962. September is the average wettest month. The normal annual precipitation is 13.32 inches. The lowest normal monthly precipitation occurs in January at 0.37 inches and September has the highest normal monthly precipitation at 2.67 inches. More than one inch of precipitation typically occurs in the months from May to October (Owenby and Ezell 1992). The number of days without killing frost ranges from 200 to 220 days per year with the last frost occurring between March 30 and April 10 (Tuan et al. 1973). Winds are a significant climate factor in the region. Natural and cultural site formation processes are determined, in part, by wind speed and direction. Between 20 and 40 percent of the year, winds exceed 13 mph (21 kph) with the most severe windstorms in March. Sustained winds of 35 mph (56 kph) with gusts to 50 mph (80 kph) are not uncommon. Winds throughout the year predominantly blow from the southeast, south and southwest in Carlsbad. Prevailing spring winds come from the southeast and winter winds are from the west or southwest (WRCC 2002).

Eddy and Lea counties are located in Air Quality Control Region (AQCR) 155 of the State of New Mexico. Both counties are currently designated by EPA as “attainment” for criteria pollutants for which federal ambient air quality standards exist—nitrogen oxides, sulfur dioxide, carbon monoxide, particulate matter, ozone and lead. This means that the currently measured concentrations of these pollutants in these counties are at or below federal ambient air quality standards. (EPA 2013). This project does not include generators or compressors that emit criteria pollutants or hazardous air pollutants. However, if the switching stations or relay stations use sulfur hexafluoride (SF6—a greenhouse gas) in circuit breakers, there is a potential for greenhouse gas air permitting. This would be determined on a case by case basis depending upon the volume used and concentration. No such use is currently anticipated. However, should it occur, and a permit be required, one would be obtained.

3.4.2 Impacts from No Action Alternative

Direct and Indirect Impacts

No impacts to climate or air quality will occur as no construction would occur.

Cumulative Impacts

There would be no cumulative impacts.

3.4.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

The construction and operation of a transmission line on any of the route alternatives (Preferred, A, B or C) and the proposed substation expansion and new substation construction would have a similar, minor effect on climate change through increased traffic emissions. However, no significant impact would occur to air quality. The level of dust produced by the short term construction activities would be slightly more than that currently from vehicles traveling down dirt roads in the area.

Cumulative Impacts

There would be no cumulative impacts. Air quality impact will occur for a brief period during construction.

Mitigation Measures

The contractor will use best management practices (BMPs), practicable methods and devices as are reasonably available to control, prevent and otherwise minimize atmospheric emissions or discharges of air contaminants. Construction related dust disturbance shall be controlled by the periodic application of water to all disturbed areas along the right-of-way and access roads.

Vehicles and equipment showing excessive emission of exhaust gases due to poor engine adjustments or other inefficient operating conditions shall not be operated until corrective adjustments or repairs are made. No other mitigation measures will be necessary.

3.5 Soils

3.5.1 Affected Environment

The soil resources within the project corridor include the Reeves-Gypsum, Simona-Pajarito and Kermit-Berino soil associations. The Reeves-Gypsum association developed in old alluvium derived from sedimentary rocks. The Simona-Pajarito association developed from wind-worked deposits and consists of sandy, deep soils and shallow soils on caliche. The Kermit-Berino association consists of sandy soils that developed from wind-worked mixed sand deposits (Chugg et al. 1971:General Soil Map).

3.5.1.1 Soil Units

Twenty soil units are within the project area, including the Berino complex, 0 to 3 percent slopes, eroded (BB); Berino-Cacique loamy fine sands association, 0 to 3 percent slopes (BE); Berino-Cacique association, hummocky, 0 to 3 percent slopes (BH); Cacique loamy sand, 0 to 3 percent slopes, eroded (CA); Kermit-Palomas fine sands, 0 to 12 percent slopes (KD); Kermit-Berino fine sands, 0 to 3 percent slopes (KM); Largo loam, 1 to 5 percent slopes (LA); Mobeetie fine sandy loam, 1 to 5 percent slopes (MO); Pajarito loamy fine sand, 0 to 3 percent slopes, eroded (PA); Pajarito-Dune land complex, 0 to 3 percent slopes (PD); Potter-Simona complex, 5 to 25 percent slopes (PS); Pyote loamy fine sand, 0 to 3 percent slopes (PT); Pyote and Maljamar fine sands (PU); Reeves-Gypsum land complex, 0 to 3 percent slopes (RG); Simona gravelly fine sandy loam, 0 to 3 percent slopes (SG); Simona-Upton association, 0 to 3 percent slopes (SR); Simona-Bippus complex, 0 to 5 percent slopes (SM); Tonuco loamy sand, 0 to 3 percent slopes, eroded (TC); and Tonuco loamy fine sand 0 to 3 percent slopes (TF) (Chugg et al. 1971: Sheet 93). The following describes these soil units.

Berino complex, 0 to 3 percent slopes, eroded (BB)

This complex, in the Deep Sand ecological site, consists mostly of Berino soil, described as having the profile typical of the series. It occurs, in association with Pajarito soils, in the smoother areas in the swales and depressions between the dunes of Kermit soils. The soils in this complex have been altered by wind erosion. Their surface layer, 9 to 36 inches thick, is hummocky to billowy. These soils are usually stabilized by Havard oak, mesquite and other vegetation (Chugg et al. 1971:17).

Berino-Cacique loamy fine sands association, 0 to 3 percent slopes (BE)

About 50 percent of this association, in the Deep Sand ecological site, is Berino and about 40 percent is Cacique. The rest is Maljamar, Palomas and Tonuco soils. It is moderately permeable. Runoff is very slow and water intake is rapid. Soil blowing is a severe hazard. The soils in this association are used as range, wildlife and recreational areas. (Turner et al. 1974:15).

Berino-Cacique association, hummocky, 0-3 percent slopes (BH)

About 50 percent of this association, in the Deep Sand ecological site, is Berino and about 40 percent is Cacique. The rest is Maljamar, Palomas and Tonuco soils. It is on low sand dunes and hummocks

intermingled with small concave areas where the red sandy clay subsoil is exposed. The hummocks consist of surface soil that was blown from adjacent areas and deposited around clumps of vegetation, mostly Havard oak and mesquite. (Turner et al. 1974:15).

Cacique loamy sand, 0 to 3 percent slopes, eroded (CA)

This soil, in the Sandy ecological site, has a surface layer of yellowish-red loamy sand about 5 inches thick. The subsoil, about 19 inches thick, is noncalcareous. The upper part consists of yellowish-red sandy loam and the lower part consists of red sandy clay loam. Indurated caliche underlies the subsoil at about 24 inches. This soil is used for native pasture. This soil is susceptible to severe wind erosion if the vegetation cover is severely depleted. (Chugg et al. 1971:19-20).

Kermit-Palomas fine sands, 0 to 12 percent slopes (KD)

This complex, in the Sand Hills and Deep Sand ecological sites, consists of coarse-textured soils. It is about 70 percent Kermit fine sand, 20 percent Palomas fine sand and 10 percent Maljamar and Pyote soils. The landscape is one of large, irregularly sloping duney areas of Kermit fine sand and intervening concave areas of Palomas fine sand dunes are 8 to 12 feet or higher. The concave areas are sandy to a depth of 4 to 20 inches. Below is a red light sandy clay loam. The sand is permeable and runoff is slow. Water intake is rapid. Soil blowing is a severe hazard. (Turner et al. 1974:19-20).

Kermit-Berino fine sands, 0 to 3 percent slopes (KM)

The Kermit-Berino fine sands, 0 to 3 percent slopes (KM), in the Sandy and Deep Sands ecological sites, consists of deep, excessively drained loose sands. The surface is undulating stabilized dunes that are 3 to 15-feet high or more. These soils are slightly to moderately eroded with rapid permeability and low water capacity. Organic content is low. The typical profile consists of a surface layer of yellowish-red fine sand about 7 inches thick, overlying a yellowish red fine sand that extends to a depth of 5 feet (Chugg et al. 1971:25–26).

Largo loam, 1 to 5 percent slopes (LA)

Largo loam, 1 to 5 percent slopes (LA), in the Loamy ecological site, developed in alluvium derived from upland sedimentary material. It occurs on upland alluvial fans. The soil is slightly eroded and is subject to water erosion. Vegetation consists of black grama, blue grama, side-oats grama, vine-mesquite and creosote bush. The typical profile consists of a surface layer of reddish-brown loam that is 4 inches thick which overlies a reddish- brown silt loam that occurs from 4 to 20-inches in depth. Below this layer is a reddish-brown silt loam that is 27 inches thick which overlies a reddish-brown loam to a depth of more than 65 inches (Chugg et al. 1971:27).

Mobeetie fine sandy loam, 1 to 5 percent slopes (MO)

Mobeetie fine sandy loam, 1 to 5 percent slopes (MO), in the Sandy ecological site, is deep, well-drained, moderately dark colored and strongly calcareous soil that developed in fine sandy loam alluvium. It occurs on alluvial fans below the High Plains escarpment. Runoff is slow, permeability is moderately rapid and the water capacity is moderately high.

The soil varies from slightly eroded, to moderately eroded, and is subject to water erosion. Vegetation consists of mesquite and other woody plants in addition to grasses. The typical profile consists of a surface layer of brown fine sandy loam that is 5 inches thick and which overlies a brown sandy loam that is 5 to 15-inches thick. Below this layer is a dark grayish-brown fine sandy loam, 15 to 35 inches thick, that overlies a grayish-brown fine sandy loam that is 35 to 50 inches thick. Below this layer is a light-brown fine sandy loam that is very strongly calcareous and moderately alkaline that extends to a depth of 50 to 86 inches (Chugg et al. 1971:29).

Pajarito loamy fine sand, 0 to 3 percent slopes, eroded (PA)

Pajarito loamy fine sand, 0 to 3 percent slopes, eroded (PA) developed in wind-worked material and alluvium derived from mixed, sandy sediments of the uplands, in the Deep Sand ecological site. It occurs in drainages and depressions and is subject to wind and water erosion. Permeability is moderately rapid and its water capacity is moderate. The typical profile consists of a surface layer of yellowish-red loamy fine sand that overlies a yellowish-red calcareous loamy fine sand that is about 13 inches thick. Below this layer is a yellowish-red to reddish-yellow fine sandy loam that extends to a depth of more than 60 inches (Chugg et al. 1971:29–30).

Pajarito-Dune land complex, 0 to 3 percent slopes (PD)

The Pajarito-Dune complex, 0 to 3 percent slopes (PD) are deep, sandy soils consisting of dune land, in the Deep Sand ecological site. The surface layer has been eroded by wind. The dunes, which are 3 to 6 feet high and 8 to 25 feet wide at the base, consist of fine sand. Little or no vegetation grows in the areas where the subsoil is exposed or where the surface layer is very thin. Permeability is moderately rapid and its water capacity is moderate. Except for the windblown surface layer, the profile is typical of the series (Chugg et al. 1971:30).

Potter-Simona complex, 5 to 25 percent slopes (PS)

Potter gravelly loam, in the Shallow ecological site, makes up about 80 percent of the acreage. The rest is Simona gravelly fine sandy loam, 0 to 3 percent slopes, which occurs at the tops of ridges and Stony and Rough broken land, which occurs on the steep slopes. The soils are susceptible to wind and water erosion and used for native pasture and wildlife habitat (Chugg et al. 1971: 32).

Pyote loamy fine sand, 0 to 3 percent slopes (PT)

This series, in the Deep Sand ecological site, consists of well-drained soils that have fine sandy loam subsoil formed in wind deposited sediments on upland plains and alluvial fans. The vegetation consists of mid and tall grasses and shrubs. It has a loamy fine sand surface layer about 25 inches thick. It is reddish yellow (upper) and light brown (lower). The substratum, to the depth of 60 inches, is pink, fine sandy loam. The soil is used as rangeland, wildlife habitat and recreational areas. (Turner et al. 1974:33).

Pyote and Maljamar fine sands (PU)

This series, in the Deep Sand ecological site, is about 45 percent Pyote fine sand and 45 percent Maljamar fine sand with 10 percent inclusions of Kermit and Palomas soils. Some areas are mostly Pyote, some are mostly Maljamar. The Pyote soil has moderately rapid permeability. Runoff is very slow. Water intake is rapid. Soil blowing is a severe hazard. (Turner et al. 1974:33)

Reeves-gypsum land complex, 0 to 3 percent slopes (RG);

Reeves loam, 0 to 1 percent slopes, occurs in pockets, swales and drainageways, in the Loamy ecological site. It consists of light colored, well drained, calcareous soils that are shallow to moderately deep over gypsiferous arths or rocks. Gypsum land occurs on the higher parts of the landscape. This complex is used for wildlife and native pasture. The soils are not easily eroded but reestablishment of vegetation is difficult (Chugg et al. 1971:35).

Simona gravelly fine sandy loam, 0 to 3 percent slopes (SG)

This soil, in the Sandy ecological site, has a profile of well drained, moderately dark colored soils that are calcareous and moderately coarse textured. These soils are shallow over indurated caliche. They have been worked by wind and are nearly level to gently sloping. This soil has been slightly wind eroded. It has a surface layer of brown fine sandy loam about 2 inches thick The next layer is light-brown gravelly

fine sandy loam about 17 inches thick. Below this is fractured, platy, indurated caliche. (Chugg et al. 1971:37-38)

Simona-Upton association, 0 to 3 percent slopes (SR);

This soil association, in the Shallow ecological site, is on ridges, foot slopes and fans. It is about 50 percent Simona gravelly fine sandy loam and about 25 percent Upton gravelly loam. The Simona soil is well-drained with a fine sandy loam subsoil. Typically, the surface layer is grayish-brown fine sandy loam about 8 inches thick. The surface layer is gravelly, and the subsoil is about 8 inches thick. The substratum is white, platy, indurated caliche. Simona soils are used as range and wildlife habitat. Upton soils are well-drained gravelly loams underlain by white indurated caliche at a depth of 6 to 20 inches. They are on fans, ridges, divides and foot slopes. The surface layer is grayish-brown gravelly loam about 8 inches thick. They are used as range and wildlife habitat. (Turner et al. 1974: 35-41)

Simona-Bippus complex, 0 to 5 percent slopes (SM)

The Simona-Bippus complex, 0 to 5 percent slopes (SM), in the Bottomland ecological site, occurs on nearly level to gently sloping terrain on uplands and on flood plains along intermittent drainages and in depressions. The profile is typical of the series, with slow runoff and infrequently water collecting in small playas for brief periods. The typical profile consists of a surface layer of brown sandy loam about 6 inches thick that is underlain by brown fine sandy loam about 10 inches thick. Below this is a 4-inch thick layer of brown fine sandy loam that is enriched with calcium carbonate. The underlying caliche is fractured and platy. The soil is slightly eroded and highly susceptible to wind erosion (Chugg et al. 1971:38).

Tonuco loamy sand, 0 to 3 percent slopes, eroded (TC)

The Tonuco series, in the Sandy ecological site, consists of moderately dark colored noncalcareous soils that have been worked by the wind. They are coarse textured, excessively drained and shallow over caliche. They occur on scattered ridges. They have a surface layer that is reddish brown noncalcareous loamy sand about 7 inches thick. The next layer, which is about 10 inches thick, is reddish brown loamy fine sand. Fractured, platy, indurated caliche is at a depth of about 15 inches. Exposed caliche blowouts are common. Runoff is slow. It is used for rangeland and wildlife habitat. (Chugg et al. 1971: 39-40)

Tonuco loamy fine sand 0 to 3 percent slopes (TF)

The Tonuco series consists of moderately dark colored noncalcareous soils that have been worked by the wind. They are coarse textured, excessively drained and shallow over caliche. They occur on ridges and in swales of uplands. They have a surface layer that is brown loamy fine sand about 5 inches thick. The next layer, which is about 10 inches thick, is reddish brown loamy fine sand. Fractured, platy, indurated caliche is at a depth of about 15 inches. Runoff is slow. It is used for pasture and wildlife habitat. (Chugg et al. 1971: 39-40)

Soil erosion is a continuing natural process. It can be accelerated by human disturbance associated with transmission line construction, such as vegetation clearing, access road construction, equipment movement and excavation for transmission structure foundations. Factors that influence the degree of erosion include soil texture, structure, length, slope, vegetative cover, rainfall and wind intensity.

Without adequate measures in place, erosion can result in discharge of sediments into water bodies. There also is a potential for wind and water erosion due to the erosive nature of some soils once cover is lost. In addition, there is the potential for soil contamination due to spills or leaks during construction activities. Contamination from spills or leaks can result in decreased soil fertility, less vegetative cover and

increased soil erosion. However, the impacts of soil erosion and compaction from constructing transmission lines are generally short-term.

3.5.2 Impacts from No Action Alternative

Direct and Indirect Impacts

Soil erosion is a continuing natural process. It can be expected to continue at its current level within the project area under the No Action alternative.

Cumulative Impacts

Cumulative impacts of the No Action alternative are the ongoing changes to the affected environment from other actions such as the expansion of the nearby Intercontinental Potash mine and the growth in the oil, gas and potash industry in the region which will reduce vegetative cover locally and lead to more soil erosion.

3.5.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

Due to the generally erosive nature of the soils within the project area, there is a potential for wind and water erosion when vegetative cover is lost during construction of the transmission line and access roads on any of the route alternatives (Preferred, A, B or C). The POD indicates that the eventual ~41 mile power line including the ~150 foot wide right-of-way would have a footprint of ~750 acres (Cribbin and Vaughan 2013). These 750 acres will be more susceptible to wind and water erosion until vegetative cover has been established. This usually takes 2-3 growing seasons. There is also the potential for soil contamination due to spills or leaks during construction activities, leading to decreased soil fertility, less vegetative cover and increased soil erosion. No prime farmlands are crossed by this route. Based on the limited area disturbed/occupied by pole structure installation the extent of soils impacted at pole structure sites would be negligible.

The need to subsequently maintain, replace and/or re-configure the transmission system (poles, wires, roads, etc.) will likely extend into the foreseeable future. Because these future actions would occur at a smaller scale and over short timespans, the impacts on soil resources would be expected to be less than during initial construction.

Cumulative Impacts

The Proposed Alternative, or Alternatives A, B or C, if implemented in association with other activities in the area, including the currently proposed expansion of the Intercontinental Potash Mine and continued extraction of oil and gas (including ancillary developments such as collection and treatment systems and pipelines) could lead to additional impacts to soil. A more robust power transmission infrastructure would contribute to the conversion of more land from use as range land to extractive industry related uses, leading to more erosion at roads, well pads and other manmade structures.

Mitigation Measures

Impacts to soil resources will be reduced by following BMPs during construction such as utilizing locations with existing surface disturbance, placing parking and staging areas on caliche surfaced areas, reestablishing vegetation in disturbed areas and removal of any contaminated soils. Construction areas will be watered to keep dust down. On completion of the work, all work areas, except any permanent access roads/trails, shall be re-graded, so that all surfaces drain naturally, blend with the natural terrain and are left in a condition that will facilitate natural re-vegetation, providing for proper drainage and preventing erosion. Soil resources will have been permanently removed from the space occupied by the transmission structure foundations.

Soil resources within roads will continue to erode. Such erosion is currently on-going in the area, however and thus the construction is not expected to result in significant long term impacts to the soil resource. Silt dams and vegetated earthen berms will be used where and when deemed ..

3.6 Wetlands

3.6.1 Affected Environment

The proposed transmission line travels through Nash Draw (T22S, R30E). Nash Draw has no external surface drainage. Several lakes, including Salt Lake in the southwestern part of the depression, have no surface outlet. A semiarid to arid climate and infertile, saline, rocky, or sandy soils combine to make agriculture impractical (Vine 1963). Photos of the project area are presented in Appendix D.

According to US FWS National Wetlands Inventory GIS records, between Potash Junction Substation to the new Roadrunner Substation, there are 44 intermittent lakes, 16 wetlands and 24 freshwater ponds that lie between 0.5 to 4.5 miles (0.8 to 7.25 km) away from the various routes being considered except for Route A, which crosses over a 'lake' that is actually under the Mosaic Potash tailings pile in T22E, R29S, Section 13 (US FWS 2013). None of the line alternatives in the proposed project affect those lakes, playas or other wetlands. The proposed route does not cross any floodplains (Eddy County Comprehensive Plan 2008).

Informal consultation with the U.S. Army Corps of Engineers (COE) was completed to address the need of a 404 permit (COE; Action No. SPA-2013-00575-ABQ, dated December, 23, 2013 [Appendix B]). It was determined that the proposed transmission line project is not subject to Section 404 of the Clean Water Act permitting requirement as no fill material associated with the project would be discharged into jurisdictional waters.

3.6.2 Impacts from No Action Alternative

Direct and Indirect Impacts

There would be no impacts from the No Action alternative.

Cumulative Impacts

There would be no cumulative impacts from the No Action alternative.

Mitigation Measures

No mitigation measures would be needed for wetlands.

3.6.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

No wetlands would be impacted by the Proposed Action or Alternatives A, B and C. There are intermittent or temporarily flooded palustrine areas (playas) in the project vicinity included on the National Wetlands Inventory (NWI) maps. However, these are greater than a mile away from the Proposed Route and Alternative C project corridors and at least a half mile away from Alternatives A and B at the nearest point (Appendix A).

No fill material from the project would be discharged into jurisdictional waters. The primary type of industrial waste for this project will be excess concrete from pouring foundations. All concrete not used will be removed from the right-of-way. No washings from the concrete trucks will be permitted on the right-of-way. Concrete trucks may wash out in the dirt piles from the excavation, but if so, the wash water and residue will be contained within the dirt pile and then removed from the right-of-way with the dirt

pile. A continuous clean-up crew will be in operation from beginning to end of the project, so that the waste dirt and concrete will be disposed of in a timely manner. Other wastes which typically derive from the operation of heavy machinery will be prevented from entering flowing streams or dry water courses, lakes and underground water sources. Waste water will be submitted to turbidity control methods (e.g. settling ponds) prior to discharge into surface waters. The contractor will not cross any wetland and riparian areas, unless specifically approved in writing by BLM and SPS.

Cumulative Impacts

There would be no cumulative impacts.

Mitigation Measures

No mitigation measures would be needed for wetlands.

3.7 Visual Resources

3.7.1 Affected Environment

The project area is located within a rural area southeast of Carlsbad. The terrain is generally flat to slightly rolling with predominantly long horizontal lines across the greater landscape and shorter vertical lines associated with Livingston Ridge. The vegetation in the landscape includes annual and perennial grasses, low to moderate height shrubs including sagebrush, mesquite, juniper and greasewood. Large canopy trees are absent except near rural agricultural homesteads where one or two trees may be located near a cluster of farm buildings. Water is generally absent in the landscape with the exception of the perennial salt lakes and associated flats and evaporation ponds associated with the potash mine. Colors in the landscape are muted shades of green, tan, brown, gray and red-brown.

Several pipeline scars, oil field access roads, transmission lines and distribution lines are present in the landscape. The pipeline scars are generally long straight lines where vegetation has been removed and minimally grown back. Oil field access roads occur within the grid of well pads and create a fine geometric web across the landscape. The access roads are permanent disturbance, smooth and flat in texture and light tan in color. Transmission and distribution lines generally follow existing roads and rights-of-way with a few transmission lines aligned across public lands. They are generally dark in color, fine in texture, geometric in form and have vertical lines as the horizontal lines of the conductors are present if in the foreground but disappear in the middle and background. Structures in the landscape include pump jacks and support structures associated with oil and gas extraction, clusters of buildings associated with potash mining and rural residential. The landscape is highly disturbed and has minimal elements of scenic quality with the exception of Livingston Ridge.

Figure 3.1 Typical terrain of the project area is flat to slightly rolling

Figure 3.2 Vegetation is low to moderate height and includes perennial grasses, shrubs and small trees

Figure 3.3 View of the salt flats visible from the project area

Figure 3.4 Potash mine evaporation ponds near the Potash Junction Substation

The Livingston Ridge is a visible landform in the landscape and is oriented generally north to south with terrain generally north-northwest to south and south-southeast. The ridge's terrain has long horizontal lines at the top of the ridge and irregular lines where the ridge meets the adjacent undulating terrain and slopes away from the predominant ridge. Livingston Ridge has short vertical lines and narrow v-shaped drainages along the western-facing slopes viewed from the project. The ridge has minimal vegetation,

mainly grasses at the base of the ridge and some grasses and short shrubs along the top. Standing or flowing water is absent on Livingston Ridge. The BLM has indicated that Livingston Ridge would be designated as a VRM II area during the next revision of the Carlsbad Field Office Resource Management Plan (RMP). The landscape around the ridge is impacted from oil and gas development and would be classified as VRM III or IV.

Figure 3.5 View of Livingston Ridge from the project corridor

Figure 3.6 View of Livingston Ridge from the project corridor

Figure 3.7 View of Livingston Ridge from the project corridor

While the landscape appears to be rural and undeveloped from some viewpoints, the general area is a location of active oil and gas operations, potash mining, rural ranching and nuclear waste containment. Well pads create a regular grid-like pattern of disturbance across the landscape with square to rectangular shaped areas for each well pad as well as linear access roads, gathering lines and fine-textured blocks of pump jacks.

Areas of potash mining are characterized by clusters of structures supporting mining activities, large tailings piles, access roads and rail lines and evaporation ponds. Since potash is extracted underground, there is a concentration of surface disturbance and modification of the terrain's form, line, color and texture where the tailings pile and evaporation ponds are located.

Rural ranching activities entail allowing livestock, predominantly cattle, to graze on large tracts of public and private land. A few clusters of rural ranches occur within the vicinity of the project and these clusters of residences, outbuildings and support structures are located on private land.

The Waste Isolation Pilot Project (WIPP) is located east of the project. It consists of a cluster of smooth-textured geometric buildings at the center of a section that is minimally undisturbed and is accessed by a two-lane road. Like the potash mine, most of the activity occurs underground and the central cluster of buildings facilitates access and support to subterranean activities.

3.7.2 Impacts from No Action Alternative

Direct and Indirect Impacts

The No Action Alternative would not impact short- and long-term visual resources in the project area. If the line were not to be built, the landscape in the proposed corridor would not be disturbed or impacted from road building or construction activities. Vegetation and surface disturbance would not occur and transmission structures would not be erected in the landscape.

Cumulative Impacts

The No Action Alternative would not alleviate the current energy oversubscription and undersupply of power in the area, which could lead to a slowdown of growth in the number of businesses in the local

economy, including the expansion of oil and gas extraction activities. Thus, this alternative would result in less disturbance to visual resources on the landscape by reducing the number of well pads, access roads and other support activities and infrastructure associated with extraction activities. This would reduce the visual impact on the landscape. However, since the landscape is extensively disturbed, this effect would be negligible.

3.7.3 Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed corridor is ~41 miles in length. The corridor commences at the proposed Roadrunner Substation in Lea County near the intersection of Vaca Lane and Highway 128. The project corridor parallels the north side of Highway 128 for ~1.1 miles before crossing the road at a perpendicular angle. This segment, including the proposed Roadrunner Substation, would be in the foreground visibility to vehicular drivers and passengers. However, due to the high speed limit for the highway and low scenic quality of the landscape, the impact of the Proposed Action would be minimal across the landscape and moderate at the road crossing.

The project corridor then continues generally west and northwest for ~17.5 miles, where it is offset approximately one mile south of Highway 128. The project corridor crosses several public roads including County Road 2, County Road 1, Buck Jackson Road, Twin Wells Road and several unnamed oil and gas access roads at an angle or nearly perpendicularly. The landscape in this area is generally flat, featureless, and monochromatic, with limited plant diversity and is impacted by the presence of pipeline scars, access roads, well pads and structures associated with oil and gas extraction operations. The segment would be in the foreground of viewers using the public roads south of Highway 128 for rural ranching or to access oil and gas development. There would be impact created by the proposed segment; however, the existing landscape has previously been impacted by energy transmission and development and therefore the Proposed Action would minimally to moderately contribute to the highly altered landscape.

The project corridor turns north for ~2.2 miles and is located slightly west of an oil and gas field. The project corridor then turns generally northwest and parallels Highway 128 for ~1.8 miles and offset to the south west by 0.10 mile. The corridor crosses Highway 128 at an angle and then northwest for ~5 miles. The landscape in this area is generally flat, featureless, and monochromatic, with limited plant diversity and is impacted by the presence of pipeline scars, access roads, well pads and structures associated with oil and gas extraction operations.

The project corridor proceeds in a northerly direction across rangeland for ~2.2 miles. The segment is west of, and near the base of Livingston Ridge (T 22S, R30E, Sections 21, 28) except for one point where it crosses over the edge of the ridge, as opposed to the remaining Alternatives (A, B and C) which cross over a section of Livingston Ridge ~220 feet higher up and to the east of that edge. This alternative thus minimizes any visual impacts to the ridge compared to the other alternatives by routing the proposed line at a lower point just off the top of the ridge. The terrain of the area is flat to rolling, with a distinctive rise to the western side of the Livingston Ridge. The color of the terrain is reddish brown with darker brown, gray and tan accents. The vegetation is low and sparse to moderate in areas consisting of clumps and aggregate drifts. There is no water visible near the base of the ridge.

The project corridor then proceeds in a north, northwesterly and westerly direction for ~6.3 miles, crossing flat to rolling terrain. The project corridor crosses Highway 128 at a perpendicular angle, avoiding the area of the salt flat. The landscape is characterized as relatively horizontal to slightly rolling, featureless with a muted color palette; however, there is seasonal water present in the salt flat, located west and south of the corridor. The area has been slightly impacted by jeep tracks and access roads to the

salt flat. The impact of the transmission structures to viewers looking to the salt flat from more than five miles away may be moderate due to the color contrast between the salt flat and transmission structure.

The project corridor then turns generally north for ~4.3 miles and crosses flat to slightly rolling rangeland. The corridor crosses Highway 31 at a perpendicular angle. The corridor continues roughly northwest for ~2 miles until it turns north for 4 miles to terminate at the existing Potash Junction Substation. As the line travels north, Highway 31 travels north by northwest and then northwest to re-approach the project corridor. The transmission structures would be in the fore and middle ground where the corridor crosses Highway 31. However, as the line proceeds north, the offset and terrain help to reduce the contrast between the structure and existing visual resources.

The impact of the proposed alternative would be minor to moderate in areas where the corridor and structures are in the immediate vicinity of public roads. However, due to the high speed limit of public roads, lightr use of access roads and the impacts created by oil and gas development, access roads, existing transmission and distribution lines and pipeline scars, the proposed alternative would only create a minor to moderate impact to visual resources.

Cumulative Impacts

The Proposed Action, in association with other activities in the area, would add to the existing disturbance to the landscape and impact scenic resources in an area previously impacted by disturbance generated by industrial and energy extraction activities.

Mitigation Measures

The proposed alternative would have a minimal negative effect on the visual resources in the project area in contrast to existing development. With the exception of Livingston Ridge, scenic qualities are scarce. Mitigation measures that could reduce the visual contrast to landscape include:

- Minimization of skylining (the outline of the transmission line structure seen against the sky on the horizon) of the transmission line by locating structures on either side of the high point or ridge;
- Minimization of the construction of new access roads by utilizing existing ones;
- Reduction of vegetation removal along access roads as much as possible; and
- Use of structural material that is medium or dark brown (such as wood or oxidized steel) as well as non-reflective insulators and conductors.

Minimal residual impacts will exist as a result of the Proposed Action.

3.7.4 Impacts from Alternative A

Direct and Indirect Impacts

The Alternative A corridor is ~41 miles in length. The corridor commences at the proposed Roadrunner Substation in Lea County near the intersection of Vaca Lane and Highway 128. The project corridor parallels the north side of Highway 128 for ~1.1 miles before crossing the road at a perpendicular angle. This segment, including the proposed Roadrunner Substation, would be in the foreground visibility to vehicular drivers and passengers. However, due to the high speed limit for the road and low scenic quality of the landscape, the impact of the Proposed Action would be minimal across the landscape and moderate at the road crossing. The corridor crosses Highway 128 at an angle and then proceeds north by 0.7 mile and northwest for ~4.4 miles.

The project corridor then continues generally west and northwest for ~23 miles where it is offset approximately one mile south of Highway 128. The project corridor crosses several public roads including County Road 2, County Road 1, Buck Jackson Road, Twin Wells Road and several un-named oil and gas access roads at an angle or nearly perpendicularly. The landscape in this area is generally flat, featureless, monochromatic, with limited plant diversity and impacted by the presence of pipeline scars, access roads, well pads and structures associated with oil and gas extraction operations. The segment would be in the foreground of viewers using the public roads south of Highway 128 for rural ranching or to access oil and gas development. There would be impact created by the proposed segment; however, the existing landscape is previously impacted from energy transmission and development and therefore the Proposed Action would minimally to moderately contribute to the highly altered landscape.

The project corridor turns north and crosses Highway 128 at a perpendicular angle approximately one half mile west of Nash Draw Road and proceeds in a northerly direction across rangeland for ~3.75 miles. The segment is west of, and near the base of Livingston Ridge (T 22S, R30E, Sections 21, 28). It crosses over a section of Livingstone Ridge ~220 feet to the east of the Proposed Action. This routes the Alternative A line at a higher point on the ridge compared to the Proposed Action. The terrain of the area is flat to rolling, with a distinctive rise to the western side of the Livingston Ridge. The color of the terrain is reddish brown with darker brown, gray and tan accents. The vegetation is low and sparse to moderate in areas consisting of clumps and aggregate drifts. There is no water visible near the base of the ridge.

The project corridor then proceeds in a westerly direction for approximately four miles, crossing flat to rolling terrain, a salt flat, Ruger Road and access roads. The landscape is relatively horizontal, featureless with a muted color palette; however, there is seasonal water present. The area has been slightly impacted by jeep tracks and access roads to the salt flat. The project corridor crosses the salt flat at a perpendicular angle, creating a minor to moderate visual impact from the transmission structures in the fore and middle ground. The impact of the transmission structures to viewers looking to the salt flat from more than five miles away may be moderate due to the color contrast between the salt flat and transmission structure.

The project corridor then turns generally north for approximately eight miles and crosses flat to slightly rolling rangeland. The corridor crosses Highway 31 at a perpendicular angle. The corridor continues roughly northwest for ~2 miles until it turns north for 4 miles to terminate at the existing Potash Junction Substation. As the line travels north, Highway 31 travels north by northwest and then northwest to re-approach the project corridor. The transmission structures would be in the fore and middle ground where the corridor crosses Highway 31. However, as the line proceeds north, the offset and terrain help to reduce the contrast between the structure and existing visual resources.

The impact of the Alternative A would be minor to moderate in areas where the corridor and structures are in the immediate vicinity of public roads. However, due to the high speed limit of public roads, lighter use of access roads and the impacts created by oil and gas development, access roads, existing transmission and distribution lines and pipeline scars, Alternative A would only create a minor to moderate impact to visual resources. However, the project would have a minor to moderate long-term impact to views to Livingston Ridge from the west.

The construction of the project would increase the available power supply as well as stimulate expansion of the oil and gas extraction and potash mining activities in the region.

Cumulative Impacts

The Alternative A route, in association with other activities in the area, would lead to a visual impact on scenic resources. The proposed project as a whole would add to the existing disturbance to the landscape and impact scenic resources in an area previously impacted by disturbance generated by industrial and energy extraction activities.

Mitigation Measures

The proposed alternative would have a minimal negative effect on the visual resources in the project area in contrast to existing development. With the exception of Livingston Ridge, scenic qualities are scarce. Mitigation measures that could reduce the visual contrast to landscape include:

- Minimization of skylining of the transmission line by locating structures on either side of the high point or ridge;
- Minimization of the construction of new access roads by utilizing existing ones;
- Reduction of vegetation removal along access roads as feasibly possible; and
- Use of structural material that is medium or dark brown (such as wood or oxidized steel) as well as non-reflective insulators and conductors.

Minimal residual impacts will exist as a result of the proposed alternative.

3.7.5 Impacts from Alternative B

Direct and Indirect Impacts

The Alternative B corridor is ~41 miles in length. The corridor commences at the proposed Roadrunner Substation in Lea County near the intersection of Vaca Lane and Highway 128. The project corridor parallels the north side of Highway 128 for ~1.1 miles before crossing the road at a perpendicular angle. This segment, including the proposed Roadrunner Substation, would be in the foreground visibility to vehicular drivers and passengers. However, due to the high speed limit for the road and low scenic quality of the landscape, the impact of the Proposed Action would be minimal across the landscape and moderate at the road crossing.

The project corridor then continues generally west and northwest for ~23 miles and offset approximately one mile south of Highway 128. The project corridor crosses several public roads including County Road 2, County Road 1, Buck Jackson Road, Twin Wells Road and several un-named oil and gas access roads at an angle or nearly perpendicularly. The landscape in this area is generally flat, featureless, and monochromatic, with limited plant diversity and impacted by the presence of pipeline scars, access roads, well pads and structures associated with oil and gas extraction operations. The segment would be in the foreground of viewers using the public roads south of Highway 128 for rural ranching or to access oil and gas development. There would be impact created by the proposed segment; however, the existing landscape is previously impacted from energy transmission and development and therefore the Proposed Action would minimally to moderately contribute to the highly altered landscape.

The project corridor turns north and crosses Highway 128 at a perpendicular angle approximately one half mile west of Nash Draw Road and proceeds in a northerly direction across rangeland for ~3.75 miles. The segment is west of, and near the base of Livingston Ridge (T 22S, R30E, Sections 21, 28). It crosses over a section of Livingston Ridge ~220 feet to the east of the Proposed Action. This routes the Alternative B line at a higher point on the ridge compared to the Proposed Action. The terrain of the area is flat to rolling, with a distinctive rise to the western side of the Livingston Ridge. The color of the terrain is reddish brown with darker brown, gray and tan accents. The vegetation is low and sparse to moderate in areas consisting of clumps and aggregate drifts. There is no water visible present near the base of the ridge.

The project corridor then proceeds in a westerly direction for approximately one mile, crossing flat to rolling terrain and then then north for ~2.75 miles, then west three miles, crossing Highway 128 at a perpendicular angle, avoiding the area of the salt flat. The landscape is characterized as relatively horizontal to slightly rolling, featureless with a muted color palette; however, there is seasonal water present in the salt flat, located west and south of the corridor. The area has been slightly impacted by jeep

tracks and access roads to the salt flat. The impact of the transmission structures to viewers looking to the salt flat from more than five miles away may be moderate due to the color contrast between the salt flat and transmission structure.

The project corridor then turns generally north for approximately five miles and crosses flat to slightly rolling rangeland. The corridor crosses Highway 31 at a perpendicular angle. The corridor continues roughly northwest for ~2 miles until it turns north for 4 miles to terminate at the existing Potash Junction Substation. As the line travels north, Highway 31 travels north by northwest and then northwest to re-approach the project corridor. The transmission structures would be in the fore and middle ground where the corridor crosses Highway 31. However, as the line proceeds north, the offset and terrain help to reduce the contrast between the structure and existing visual resources.

The impact of the Alternative B route would be minor to moderate in areas where the corridor and structures are in the immediate vicinity of public roads. However, due to the high speed limit of public roads, lighter use of access roads and the impacts created by oil and gas development, access roads, existing transmission and distribution lines and pipeline scars, the proposed alternative would create a minor to moderate impact to visual resources. The construction of the project would increase the available power supply as well as stimulate expansion of the oil and gas extraction and potash mining activities in the region.

Cumulative Impacts

Alternative B, in association with other activities in the area, would lead to a visual impact on scenic resources. The proposed projects as a whole would add to the existing disturbance to the landscape and impact scenic resources in an area previously impacted by disturbance generated by industrial and energy extraction activities.

Mitigation Measures

Alternative B would have a minimal negative effect on the visual resources in the project area in contrast to existing development. With the exception of Livingston Ridge, scenic qualities are scarce. Mitigation measures that could reduce the visual contrast to landscape include:

- Minimization of skylining of the transmission line by locating structures on either side of the high point or ridge;
- Minimization of the construction of new access roads by utilizing existing ones;
- Reduction of vegetation removal along access roads as feasibly possible; and
- Use of structural material that is medium or dark brown (such as wood or oxidized steel) as well as non-reflective insulators and conductors.

Minimal residual impacts will exist as a result of Alternative B.

3.7.6 Impacts from Alternative C

Direct and Indirect Impacts

The Alternative C corridor is ~41 miles in length. The corridor commences at the proposed Roadrunner Substation in Lea County near the intersection of Vaca Lane and Highway 128. The project corridor parallels the north side of Highway 128 for ~1.1 miles before crossing the road at a perpendicular angle. This segment, including the proposed Roadrunner Substation, would be in the foreground visibility to vehicular drivers and passengers. However, due to the high speed limit for the road and low scenic quality of the landscape, the impact of the Proposed Action would be minimal across the landscape and moderate at the road crossing.

The project corridor then continues generally west and northwest for ~17.5 miles and offset approximately one mile south of Highway 128. The project corridor crosses several public roads including County Road 2, County Road 1, Buck Jackson Road, Twin Wells Road and several unnamed oil and gas access roads at an angle or nearly perpendicularly. The landscape in this area is generally flat, featureless, and monochromatic, with limited plant diversity and impacted by the presence of pipeline scars, access roads, well pads and structures associated with oil and gas extraction operations. The segment would be in the foreground of viewers using the public roads south of Highway 128 for rural ranching or to access oil and gas development. There would be impact created by the proposed segment; however, the existing landscape is previously impacted from energy transmission and development and therefore the Proposed Action would minimally to moderately contribute to the highly altered landscape.

The project corridor turns north for ~2.2 miles and is located slightly west of an oil and gas field. The project corridor then turns generally northwest and parallel Highway 128 for ~1.8 miles and offset to the south west by 0.10 mile. The corridor crosses Highway 128 at an angle and then proceed north by 0.7 mile. And then northwest for ~4.4 miles. The landscape in this area is generally flat, featureless, and monochromatic, with limited plant diversity and impacted by the presence of pipeline scars, access roads, well pads and structures associated with oil and gas extraction operations.

The project corridor proceeds in a northerly direction across rangeland for ~2.2 miles. The segment is west of, and near the base of Livingston Ridge (T 22S, R30E, Sections 21, 28). It crosses over a section of Livingston Ridge ~220 feet to the east of the Proposed Action. This routes the Alternative C line at a higher point on the ridge compared to the Proposed Action. The terrain of the area is flat to rolling, with a distinctive rise to the western side of the Livingston Ridge. The color of the terrain is reddish brown with darker brown, gray and tan accents. The vegetation is low and sparse to moderate in areas consisting of clumps and aggregate drifts. There is no visible water near the base of the ridge.

The project corridor then proceeds in a north, northwesterly and westerly direction for ~6.3 miles, crossing flat to rolling terrain. The project corridor crosses Highway 128 at a perpendicular angle, avoiding the area of the salt flat. The landscape is characterized as relatively horizontal to slightly rolling, featureless with a muted color palette; however, there is seasonal water present in the salt flat, located west and south of the corridor. The area has been slightly impacted by jeep tracks and access roads to the salt flat. The impact of the transmission structures to viewers looking to the salt flat from more than five miles away may be moderate due to the color contrast between the salt flat and transmission structure.

The project corridor then turns generally north for ~4.3 miles and crosses flat to slightly rolling rangeland. The corridor crosses Highway 31 at a perpendicular angle. The corridor continues roughly northwest for ~2 miles until it turns north for 4 miles to terminate at the existing Potash Junction Substation. As the line travels north, Highway 31 travels north by northwest and then northwest to re-approach the project corridor and is thus offset to the west by ~0.3 to two miles. The transmission structures would be in the fore and middle ground where the corridor crosses Highway 31. However, as the line proceeds north, the offset and terrain help to reduce the contrast between the structure and existing visual resources.

The impact of the Alternative C route would be minor to moderate in areas where the corridor and structures are in the immediate vicinity of public roads. However, due to the high speed limit of public roads, lighter use of access roads and the impacts created by oil and gas development, access roads, existing transmission and distribution lines and pipeline scars, the proposed alternative would create a minor to moderate impact to visual resources. The construction of the project would increase the available power supply as well as stimulate expansion of the oil and gas extraction and potash mining activities in the region.

Cumulative Impacts

Alternative C, in association with other activities in the area, would lead to a visual impact on scenic resources. The proposed projects as a whole would add to the existing disturbance to the landscape and impact scenic resources in an area previously impacted by disturbance generated by industrial and energy extraction activities.

Mitigation and Residual Impacts

Alternative C would have a minimal negative effect on the visual resources in the project area in contrast to existing development. With the exception of Livingston Ridge, scenic qualities are scarce. Mitigation measures that could reduce the visual contrast to landscape include:

- Minimization of skylining of the transmission line by locating structures on either side of the high point or ridge;
- Minimization of the construction of new access roads by utilizing existing ones;
- Reduction of vegetation removal along access roads as feasibly possible; and
- Use of structural material that is medium or dark brown (such as wood or oxidized steel) as well as non-reflective insulators and conductors.

Minimal residual impacts will exist as a result of Alternative C.

3.8 Native Vegetation

3.8.1 Affected Environment

The dominant vegetative community of the project area is Chihuahuan Desert Scrub. Vegetation is dominated by mesquite, acacia, creosote and javelina bush. Other areas were dominated by mesquite, Havard oak and various species of Opuntia. Dominant grasses include gramas (Bouteloua spp.), dropseeds (Sporobolus spp.), and three-awns (Aristida spp.). Photos of the project area are presented in Appendix D. Plant species observed during site visits between May 31, 2013 and March 17, 2014 are presented in Table 3.2. For more information, see Jain (2014 in prep).

Treatment of vegetation within the right-of-way will include the selective removal or trimming of trees to prevent contact with the transmission line conductors. “Danger trees” which are 20 feet or more in height and which upon falling could come within ten feet of a structure will be removed completely. Tree removal is anticipated to be minimal due to the nature of the vegetation communities in the Project Area and the method of construction used. Vegetation shall be preserved and protected from damage by construction operations to the maximum extent practicable. Removal of brush and trees will be limited to those necessary for construction of the line and/or pose a threat to safe and reliable operation and maintenance of the line, or as otherwise determined by SPS. There will be no clear cutting within the right-of-way unless specifically approved in writing by SPS. Areas surveyed for expansion or construction of Potash Junction and Roadrunner Substation include low scrub and thus no clear cutting of trees would occur.

Table 3.2 Plant species observed during site visits

Common Name	Plant Species
White-thorn acacia	*Acacia constricta*
Honey mesquite	*Prosopsis glandulosa*
Javelina bush	*Condalia ericoides*
Creosote	*Larrea tridentata*

Common Name	Plant Species
Prickly pear	*Opuntia spp.*
Soap tree yucca	*Yucca elata*
Kochia	*Kochi scoparia*
Buckwheat	*Eriogonum spp.*
Snakeweed	*Gutierrezia sarothae*
Crucifixion plant	*Castela emoryi*
Juniper	*Juniperus monosperma*
Little leaf sumac	*Rhus microphylla*
Nightshade	*Solanum spp.*
Christmas cactus	*Opuntia leptocaulis*
Algerita	*Berberis haematocarpa*
Grama grass	*Bouteloua spp.*
Shrubby coldenia	*Tiquilia canescens*
Thistle	*Cirsium spp.*
Feather dalea	*Dalea formosa*
Rabbitbrush	*Chrysothamnus spp.*
Seep willow	*Baccharis salicifolia*
Cholla	*Opuntia spp.*
Sand sage	*Artemisia filifolia*
Catclaw acacia	*Acacia greggii*
Cliff-rose	*Purshia mexicana*
Shinnery oak	*Quercus havardii*
Fourwing saltbush	*Atriplex canescens*
Russian thistle	*Salsola iberica*
Spike dropseed	*Sporabolus contracta*
Horse weed	*Tetradymia canescens*
Desert willow	*Chilopsis linearis*
Beargrass	*Nolina microcarpa*
Indian gourd	*Cucurbita foetissima*
Desert holly	*Acourtia nana*

3.8.2 Impacts from No Action Alternative

Direct and Indirect Impacts

The No Action alternative would have no impact on native vegetation, as no construction activities would occur. No vegetation would have to be cleared and no project footprint would exist (access road, transmission line poles, etc.).

Cumulative Impacts

No cumulative impacts would occur in the No Action alternative.

3.8.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

Measurable impacts may occur to vegetation within the project area due to vehicular traffic during construction and the placement of new structures. These impacts would be similar for the Proposed

Action as well as Alternatives A, B and C. Traffic would be minimal after completion of construction and more or less limited to maintenance along the right-of-way. Some vegetation would regrow following completion of the construction. However, there would be a long term reduction in the abundance, relative to the total abundance of these species in the landscape, of some species and effects from weed control and vehicular traffic associated with maintenance of the line. The associated 150 foot wide, (~750 acre) ROW and the substations.

Cumulative Impacts

The Proposed Action Alternative, or Alternatives A, B and C, in association with other activities in the area, including the currently proposed expansion of the Intercontinental Potash Mine and continued extraction of oil and gas (including ancillary developments such as collection and treatment systems and pipelines), would lead to additional measureable impacts to native vegetation. A more robust power transmission infrastructure would contribute to the conversion of more land from use as range land to extractive industry related uses.

Mitigation Measures

Construction activities that disturb vegetation would be kept to a minimum and vegetative cover would be left undisturbed wherever possible. The impacts on vegetation would be temporary and not significant. Signs and gates will be constructed that discourage casual traffic along the power line. No other mitigation measures would be necessary.

3.9 Noxious Weeds

3.9.1 Affected Environment

Most noxious species in New Mexico are found on rangelands and wild lands. Invasions of noxious species in the range and wild landscape result in decreases in available forage for livestock and wildlife.

Noxious weeds have become a growing concern in the western U.S. due to their ability to increase in cover and exclude native plants from an area. The spread of noxious weeds caused damage to endangered native species, resulting in reductions in available forage for livestock and wildlife and economic resources. As a result, the State of New Mexico passed the Noxious Weeds Management Act (NWMA), which requires the New Mexico Department of Agriculture (NMDA) to develop a list of noxious weeds, identify methods of control, and educate the public (76-7-1 to 76-7-30 NMSA 1978). The NWMA defines a noxious weed as any weed or plant that is harmful or possesses noxious characteristics, as determined by the board of county commissioners. The board of county commissioners acts as the governing body of the district.

The federal Noxious Weed Act of 1974, as amended (7 USC 2801 et seq.) requires cooperation with state, local, and other federal agencies in the application and enforcement of all laws and regulations relating to the management and control of noxious weeds. The BLM acknowledged the Act by establishing a goal to include noxious weed considerations in NEPA documents. Analysis should include the potential for the spread of noxious weed species and provide preventive rehabilitation measures for each management action involving surface disturbance.

There are four categories of noxious weeds identified by the NMDA (Classes A, B, C, and watch species). Table 3.7-2 lists the noxious weed species in the state and their associated status.

Class A species are the highest priority but are not currently present in New Mexico or have limited distribution. Management of Class A species focuses on prevention of new infestations, and eradication of existing infestations.

Class B species are limited to portions of the state. For Class B species, with severe infestations, management includes containing the infestation and limiting any further spread.

Class C species are widespread in the state. For Class C species, management decisions are made at the local level based on the feasibility of control and level of infestation.

Watch species are species of concern in the state that have the potential to become problematic. When these species are encountered, their location should be documented and provided to the appropriate authorities.

Ten noxious weeds are listed for Eddy and Lea counties by New Mexico State University's Weeds Information website (NMSU 2014).

Table 3.3 Noxious Weeds present in Eddy and Lea Counties, NM

Common Name	Plant Species	Noxious Weed Class
African rue	*Peganum harmala*	Class B
Camelthorn	*Alhagi maurorum*	Class A
Field bindweed	*Convolvulus arvensis*	Class C
Hoary cress/Whitetop	*Lepidium draba*	Class B
Jointed goatgrass/jointgrass	*Aegilops cylindrica*	Class C
Purple starthistle	*Centaurea calcitrapa*	Class A
Russian knapweed	*Acroptilon repens*	Class A
Russian olive	*Elaeagnus angustifolia*	Class C
Saltcedar	*Tamarix chinensis*	Class C
Siberian elm	*Ulmus pumila*	Class C

(NMSU 2014)

Two portions of the analyzed route alternatives (Proposed Alternative and Alternatives A, B and C) have had recent treatments of African rue. This noxious weed is native to North Africa and to the Mediterranean region. It was introduced into the U.S. around the 1920s and was first noticed in the Deming area but is now common near Carlsbad and throughout southern New Mexico. The plant favors disturbed and barren areas such as oil pads, roadsides, parking lots, corrals, stockyards and abandoned crop fields. African rue is expanding into rangeland and can dominate pastures as it is very drought tolerant. African rue is a small bright green succulent perennial herb with a bushy growth habit that reaches about one foot in height at maturity. The plant dies back to its roots in winter and initiates new growth in late March in southern New Mexico. After spring growth the plant often becomes senescent as soils dry in early summer, but then will undergo a second growth phase later in the season as rains occur. Leaves are alternate, smooth, and divided deeply into narrow lobes. Single flowers are borne along the stem and in the leaf forks. Flowers have five white petals and produce a cylindrical 2–4 celled fruit with many seeds.

African Rue was treated along an east/west running oil/gas lease road, where it crosses the section line between 22 and 23, T. 21 S., R. 29 E. This area also includes a portion of the Proposed Alternative route as well as a portion of all of the other three route alternatives (A, B and C). This area has been sprayed with a 1% solution of Arsenal® (imazapyr) and Roundup® (glyphosate), in the spring at least twice since 2008. In addition, African Rue has also been treated along Cimarron Road (Eddy Co. Rd. C796) where it crosses the section line between section 7 and 8, T22S, R30E, an area traversed by Alternative B only. This area has been treated with the same herbicide mix and was treated in the spring of 2013 and 2012.

3.9.2 Impacts from No Action Alternative

Direct and Indirect Impacts

The No Action alternative would have no impact on noxious weeds, as no construction activities would occur. No vegetation would have to be disturbed and noxious weeds would not be at risk of being spread.

Cumulative Impacts

No cumulative impacts would occur in the No Action alternative.

3.9.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

Measurable noxious weed impacts may occur within the project area due to movement by vehicles and humans spreading seeds and other propagative plant parts. These impacts would be similar for the Proposed Action as well as Alternatives A, B and C. Noxious weeds along the route (Affected Environment) could be spread through transportation and through clearing of existing native vegetation, allowing for invasive species to propagate.

Cumulative Impacts

The Proposed Action Alternative, or Alternatives A, B and C, in association with other activities in the area, including the continued extraction of oil and gas (including ancillary developments such as collection and treatment systems and pipelines) and range management (grazing) could potentially increase the rate of spread of noxious weeds in the region. Construction activities maintain a disturbed state in the landscape. Linear rights-of-way with human and vehicular traffic have the potential to carry seeds and other propagative plant parts quickly across the region, allowing noxious weeds to establish in new areas. A more robust power transmission infrastructure would contribute to the conversion of more land from use as range land to extractive industry related uses, with associated increases in risk of noxious weed spread.

Mitigation Measures

Construction activities that cause disturbance of vegetation would be kept to a minimum and vegetative cover would be left undisturbed wherever possible. The impacts on vegetation would be temporary, localized and not significant. Signs and gates will be constructed that discourage casual traffic along the power line. To minimize the spread of noxious weeds, construction crews will clean all equipment and vehicles (power or high pressure) of all mud, dirt and plant parts before entering the construction area. The contractor will be responsible for control of noxious weeds in the area proposed for construction. Once the appropriate route has been selected, SPS will conduct a noxious weed survey to identify: a) noxious weed species present; b) locations of infestations; c) acreage infested; and d) density of plants. Gravel and fill to be used on the project must come from a weed free source(s). Gravel pits and fill sources will be inspected to identify weed-free sources. No other mitigation measures would be necessary.

3.10 Threatened, Endangered and Sensitive Plant Species

3.10.1 Affected Environment

Informal consultation with the U.S. Fish and Wildlife Service (USFWS) was initiated on December 18, 2013. The USFWS provided a list of threatened, endangered, proposed and candidate species and species of concern in the project area (USFWS 2013, Appendix F). These species are listed in Table 3.3.

Table 3.4 Threatened, Endangered and Sensitive plant species

Species	Name	USFWS	Preferred Habitat	Occurrence
Amsonia tharpii	Tharp's blue-star	BLM Sens.	Limestone and gypsum hills in Chihuahuan desert scrub	N/A
Coryphantha scheeri var. scheeri also *Coryphantha robustispina ssp. var. scheeri*	Scheer's pincushion cactus	Fed: Spec. of concern. NM: Endangered	Nearly level areas in desert grassland and scrub, usually on gravelly or silty soils, occasionally on rocky benches or bajadas on limestone or gypsum.	Along route
Coryphantha sneedii var. leei also *Escobaria sneedii var. leei*	Lee's pincushion cactus	T	Steep slopes, limestone cracks, broken terrain	N/A
Coryphantha sneedii var. sneedii also *Escobaria sneedii var. sneedii*	Sneed's pincushion cactus	E	Cracks in limestone in areas of broken terrain and steep slopes usually in desert scrub	N/A
Cirsium wrightii	Wright's Marsh thistle	C	Seeps, springs and wetland habitat with saturated soils with surface or subsurface water flow.	N/A
*Echinocereus fendleri var. Kuenzler'*si	Kuenzler's hedgehog cactus	E	Breaks in limestone and sandstone strata, gravelly to rocky slopes	N/A
Eriogonum gypsophilum	Gypsum wild-buckwheat	T w/CH	Gypsum soils	N/A

(USFWS 2013, Appendix F)

Key: E =endangered, T=threatened, T w/CH=threatened with critical habitat, C=Candidate, SOC=species of concern, BLM Sens = BLM Sensitive spp.

A pedestrian survey of the entire transmission line was performed by biologists from late October 2013 to mid-March 2014. In addition, J. Chopp (Biologist – Carlsbad BLM) was consulted as to the presence of these species in the region of the project. J. Chopp designated sections (T21S, R 29E, sections 26 and 27, T22S, R30E, sections 28, 29, 33, 34 and 35, T23S, R30E, sections 1, 2 and 12 and T23S, R31E, sections 6 and 7, as regions where the Scheer's cactus may exist (Map 1, Appendix E). Special survey protocols for the cactus were instituted where the proposed line passed through these sections. The parts of the Proposed Action and Alternative C that pass through these sections were extensively surveyed following this protocol except for a ~1.2 mile segment of the Proposed route at T23S R30E sections 1 and 12, which is yet to be surveyed. (Map 2, Appendix E). The parts of Alternatives A and B that did not overlap with Alternative C and the Proposed Action in this region were not surveyed though they do pass through potential Scheer's pincushion cactus habitat (Appendix A [map] and Appendix E, [Protocol and map 1]). If either the Proposed Action, Alternative A or Alternative B were chosen for construction, then additional surveys will be completed in accordance with the BLM protocol prior to any construction in those regions and any individuals of this species found will need to be protected, as detailed in the mitigation sections, below. More details on the surveys, results and location of cacti are on file with the BLM (Jain 2014 in prep.). In addition, there is a short (>0.5 miles) stretch of private land that was not surveyed in Alternative C that would require surveying if that alternative is chosen (Map 2, Appendix E).

Scheer's Pincushion Cactus

Coryphantha scheeri var. *scheeri* favors nearly level areas in desert grassland and Chihuahuan desert scrub, usually on gravelly or silty soils, occasionally on rocky benches or bajadas on limestone or gypsum; 1,000–1,100 m (3,300–3,600 ft). This species is distributed in New Mexico, Chaves and Eddy counties; adjacent western Texas, Brewster, Crockett, Loving, Pecos, Reeves, Terrell, Ward and (possibly) Maverick counties. This variety is apparently limited to the Pecos River drainage in western Texas and southeastern New Mexico; it is unknown if it is present in adjacent Coahuila. The variety shows kinship to *Coryphantha sulcata*, which occurs farther to the east. The variety *scheeri* is little

studied and population dynamics are not well understood. Apparently populations exist over wide areas in low densities, giving the (perhaps false) impression that plants are rare. Since populations are apparently comprised of relatively few long-lived individuals, it is likely that any impact may be detrimental to the health of the populations. Off-road vehicles and commercial and residential development seem to have a limited impact in some areas. Even so, at this time, most populations seem to be in no immediate danger, but protection measures may be needed in the future.

Surveys found six Scheer's cacti along the Proposed Action route, along with four cacti that were juvenile and thus more difficult to verify as Scheer's cacti (Appendix E). For the purposes of this EA, all 10 cacti are treated as Scheer's cacti. Suitable habitat does exist for this species in the project area. With mitigation as detailed below (marking, avoidance, protection), this project would have "no effect" on Scheer's pincushion cactus.

Lee's pincushion Cactus

Coryphantha sneedii var. leei occurs on north facing slopes in steep limestone hills (BLM 1997). It is often found in shallow soils or in cracks in stair step limestone shelves, in broken terrain and on steep slopes in Chihuahuan Desert Scrub. There are no steep slopes nor stair step limestone within the project area. Suitable habitat does not exist for this species within the project area. This project would have "no effect" on Lee's pincushion cactus.

Sneed's pincushion Cactus

Coryphantha sneedii var. sneedii is part of a complex of semi-differentiated populations that occur in different geographical areas or in isolation in the mountains of New Mexico and Texas. It occurs in cracks in limestone and on steep slopes in Chihuahuan Desert Scrub. This subspecies is known to be from the Franklin Mountains; however, plants from the Guadalupe Mountains that are intergradations between var. *sneedii, leei* and *guadalupensis* are not distinguishable from Franklin Mountains' specimens (NMRPTC 2001). The habitat is essentially the same as that of Lee's pincushion cactus. Suitable habitat does not exist for this species in the project area. This project would have "no effect" on Sneed's pincushion cactus.

Kuenzler's Hedgehog Cactus

The largest population of *Echinocereus fendleri var. Kuenzlerii* occurs in shallow limestone soils in piñon-juniper grassland in Chaves County. In Eddy County, this cactus usually occurs on gentle, gravelly to rocky slopes and benches on limestone or on limey sandstone in the western half of the county. Such suitable habitat is west of the project area and approximately 1,500 feet higher in elevation. This project would have "no effect" on Kuenzler's hedgehog cactus.

Gypsum Wild Buckwheat

Eriogonum gypsophilum is an herbaceous perennial restricted to almost pure gypsum substrate sparsely vegetated with other gypsophilous plants such as *Coldenia hispidissima*, *Mentzelia humulis* and *Anulocaulis leisolenus*. The plant grows approximately 5 to 8 inches tall, flowers from May through June and is found at elevations of 3,280 to 3,600 feet (NMRPTC 2001). Populations are known to exist at Seven River Hills, Ben Slaughter Springs and Black River. The Carlsbad Field Office (CFO) maintains a Special Management Area (SMA) containing Federal-designated essential habitat for this species approximately one mile south of Seven Rivers. The proposed route does not closely approach any areas of the essential habitat for this species. This project would have "no effect" on gypsum wild buckwheat.

3.10.2 Impacts from No Action Alternative

Direct and Indirect Impacts

The No Action alternative would have no impact on Threatened, Endangered or Sensitive species as no construction activities would occur. No vegetation would have to be cleared and no project footprint would exist (access road, transmission line poles, etc.) No additional access to the project area due to the project right of way would exist.

Cumulative impacts

There would be no cumulative impacts from the No Action alternative.

3.10.3 Impacts from the Proposed Action

Direct and Indirect Impacts

The only listed species with a likelihood of presence on the Proposed Action route is the Scheer's pincushion cactus (*Coryphantha scheeri var. scheeri*). Construction activity has the potential, through earth moving, storage of materials, vehicle movement and human activity, to cause damage to these plants. However, all parts of the proposed route that go through likely habitat for Scheer's pincushion cactus have been extensively surveyed for the species according to the protocol created by J. Chopp, BLM Biologist, (Appendix E, map 2). All Scheer's pincushion cacti located during the surveys have been marked and flagged to allow for mitigation measures, detailed below. Prior to construction any un-surveyed areas would be similarly surveyed and any Scheer's pincushion cacti found would be similarly protected. Consequently, no impact would occur to endangered, threatened, or sensitive plant species with the Proposed Action.

Cumulative Impacts

The Proposed Action for this project, in association with other activities in the area, including the currently proposed expansion of the Intercontinental Potash Mine and continued extraction of oil and gas (including ancillary developments such as collection and treatment systems and pipelines) could lead to additional impacts to Threatened, Endangered or Sensitive plant species. Specifically, additional projects in the sections designated above as likely to have Scheer's pincushion cactus would require mitigation to prevent harm to individual cacti. Building the transmission line on the proposed route would allow for more land to be potentially converted from range land to extractive industry related uses with the availability of a more robust power transmission infrastructure. Thus, there could be a negative effect to this species through construction and increased traffic unless suitable mitigation was implemented.

Mitigation Measures

As detailed above, all Scheer's pincushion cacti found during extensive surveys have been flagged and their location noted using GPS. Maps of the cactus survey area are attached in Appendix E, map 2. To ensure that this species is not impacted during construction, it is recommended that biologists clearly demarcate a boundary around each cactus with either bright yellow caution tape or bright orange plastic netting, so they can be avoided and impacts prevented to the extent possible. In addition, if the Proposed Action were to be selected, any private land within the Scheer's pincushion cactus zone would need to be surveyed in order to enact similar mitigation measures.

3.10.4 Impacts from Alternative A

Direct and Indirect Impacts

The only listed species with a likelihood of presence on the Alternative A route is the Scheer's pincushion cactus (*Coryphantha scheeri var. scheeri*). Construction activity has the potential, through earth moving,

storage of materials, vehicle movement and human activity, to cause damage to these plants. Two parts of the Alternative A route that pass through likely habitat for Scheer's pincushion cactus have been surveyed for the species according to the protocol created by J. Chopp, BLM Biologist, barring a short, ~4.6 acre strip that goes through private land (Appendix E, protocol). However, the parts of the Alternative A route that pass through sections Township/Range/Section T22S R30E, Sections 28 and 33 as well as T23S R30E, Sections 4, 9 and 10, may also have Scheer's pincushion cactus. All Scheer's pincushion cacti located in surveyed areas have been marked and flagged to allow for mitigation measures, detailed below. Prior to construction any non-surveyed areas would be similarly surveyed and any Scheer's pincushion cacti found would be similarly protected. Consequently, no impact would occur to endangered, threatened, or sensitive plant species with Alternative A.

Cumulative Impacts

Alternative A, if implemented in association with other activities in the area, including the currently proposed expansion of the Intercontinental Potash Mine and continued extraction of oil and gas (including ancillary developments such as collection and treatment systems and pipelines) could lead to additional impacts to Threatened, Endangered or Sensitive plant species. Specifically, additional projects in the sections designated above as likely to have Scheer's pincushion cactus would require mitigation to prevent harm to individual cacti. Building the transmission line on the Alternative A route would allow for more land to be potentially converted from range land to extractive industry related uses with the availability of a more robust power transmission infrastructure. Thus, there could be a negative effect to this species through construction and increased traffic unless suitable mitigation was implemented.

Mitigation Measures

As detailed above, all Scheer's pincushion cacti found during extensive surveys have been flagged and their location noted using GPS. Maps of the cactus survey area are attached in Appendix E, map 2. To prevent a negative effect to this species during construction, it is recommended that biologists clearly demarcate a boundary around each cactus with either bright yellow caution tape or bright orange plastic netting, so they can be avoided and impacts prevented to the extent possible. In addition, if the Alternative A route were to be selected, any non-surveyed land along the route within the Scheer's pincushion cactus zone would need to be surveyed following the BLM's protocol in order to enact similar mitigation measures prior to construction (Appendix E, protocol).

3.10.5 Impacts from Alternative B

Direct and Indirect Impacts

The only listed species with a likelihood of presence on the Alternative B route is the Scheer's pincushion cactus (*Coryphantha scheeri var. scheeri*). Construction activity has the potential, through earth moving, storage of materials, vehicle movement and human activity, to cause damage to these plants. Two parts of the Alternative B route that pass through likely habitat for Scheer's pincushion cactus have been surveyed for the species according to the protocol created by J. Chopp, BLM Biologist, barring a short, ~4.6 acre strip that goes through private land. However, the parts of the Alternative B route that pass through sections Township/Range/Section T22S R30E, Sections 28 and 33 as well as T23S R30E, Sections 4, 9 and 10, may also have Scheer's pincushion cactus. All Scheer's pincushion cacti located in surveyed areas have been marked and flagged to allow for mitigation measures, detailed below. Prior to construction any non-surveyed areas would be similarly surveyed and any Scheer's pincushion cacti found would be similarly protected. Consequently, no impact would occur to endangered, threatened, or sensitive plant species with Alternative B.

Cumulative Impacts

Alternative B, if implemented in association with other activities in the area, including the currently proposed expansion of the Intercontinental Potash Mine and continued extraction of oil and gas (including ancillary developments such as collection and treatment systems and pipelines) could lead to additional impacts to Threatened, Endangered or Sensitive plant species. Specifically, additional projects in the sections designated above as likely to have Scheer's pincushion cactus would require mitigation to prevent harm to individual cacti. Building the transmission line on the Alternative B route would allow for more land to be potentially converted from range land to extractive industry related uses with the availability of a more robust power transmission infrastructure. Thus, there could be a negative effect to this species through construction and increased traffic unless suitable mitigation was implemented.

Mitigation Measures

As detailed above, all Scheer's pincushion cacti found during extensive surveys have been flagged and their location noted using GPS. Maps of the cactus survey area are attached in Appendix E, map 2. To prevent a negative effect to this species during construction, it is recommended that biologists clearly demarcate a boundary around each cactus with either bright yellow caution tape or bright orange plastic netting, so they can be avoided and impacts prevented to the extent possible. In addition, if the Alternative B route were to be selected, any non-surveyed land along the route within the Scheer's pincushion cactus zone would need to be surveyed following the BLM's protocol in order to enact similar mitigation measures prior to construction.

3.10.6 Impacts from Alternative C

Direct and Indirect Impacts

The only listed species with a likelihood of presence on the Alternate C route is the Scheer's pincushion cactus (*Coryphantha scheeri var. scheeri*). Construction activity has the potential, through earth moving, storage of materials, vehicle movement and human activity, to cause damage to these plants. However, all parts of the Alternative C route that go through likely habitat for Scheer's pincushion cactus have been extensively surveyed for the species according to the protocol created by J. Chopp, BLM Biologist, barring a short, ~4.6 acre strip that goes through private land. All Scheer's pincushion cacti located during the surveys have been marked and flagged to allow for mitigation measures, detailed below. Prior to construction any unsurveyed areas would be similarly surveyed and any Scheer's pincushion cacti found would be similarly protected. Consequently, no impact would occur to endangered, threatened, or sensitive plant species with Alternative C.

Cumulative Impacts

Implementing Alternative C, in association with other activities in the area, including the currently proposed expansion of the Intercontinental Potash Mine and continued extraction of oil and gas (including ancillary developments such as collection and treatment systems and pipelines) could lead to additional impacts to Threatened, Endangered or Sensitive plant species. Specifically, additional projects in the sections designated above as likely to have Scheer's pincushion cactus would require mitigation to prevent harm to individual cacti. Building the transmission line on the Alternative C route would allow for more land to be potentially converted from range land to extractive industry related uses with the availability of a more robust power transmission infrastructure. Thus, there could be a negative effect to this species through construction and increased traffic unless suitable mitigation was implemented.

Mitigation Measures

As detailed above, all Scheer's pincushion cacti found during extensive surveys have been flagged and their location noted using GPS. Maps of the cactus survey area are attached in Appendix E, map 2. To

ensure that this species is not impacted during construction, it is recommended that biologists clearly demarcate a boundary around each cactus with either bright yellow caution tape or bright orange plastic netting, so they can be avoided and impacts prevented to the extent possible. In addition, if the Alternative C were to be selected, any private land within the Scheer's pincushion cactus zone would need to be surveyed in order to enact similar mitigation measures.

3.11 Wildlife

3.11.1 Affected Environment

As mentioned in the section titled "Native Vegetation", the dominant vegetative community of the project area is Chihuahuan Desert Scrub. Vegetation is dominated by mesquite, acacia, creosote and javelina bush. Other areas were dominated by mesquite, Havard oak and various species of Opuntia, and include Western Great Plains Sandhill Sagebrush Shrubland. Photos of the project area are presented in Appendix D. Plant species observed during site visits between May 31, 2013 and March 17, 2014 are presented in Table 3.2. The Western Great Plains Sandhill Sagebrush Shrubland hosts a variety of resident native wildlife. The lesser prairie-chicken (Tympanuchus pallidicinctus), and dune sagebrush lizard (Sceloporus arenicolus) are known to occur in some areas vegetated with Chihuahuan Desert Scrub. Shrub components of this type remain important in terms of nutrient cycling and ecosystem function where sagebrush, shinnery oak, and subdominant shrubs trap and accumulate nutrients around their bases. This accretion of organic matter and nutrients is especially important to insects and ultimately to rodents, herpetofauna, and birds that consume them (NMDGF 2006).

Birds common in habitat typical of the proposed project site include quail, doves, various hawks, sparrows, loggerhead shrike, flycatchers, thrashers and cowbirds. Common mammals include mule deer and antelope, coyote, skunks, cottontail and jackrabbits, pocket gophers, foxes, woodrats and various small rodents. Many species of lizards and snakes are also common. In addition, various sized active burrows, tracks and scat seen in the field implied the presence of small mammals, coyote, foxes and lizards.

Wildlife observed during site visits between May 31, 2013 and March 17, 2014 is presented in Table 3.4.

Table 3.5 Wildlife observed during site visits

Common Name	Scientific Name
Birds	
American kestrel	*Falco sparverius*
Ash-throated flycatcher	*Myiarchus cinerascens*
Black-tailed jackrabbit	*Lepus californicus*
Black-throated sparrow	*Amphispiza bilineata*
Blue grosbeak	*Passerina caerulea*
Bullock's oriole	*Icterus bullockii*
Cassin's kingbird	*Tyrannus vociferans*
Common nighthawk	*Chordeiles minor*
Common raven	*Corvus corax*
Crissal thrasher	*Toxostoma crissale*
Harris hawk	*Parabuteo unicinctus*
House finch	*Carpodacus mexicanus*
Loggerhead shrike	*Lanius ludovicianus*
Mourning dove	*Zenaida macroura*
Northern cardinal	*Cardinalis*

Common Name	Scientific Name
Northern Harrier	*Circus cyaneus*
Northern mockingbird	*Mimus polyglottos*
Pyrrhuloxia	*Cardinalis sinuatus*
Red-tailed Hawk	*Buteo jamaicensis*
Scaled quail	*Callipepla squamata*
Scissor-tailed flycatcher	*Tyrannus forficatus*
Scott's oriole	*Icterus parisorum*
Swainson's hawk	*Buteo swainsoni*
Turkey vulture	*Cathartes aura*
Virginia warbler	*Oreothlypis virginiae*
Western kingbird	*Tyrannus verticalis*
Mammals	
Coyote (scat)	*Canis latrans*
Desert cottontail	*Sylvilagus audubonii*
Javelina	*Pecari tajacu*
Mule deer	Odocoileus hemionus
Pocket gopher spp.	*Cratogeomys/Thomomys/Geomys spp.*
Woodrat spp. (midden)	*Neotoma spp.*
Reptiles	
Coachwhip	*Masticophis flagellum*
Prairie lizard	*Sceloporus undulatus*
Rattlesnake spp.	*Crotalus spp.*
Side blotched lizard	*Uta stansburiana*

The federal Migratory Bird Treaty Act (MBTA), first enacted in 1916, prohibits any person, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatsoever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention for the protection of migratory birds…or any part, nest, or egg of any such bird." (MBTA, 16 USC 703). As authorized by the MBTA, the US Fish and Wildlife Service issues permits to qualified applicants for the following types of activities: falconry, raptor propagation, scientific collecting, special purposes (rehabilitation, education, migratory game bird propagation, and salvage), take of depredating birds, taxidermy, waterfowl sale, and disposal. The list of migratory birds includes nearly all bird species native to the United States. The Migratory Bird Treaty Reform Act of 2004 further defined species protected under the Act and excluded all non-native species. The statute was extended in 1974 to include parts of birds, as well as eggs and nests. Thus, it is illegal under the MBTA to directly kill nearly all migratory bird species, not just endangered species. Activities that result in removal or destruction of an active nest (a nest with eggs or young being attended by one or more adults) would also violate the MBTA. Removal of inactive nests is not in violation of the MBTA.

After an initial site visit in late May, early June, a biological survey was conducted between October 21 and October 28, 2013 by a biologist who examined a 100-foot-wide right-of-way (50 feet on either side of a centerline staked with lathe along the route) along Alternative C. A raptor nest survey was conducted according to a protocol created by J. Chopp (BLM Biologist). Binoculars were used to scan every 100 m to view potential nest-containing trees or shrubs along the Proposed Action route as well as along Alternative C and the parts of Alternatives A and B that overlapped with Alternative C. State and federal land was surveyed, but not private land. An assessment of the nests included nest diameter, height above ground, type

of tree or shrub in which the nest was found, height of that tree or shrub and surrounding habitat. Nest locations were recorded using a Global Positioning System and each nest and habitat was photographed.

Surveys for raptor nests conducted in October resulted in identification of 2 possible raptor nests along the Proposed Route and Alternative C. The location of these nests is indicated on project maps, which can be found at the end of the report (Appendix E, map 2). A listing and description of each nest is given in Table 3.5. Additional biological surveys were carried out, in December 2013 and January and March 2014, on shorter segments of the Proposed Alternative that differed from Alternative C (Appendix E, map 2). These surveys detected two additional raptor nests. For more information, see Jain(2014 in prep.).

Table 3.6 Results of raptor nest surveys

Nest No.	Tree/shrub	Tree Height (Feet)	Nest Height (Feet)	Nest Diameter (Inches)	Twig Diameter (Inches)	Comments
1	Honey Mesquite - *Prosopis glandulosa*	20	16	15	1/2	Poor condition (Nest)
2	Honey Mesquite - *Prosopis glandulosa*	25	20	15	1/2	Poor Condition (Nest)
3	Honey Mesquite - *Prosopis glandulosa*	35	25	unknown	1/2	Poor Condition (Nest)
4	Honey Mesquite - *Prosopis glandulosa*	20	20	20	3/8	Whitewash present

3.11.2 Impacts from No Action Alternative

Direct and Indirect Impacts

Wildlife species would not be impacted by the No Action alternative as no construction would occur and no disturbance or temporary or permanent habitat loss would occur.

Cumulative Impacts

No cumulative impacts would occur in the No Action alternative.

3.11.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

During the period of construction, some temporary habitat loss would occur. Disturbance to common species through construction activity and vehicular traffic would occur. However, these would cease after construction was completed. Periodic maintenance of the transmission line and substations after construction would result in non-significant disturbance to common wildlife species through the life of the line. With regard to raptors nesting in the vicinity of the line, construction could damage nesting trees or disturb raptors, resulting in loss of the fledglings. The POD calls for ‘the selective removal or trimming of trees to prevent contact with the transmission line conductors. “Danger trees” which are 20 feet or more in height and which upon falling would come within ten feet of a structure will be removed completely.’ The principal impact of transmission lines on raptors occurs when they are electrocuted by perching on power poles or lines (Bevanger 1994). Raptors can also collide with transmission lines, although this rarely occurs (Thompson 1977). The U.S. Fish and Wildlife Service recommend the use of bird diverters, such as BFD-4, on power lines in areas such as playas that are likely to be used by raptors such as bald eagles. However, the Proposed Action route is more than 1 mile from the nearest playa. The Alternative A route is > 0.5 mile from the nearest playa. The Alternative B and C routes are >1 mile from the nearest playa and bird diverters would be thus not be necessary (APLIC 2006).

Cumulative Impacts

The Proposed Action for this project, or Alternatives A, B and C, in association with other activities in the area, including the currently proposed expansion of the Intercontinental Potash Mine and continued extraction of oil and gas (including ancillary developments such as collection and treatment systems and pipelines), would lead to additional measureable impacts to common species. A more robust power transmission infrastructure would contribute to the conversion of more habitat for common species to extractive industry related uses. However, this will not result in a significant effect to common species.

Mitigation Measures

To prevent disturbance to active nests during construction, the raptor nests found during the biologist's surveys will be removed prior to the nesting season, taking care to avoid damage to the nesting tree. In addition, these nesting trees will be prominently flagged and the line will avoid these trees so that they are not classified as "danger trees" (see above). Once a route is selected for construction, any land that was not previously surveyed as described in the 'Affected Environment' section (above) will be surveyed according the BLM protocol and any new raptor nests detected will be similarly treated.

3.12 Threatened, Endangered and Sensitive Wildlife Species

3.12.1 Affected Environment

Informal consultation with the USFWS was initiated on December 18, 2013. In response, the USFWS provided a list of Threatened, Endangered, Proposed and Candidate species and species of concern in the project area (Appendix F). Information on BLM-listed wildlife was obtained from BISON-M, a site maintained by the New Mexico Department of Game and Fish and other governmental organizations (BISON-M 2013). These species are listed in Table 3.6. For more information, see Jain 2014 in prep.

Table 3.7 Threatened, Endangered and Sensitive wildlife species

Species	Listing	Preferred Habitat	Potential to occur on site	Occurrence
Mammals				
Big free-tailed bat *Nyctinomops macrotis*	BLM	Roosts in caves, cliff fissures, buildings; needs water source	Habitat present in the form of caves and Karst.	Along route
Arizona Black-tailed prairie dog *Cynomys ludovicianus arizonensis*	C, BLM	Grasslands	Habitat not present;	NA
Cave myotis *Myotis velifer*	BLM	Sycamore, cottonwood, or rabbitbrush riparian habitats; roosts in limestone caves	Habitat present in the form of caves and Karst;	Along route
Spotted bat, *Euderma maculatum*	BLM	Rocky cliffs, forested regions, pinyon-juniper	Habitat not present	NA
Fringed Myotis *Myotis thysanodes*	BLM	Roosts in caves, mines, buildings	Does occur	Along route
Guadalupe pocket gopher *Thomomys bottae guadalupensis*	BLM, SOC	Grassland, woodland, chaparral. Often found associated with Agave lechuguilla.	Habitat not present; no potential to occur. (This subspecies found only in the Guadalupe Mts.)	NA
Long-legged myotis bat *Myotis volans interior*	BLM	Montane, ponderosa forests	Habitat not present;	NA
Gray-footed Chipmunk *Taimias canipes*	BLM	Coniferous forest, rocky slopes and ridges	Habitat not present; not likely to occur	NA
Muskrat, Pecos River *Ondatra zibethicus ripensis*	BLM	Riparian areas.	Habitat not present	NA
Townsend's big-eared bat *Corynorhinus townsendii*	BLM, SOC	Roosts in caves and abandoned mines	Habitat present; potential to occur.	Along route
Western small-footed myotis bat *Myotis ciliolabrum melanorhinus*	BLM	Sycamore, cottonwood, or rabbitbrush riparian habitat	Habitat not present	Along Route
Yuma myotis bat *Myotis yumanensis yumanensis*	BLM	Near streams at lower elevations	Habitat not present;	NA
Birds				
Aplomado falcon *Falco femoralis septentrionalis*	E	Nests in yucca, grassland with adjacent shrubs	Some, yucca present. Habitat marginal. Unlikely to occur	NA
Baird's sparrow *Ammodramus bairdii*	BLM, SOC	Short grass prairie species	Habitat not present; no potential to occur	NA
Black tern *Chlidonias niger*	BLM, SOC	Grasslands; riparian woodlands, especially cottonwood.	Habitat not present; no potential to occur	NA
Burrowing owl *Athene cunicularia*	BLM	Shortgrass prairie or steppe; nests in mammal burrows	Occurs in railroad embankment and gypsum escarpment in project area	Along route

Species	Listing	Preferred Habitat	Potential to occur on site	Occurrence
Ferruginous hawk *Buteo regalis*	BLM	Nests in arid plains, open prairie	Does occur seasonally	Along route
Interior least tern *Sterna antillarum*	E	Alkali flats habitats	Foraging habitat present at playas within 1 mile, but not in project area	NA
Lesser prairie chicken *Tympanuchus pallidicinctus*	C, BLM	Shinnery oak rangeland with mid-and tall-grass species	Marginal habitat present, no potential to occur	NA
Loggerhead shrike *Lanius ludovicianus*	BLM	Primarily open areas dominated by shrubs and desert grasses; sand shinnery oak communities	Does occur	Along route
Mexican spotted owl *Strix occidentalis lucida*	T	Woodlands or forest habitat	Habitat not present; no potential to occur	NA
Piping plover *Charadrius melodus*	BLM	Irrigated agricultural, aquatic, playas, riverine/lacustrine	Habitat present at playas within 1 mile, but not in project area. Transient in the state.	NA
Southwestern willow flycatcher *Empido-nax traillii extimus*	BLM	Riparian, marshes and aquatic, in cottonwood, alder willow or salt-cedar trees.	Habitat not present	NA
Sprague's Pipit *Anthus spragueii*	BLM	Shortgrass prairies, highland shrub-steppe, herbaceous rangeland.	Habitat present. Potential to occur.	NA
White-faced ibis *Plegadis chihi*	BLM	Wetland and riparian habitats	Habitat present at playas within 1 mile, but not in project area.	NA
Reptiles				
Dunes sagebrush lizard *Sceloporus arenicolus*	BLM	Habitat specialist of shinnery oak sand dunes; prefers large deep blowouts associated with shinnery oak	Habitat present; Unlikely to occur. Outside of known habitat.	NA
Texas horned lizard *Phrynosoms cornutum*	BLM	Open deserts and grasslands; sandy to gravelly soils	May occur	Along route
Fish				
Blue sucker *Cycleptus elongatus*	BLM, SOC	Riverine	Habitat includes Pecos R. south of Brantley Dam; river crossing south of Brantley Dam not permanent water; habitat not present	NA
Headwater catfish *Ictalurus lupus*	BLM, SOC	Riverine	Habitat includes Pecos R. downstream from Sumner Reservoir; no potential to occur.	NA

Species	Listing	Preferred Habitat	Potential to occur on site	Occurrence
Pecos bluntnose shiner *Notropis simus*	T w/Ch	Riverine	Critical habitat designated along Pecos R. from the Chaves-Eddy Co. line to Avalon Reservoir (BLM, 1997); no potential to occur	NA
Pecos gambusia *Gambusia nobilis*	E	Riverine	Springs and gypsum sinkholes west of Pecos R.; Habitat not present; no potential to occur	NA
Rio Grande shiner *Notropis jemezanus*	BLM, SOC	Riverine	Habitat includes Pecos R. from Ft. Sumner to Brantley Dam; no potential to occur.	NA
Invertebrates				
Pecos spring snail *Pyrgulopsis peconsensis*	BLM, SOC	Aquatic; found in two springs south of Carlsbad	No springs occur in project area; no potential to occur	NA
Texas hornshell *Popenaias popeii*	C	Aquatic; lower portions of the Pecos and Rio Grande drainages; Black River	Project areas crossing the Pecos R are unlikely habitats for this species. Species known from areas south of Carlsbad. Unlikely to occur	NA

(BISON-M 2013) Key: E-Federally endangered, T=Federally threatened, T w/CH=Federally threatened with critical habitat, C=Federal candidate species, SOC=Federal species of concern, BLM=BLM sensitive.

Big Free-tailed Bat

(*Nyctinomops macrotis*) This species is a seasonal migrant and a powerful flyer. Maternity roosts have been documented in rock crevices, with evidence of long term use. Little is known about the species population dynamics and ecology. Big free-tailed bats roost mainly in crevices and rocks in cliff situations, although there is some documentation of roosts in buildings, caves and tree cavities. N. macrotis forages almost entirely on large moths, but some data exist to document occasional foraging on other insects, including grasshoppers, beetles, crickets, leafhoppers and flying ants. N. macrotis ranges from most of South America northward to include Mexico, Arizona, New Mexico, southern and western Texas, southern California and southeastern Nevada, southern Utah and north to central Colorado. The species is migratory and there are some extralimital records from British Columbia, Iowa, Kansas and South Carolina. The known elevation range is from near sea level to about 8,500 ft. N. macrotis appears to be mainly an inhabitant of rugged, rocky habitats in arid landscapes. It has been found in a variety of plant associations, including desert shrub, woodlands and evergreen forests. It appears to be associated with lowlands, but has been documented at around 8,000 ft in New Mexico. This project is 'not likely to adversely affect' N. macrotis as construction will not disturb or destroy roosts nor affect significant suitable habitat. Karst and caves will be avoided or spanned, where possible, by the transmission line.

Black-Tailed Prairie Dog

(*Cynomys ludovicianus*) Black-tailed prairie dogs typically live in plains-mesa grasslands. Colonies of this species are often found in marginal habitat, such as open woodland and in the southwestern part of the state they occupy semi-desert conditions (BISON-M 2013). Black-tailed prairie dogs are herbivores feeding primarily on grass, weed and shrub stems, leaves and seeds. Formerly, they were widespread and abundant east of the Rio Grande and in the grasslands of southwestern New Mexico. Black-tailed prairie dogs have been largely eliminated from the state. Decline in numbers has been attributed to disease and habitat loss (BISON-M 2013). This project "is not likely to adversely affect" the black-tailed prairie dog. No extant prairie dog towns were observed within the transmission line right-of-way during the field survey. If encountered along the transmission line right-of-way, prairie dog towns will be spanned and avoided by vehicular traffic to minimize adverse impacts.

Burrowing Owl

(*Athene cunicularia*) Burrowing owls are ground-dwelling birds that excavate their own homes. If available, however, they prefer to use other burrowing animals' dens. They typically nest in vacated prairie dog burrows where they may live sociably in colonies. These owls eat mostly insects, rodents and occasionally birds, which they hunt either by day or night. Burrowing owls are found throughout grasslands and deserts. These owls range from the western portions of North America to the arid regions of Central and South America. This species lives in dry, open areas with no trees and short grass. Populations are declining in many areas. This species is listed as endangered or threatened in some states and provinces. Collision with cars is a major source of mortality. Congruent with cactus surveys (Section 3.8), 15 foot wide transects were searched for owl burrows. While several burrows were identified as being the correct size for burrowing owls within these transects and along the length of the ~41 mile biological survey, no sign of owl use (white wash/prey remains/feathers) were detected. These burrows were not determinable to be in use or in past use for this species. This project "is not likely to adversely affect" the burrowing owl.

Cave Myotis

(*Myotis velifer*) Cave myotis have been reported foraging over dense riparian vegetation and in drier desert washes. Dietary studies in Arizona, Kansas and Mexico indicate that insects such as butterflies, moths and beetles are typical prey. This species is found primarily at lower elevations (the Sonoran and Transition life zones) of the southwest, in areas dominated by creosote bush, palo verde, brittlebush and

cactus. The cave bat occurs from Kansas, Oklahoma and central Texas, to southern Nevada and southeastern California (along the Colorado River only), south through Mexico to Honduras. At least some populations are migratory. In Texas, cave myotis occupy the High Plains, Rolling Plans, Trans-Pecos, Edwards Plateau and South Texas Plains during the summer. This project is 'not likely to adversely affect' cave myotis as construction will not disturb or destroy roosts nor affect significant suitable habitat. Karst and caves will be avoided or spanned, where possible, by the transmission line.

Fringed Myotis

(*Myotis thysanodes*) This is a rather large Myotis with long ears and reddish-brown hair. It can be distinguished from all other species by a conspicuous fringe of hair along the posterior edge of its interfemoral membrane. The fringed bat is a colonial-roosting species with colonies ranging anywhere from 10 to 2,000 individuals, although large colonies are quite rare. Not much is known about the diet of the fringed bat. Their diet is based on insects. Some studies have shown that beetles are their preferred prey, while others show that moths or crickets are eaten more often than anything else. This species has been found in hot desert scrubland, grassland, xeric woodland, sage-grass steppe, mesic old-growth forest and multi-aged subalpine coniferous and mixed-deciduous forest. Xeric woodlands (oak and pinyon-juniper) appear to be the most commonly used.

Where available, caves, buildings, underground mines, rock crevices in cliff faces and bridges are used for maternity and night roosts, while hibernation has only been documented in buildings and underground mines. Tree-roosting has also been documented in Oregon, New Mexico and California. This project is 'not likely to adversely affect' fringed myotis as construction will not disturb or destroy roosts nor affect significant suitable habitat. Karst and caves will be avoided or spanned, where possible, by the transmission line.

Townsend's Big-eared Bat

(*Plecotus townsendii*) Townsend's big-eared bat can be distinguished from all other vespertilionids by the presence of prominent, bilateral nose lumps and large ears. Its habit of roosting on open surfaces makes it readily detectable and it is often the species most frequently observed (commonly in low numbers) in caves and abandoned mines throughout its range. It has also been reported to utilize buildings, bridges, rock crevices and hollow trees as roost sites.

Foraging associations include edge habitats along streams and areas adjacent to and within a variety of wooded habitats. It often travels large distances while foraging, including movements of over 10 miles during a single evening. It is a moth specialist with over 90 percent of its diet composed of lepidopterans. Habitat associations include coniferous forests, mixed mesophytic forests, deserts, native prairies, riparian communities, active agricultural areas and coastal habitat types. This project is 'not likely to adversely affect' Townsend's big-eared bat as construction will not disturb or destroy roosts nor destroy significant suitable habitat. Karst and caves will be avoided or spanned, where possible, by the transmission line.

Western Small-footed Myotis

(*Myotis ciliolabrum*) Western small-footed myotis are known to roost singly or in small groups in cliff and rock crevices, buildings, concrete overpasses, caves and mines. They forage early in the evening, feeding on various small insects. M. ciliolabrum ranges across the western half of North America from British Columbia, Alberta and Saskatchewan in Canada, throughout most of the United States west of the 100th Meridian and into central Mexico. M. ciliolabrum occurs in deserts, chaparral, riparian zones and western coniferous forest; it is most common above piñon-juniper forest. This project is 'not likely to adversely affect' M. ciliolabrum as construction will not disturb or destroy roosts nor destroy significant suitable habitat. Karst and caves will be avoided or spanned, where possible, by the transmission line.

Aplomado Falcon

(*Falco femoralis septentrionalis*) The Aplomado is a neotropical falcon, intermediate in size between the American kestrel and the prairie falcon. Its prey base in desert grassland consists primarily of various passerine species. However, reptiles, rodents and occasionally insects are taken as well. The historic range included Arizona to Texas and Mexico; however, recent sightings have been sporadic throughout this area. A breeding population of falcons was recently found in northern Chihuahua, 25 miles from the U.S. border. Decline in numbers has been attributed to brush encroachment caused by overgrazing and fire suppression and pesticide contamination. This species uses stick nests constructed by large birds such as ravens or hawks and are found in the tops of mesquite or the forks of soaptree yuccas. The USFWS (1999) has documented the use of an abandoned nest in an electrical tower. This species is very rare in New Mexico. This project "is not likely to adversely affect" the Aplomado falcon or its habitat. The project does not cross any expansive grasslands with shrub density less than 700 to 800 plants/hectare. There are no known records of Aplomado falcon breeding within the project area.

Ferruginous Hawk

(*Buteo regalis*) Ferruginous hawks occur as residents locally almost statewide (at least formerly) and are considered to be rare to uncommon. During the winter they are considered to be rare to fairly common due to migration (BISON-M 2013). The preferred habitat for Ferruginous Hawks is the arid and semiarid grassland regions of North America. The countryside is open, level, or rolling prairies; foothills or middle elevation plateaus largely devoid of trees; and cultivated shelterbelts or riparian corridors. Rock outcrops, shallow canyons and gullies may characterize some habitats. They are sometimes found on mounds in open desert. During the breeding season, the preference is for grasslands, sage and other arid shrub country. Nesting occurs in the open areas or in trees including cottonwoods, willows and swamp oaks along waterways. Cultivated fields and modified grasslands are avoided during the breeding period. A raptor nest survey was carried out for the length of the Proposed Action route as well as Alternative C (Section 3.9.1). Two possible raptor nests were found and will be removed according to BLM protocols, prior to any construction, thus reducing the possibility of a negative effect on an active nest during construction. Thus, this project is 'not likely to adversely affect' the ferruginous hawk.

Interior Least Tern

(*Sterna antillarum*) Interior least terns nest on alkali flats in New Mexico. They are commonly associated with shallow water areas of rivers, streams and lakes, feeding primarily on small fish, crustaceans and insects. In New Mexico, the least tern is a summer resident and nests only at or near Bitter Lake National Wildlife Refuge (NWR). It also occurs as a rare vagrant at other wetlands in the state including Eddy County (BISON-M 2013). Severe declines in interior least tern populations are due to habitat loss from river channelization, dam construction and regulated flows (BISON-M 2013). This project "is not likely to affect" the interior least tern or its habitat. Foraging habitat for the interior least tern is present at the Brantley dam and reservoir, however it is not found in the project area.

Lesser Prairie Chicken

(*Tympanuchus pallidicinctus*) The Lesser prairie chicken is a small social upland grassland-nesting bird present year-round in areas of New Mexico, Texas, Kansas, Colorado and Oklahoma. In New Mexico, the lesser prairie-chicken range includes Eddy County and three other counties. In southeastern NM, prairie chickens are found most commonly in shinnery oak/grassland communities. Ideal nesting habitat consists of 65 percent grassy stands, 20–30 percent low shrubs and the remainder forbs. Brood rearing and foraging habitat is similar with less stringent requirements. Breeding grounds (leks) are characterized by elevated ridges and knolls with flat surfaces and are usually close to the breeding areas.

In southern New Mexico primary shrub and mast species is shinnery oak (Quercus havardii) (NRCS 1999). This habitat does occur in the project area but is marginal and outside the focal range and connectivity areas for the lesser prairie chicken (SGP CHAT, 2013). Lack of appropriate grasses makes this habitat unsuitable for nesting, but may be suitable habitat for brood rearing or foraging for the lesser prairie chicken. This project would not significantly reduce the amount of suitable nesting habitat or reduce the availability of native rangeland through conversion to cropland or use by livestock. This project would have "no effect" on lesser prairie chicken.

Loggerhead Shrike

(*Lanius ludovicianus*) Loggerhead shrikes are found in short grass with isolated trees or shrubs, especially pastureland in most of Mexico and the southern half of the United States. Populations are believed to benefit from stands of native grasses and forbs and use creosote, sagebrush, mesquite and other scrub and brush rangeland in New Mexico. In the Chihuahuan desert scrub, shrikes are associated with open stands of creosote bush and large succulents in southern New Mexico and southwest Texas. They feed on an assortment of insects, small mammals, small birds and reptiles. The range extends from southern Ontario, Quebec and the Canadian Prairie Provinces, south to Mexico, however, populations in the north east have suffered severe decline. This project would have "no significant effect" on the loggerhead shrike as the proportion of local habitat (rangeland) would not be significantly reduced with the construction of this transmission line.

Mexican Spotted Owl

(*Strix occidentalis lucida*) Mexican spotted owls are commonly found in woodland or forested habitats with high canopy closure, high stand density, a multi-layered canopy, uneven-aged stands, numerous snags and downed woody matter. They feed primarily on small mammals. This species is found from parts of central Colorado and Utah and south through Arizona, New Mexico and west Texas. Spotted owls are residents in the mountains of New Mexico almost statewide (BISON-M 2013). This project would have "no effect" on the Mexican spotted owl. Suitable habitat, consisting of mixed coniferous forest or woodland is not found in the project area.

Dunes Sagebrush Lizard

(*Sceloporus arenicolus*) is confined to areas of active sand dunes vegetated by shinnery oak. Uneven sandy terrain and wind-created blowouts are essential habitat requirements for this species (BISON-M 2013). The dunes sagebrush lizard feeds primarily on arthropods including ants, crickets, grasshoppers and beetles. This species is native to New Mexico with a limited and often spotty distribution in the southeastern part of the state. Population declines are most likely due to stabilization of sand dunes. Sand dunes stabilized by vegetation are unsuitable for this species (BISON-M 2013). This project "is not likely to adversely affect" the dunes sagebrush lizard. Sufficient suitable habitat for this species is not found in the project area.

Texas Horned Lizard

(*Phrynosoma cornutum*) The Texas horned lizard inhabits arid and semiarid open country with loose soil supporting bunchgrass, cactus, juniper, mesquite, or acacia. Strictly terrestrial, this lizard can bury itself in loose soil that is sandy, loamy, or rocky. It seeks shelter under rocks (BISON-M 2013). Texas horned lizards range from the south-central United States to northern Mexico, throughout much of Texas, Oklahoma, Kansas and New Mexico. While some temporary habitat losses will occur during construction, these will affect a negligible proportion of this species' habitat. This project would have "no effect" on the Texas horned lizard.

Pecos Bluntnose Shiner

(*Notropis simus pecosensis*) The Pecos bluntnose shiner is a fish endemic to the Pecos River. It has been found from south of Ft. Sumner downstream to Brantley Reservoir. This species can occur in most available habitats in streams, but prefers main channels with sandy substrates, low flow and a depth of 17 to 31 cm. (BISON-M 2013). This project does not cross or affect the Pecos River. This project would have "no effect" on Pecos bluntnose shiner.

Pecos Gambusia

(*Gambusia nobilis*) Pecos gambusia is a fish endemic to the Pecos River Basin. In New Mexico, it occurs in springs and sinkholes on the west side of the Pecos River from Bitter Lake NWR to Blue Spring, a tributary of the Black River located south of Carlsbad. The principal habitat in Eddy County is Blue Spring. Reintroduction has occurred in New Mexico in several shallow alkaline lakes. Suitable habitat includes aquatic vegetation. Pecos gambusia feed primarily on aquatic and terrestrial insects and amphipods. This project does not cross or affect the Pecos River. This project would have "no effect" on the Pecos gambusia.

Texas Hornshell

(*Popenaias popeii*) The Texas hornshell occurs in large streams with variable substrates including mud, sand and rocky substrates. This species is a filter-feeder like other freshwater mussels. The historic range of this species includes New Mexico, Texas and Mexico. In New Mexico the Texas hornshell is confined to the lower portions of the Pecos River and Rio Grande drainages. This project "is not likely to adversely affect" the Texas hornshell. Habitat for this species is known to occur in areas south of Carlsbad, New Mexico but does not occur in the project area.

3.12.2 Impacts from No Action Alternative

Direct and Indirect Impacts

The No Action alternative would have no impact on Threatened, Endangered or Sensitive species as no construction activities would occur. No vegetation would have to be cleared and no project footprint would exist (access road, transmission line poles, expanded/new substations etc.) No additional access to the project area due to the project right of way would exist.

Cumulative impacts

There would be no cumulative impacts from the No Action alternative.

3.12.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

The proposed transmission line project, or Alternatives A, B and C, would have no significant impact to Threatened, Endangered, or Sensitive wildlife species. The project would not adversely affect the habitat of sensitive wildlife species. Vegetation shall be preserved and protected from damage by construction operations to the maximum extent practicable. Removal of brush and trees will be limited to those necessary for construction of the line and substations and/or pose a threat to safe and reliable operation and maintenance of the line, or as otherwise determined by SPS.

Cumulative Impacts

The Proposed Action for this project, , or Alternatives A, B and C, in association with other activities in the area, including the currently proposed expansion of the Intercontinental Potash Mine and continued extraction of oil and gas (including ancillary developments such as collection and treatment systems and

pipelines) could lead to additional impacts to Threatened, Endangered or Sensitive wildlife species. Specifically, additional projects to the northeast, in areas designated as Sand dune lizard or Lesser prairie chicken habitat would require mitigation to prevent harm to those species. Building the transmission line on the proposed route would allow for more land to be potentially converted from range land to extractive industry related uses with the availability of a more robust power transmission infrastructure. Thus, there could be a negative effect to these species at other projects through construction, increased traffic and habitat loss unless suitable mitigation was implemented. All parts of the Proposed Action were surveyed for raptor nests including private land. Parts of Alternative A, B and C that overlapped with the Proposed Action were surveyed for raptor nests. If one of these alternate routes was chosen, all non-surveyed parts of the route would be surveyed prior to construction.

Mitigation Measures

No mitigation measures would be needed for Threatened, Endangered and Sensitive wildlife species other than those identified above (nest removal) for raptors including the ferruginous hawk, in Section 3.12.1, as well as in Section 3.11.

3.13 Cultural Resources

3.13.1 Affected Environment

Cultural resources are locations of past human activity, occupation, or use and include archaeological and historic sites. Numerous federal and state laws and regulations govern the protection of cultural resources, including the Antiquities Act of 1906 (PL 59-209), the National Historic Preservation Act of 1966, as amended (PL 59-209), the National Environmental Policy Act of 1969 (PL 91-852, the Archaeological Resources Protection Act of 1979 (PL 96-95) Executive Order 1159, the New Mexico Cultural Properties Act (18-6-17 NMSA 1978), the New Mexico Prehistoric and the Historic Sites Preservation Act (18-18-8-9 NMSA 1978).

The project area falls within the Southeastern New Mexico Archaeological Region. This region contains cultural materials associated with the following cultural/temporal periods: Paleoindian (ca. 10,000–5200 B.C.); Archaic (5200 B.C.–A.D. 950); Formative (A.D. 950–1450); and Proto/Ethnohistoric (A.D. 1450–1850); and Historic (1850 to present). A team of experienced archaeologists completed a Class I and Class III cultural survey within the project area, surveying a 150-foot wide corridor on both sides of the Proposed Action route for a total 300-foot wide corridor surveyed (Maps included in Appendix G) as well as the Alternative C route, except on private land and where the Proposed Action route diverged from Alternative C for a ~1.2 mile segment at T23S R30E sections 1 and 12, that is yet to be surveyed. Thus the sections where Alternatives A and B overlapped with the Proposed Action and Alternative C were also surveyed. The survey indicated that sites representing the Late Archaic or Formative, Protohistoric and Historic periods occur on BLM and State trust lands within the project area. These sites are summarized in Table 3.7. A brief discussion of each site's cultural affiliation and Period follows. Detailed treatments of the cultural history of Southeastern New Mexico can be found in Hogan (2006), Katz and Katz (1993), Staley et al. (1996), Stuart and Gauthier (1996), Sebastian and Larralde (1989). Further details on the Class I and Class III surveys are included in the report: Cultural Technical Report to be placed on file with the BLM (Brown and Brown 2014).

Table 3.8 Summary of archaeological sites within the project area

LA No.	Land Status	Affiliation and Period
65916	BLM	Late Archaic or Jornada Mogollon, AD 1–1400
65917	BLM	Late Archaic or Jornada Mogollon, AD 950–1400
162620	BLM, SLO, Private	U.S. Statehood to Recent, 1932–1967

LA No.	Land Status	Affiliation and Period
171925	BLM	Jornada Mogollon, AD 400–1400
177526	BLM	Late Territorial, Early Statehood, 1905–1920
177527	BLM, SLO	Jornada Mogollon, AD 400–1400
177528	BLM	Early Statehood to Recent, 1945–1980
177529	BLM	Early Statehood to Recent, 1945–1980

Paleoindian Period (10,000 B.C. to 5200 B.C.)

The Paleoindian Period represents the earliest uncontested human occupation in the Southwest and is divided into three subperiods or complexes: Clovis (10,000–9000 B.C.); Folsom (9000–8000 B.C.); and Plano (8000–5200 B.C.). Paleoenvironmental data suggest that the climate was cooler than at present, with considerably less variation in temperatures between seasons. Paleoindians were a highly mobile people who hunted now extinct megafauna, such as mammoth and a more robust form of bison. They had a distinctive stone tool kit, characterized by several lithic technologies, highlighted by fluted and parallel-flaked projectile points. Of the known Paleoindian sites in southeastern New Mexico, only 19 were in Eddy County, New Mexico as of 1990 (Katz and Katz 1993:I–107, Table 15). No Paleoindian sites were identified during the current survey.

Archaic Period

As an "adaptation" or way of life, the Archaic period in southeastern New Mexico is considered to be a continuation of the mobile hunting and gathering strategy of the preceding Paleoindian period but distinguished by the use of a greater variety of plants and the modern suite of Plains fauna. Archaic sites are usually identified as lithic scatters with fire-cracked rock, hearths, ground stone tools and specific projectile point types. Distinctive Archaic artifacts include a variety of stemmed or corner-notched dart point styles, basin metates and one-hand manos, scrapers, drills, choppers, knives (Cordell 1984). The Archaic is also associated with a biface-oriented chipped stone technology and a diversity of lithic raw materials (Lintz et al. 1988). Pottery, however, is absent.

Formative Period

Cultural attributes associated with the earliest phase of the Formative represent a continuum from the Archaic (Katz and Katz 1993:I–126), with minor changes in stone tool technology. Major developments during the Formative period include the introduction of pottery and presumably, the bow and arrow. Evidence for agriculture and sedentism, however, is limited. Later characteristics of the period include evidence of domestic architecture, Black-on-white pottery, pit houses, surface rooms and stone circles.

Protohistoric Period

The Protohistoric period is the least understood and least studied period in the entire prehistory of the Southwest (Sebastian and Levine 1989:93). It appears, however, that as agricultural lifeways began to disappear from southeastern New Mexico after A.D. 1300, the local hunting and gathering adaptation became increasingly mobile and focused more and more on hunting bison. Proto/Ethnohistoric sites are generally small and ephemeral and primarily occur in elevated settings near water. Known sites of this period include hearths, burned rock scatters, chipped stone scatters and ring middens. The tipi ring and rock art (petroglyphs and pictographs), however, are distinctive features of the Proto/Ethnohistoric period (Katz and Katz 1993:I–133, I–134). Metal, which could be used to make metal projectile points, began to appear during this time. The Protohistoric to Historic period also witnessed the arrival of pre-Apachean, Apache (later prehistoric to early historic times), Spanish (mid-1500s) and Comanche (mid-1800s) in the Southwest.

In 1821, Mexico declared its independence from Spain and in January 1822, established the Republic of Mexico. As a consequence, Spanish rule in New Mexico ended and the territory subsequently became part of the Mexican nation. War between Mexico and the United States over Texas eventually resulted in the Treaty of Guadalupe Hidalgo in 1848, in which Mexico ceded nearly all of present-day New Mexico to the United States. The Territory of New Mexico was created in 1850 (Jenkins and Schroeder 1974).

Historic Period

Because it lay outside the primary Spanish and Mexican occupations of New Mexico, Southeastern New Mexico was virtually ignored from 1850 until after the U.S. Civil War. By the mid-nineteenth century, however, livestock ranchers were migrating into southeastern New Mexico, attracted by the availability of grazing land. The establishment of U.S. military posts in New Mexico, beginning in 1846 and their concomitant demand for fresh beef provided the impetus for cattle ranching throughout New Mexico and the rest of the Southwest (Frazer 1983:1–2).

After the Civil War, Texas cattlemen trailed cattle to military forts, mining camps and railroad towns in Colorado and other northern regions. As the threat of Indian raids decreased, the cattlemen began to accumulate and winter herds in eastern New Mexico, especially the lower Pecos. These large herds were driven north and west (Williams 1986:120–121). Gradually, Texas cattlemen established ranches in eastern New Mexico (Beck 1962:258–260), John Chisum being the first cattleman to establish headquarters along the Pecos (Williams 1986:120). The Texas cattle drives only lasted 14 years (1866–1880), but they helped "to populate the Plains area as well as feed the miners and railroad-building crews" (Beck 1962:259).

In the 1880s, huge cattle empires were established throughout eastern New Mexico. Most were only defined by rights to water holes and by drift fences used to keep cattle on a home range. John Chisum reportedly controlled the entire area south of Fort Sumner, between the Pecos Valley and the Texas border. His headquarters at South Spring eventually became the town of Roswell. By the late 1880s, however, much of Chisum's empire, was carved into cattle companies, such as the Mallet, Littlefield and DZ (Williams 1986:120, 122).

By 1900, major changes were affecting the character of cattle ranching in New Mexico and Texas. Uninhibited use of the open range had produced extensive overgrazing. The grasslands were declared public domain and large portions of it were offered to homesteaders. Drift fences were removed and replaced by barbed wire fences that delimited the new ranches, which were reduced in size to several thousand acres each. Windmills provided water for the pastures created by the fencing. Although these changes helped signal the end of the huge cattle empires of the open range era, the changes also contributed to the development of stock farming (Jordan 1993:236–240; Simmons 1988:12–13; Williams 1986:122).

The present cultural environment of the project corridor is rural. In the past century and a half, Euro-Americans have substantially altered portions of the study area. These alterations include the introduction of livestock (and in many cases, subsequent overgrazing), suppression of native predators, building roads and railroads, construction of buried and overhead utility lines and land development for agriculture and mining. Most of the project area has been altered by oil and gas development, potash mining and/or livestock grazing. These activities are evidenced by remains of potash mining activities (that began in the 1930s and continue today), oil and gas pumping pads and access roads, pipelines, power lines, stock tanks and fences. In addition, both railroads associated with the potash mines and two-track roads crisscross the landscape.

3.13.2 Impacts from No Action Alternative

Direct and Indirect Impacts

Cultural resources will not be affected by the No Action alternative. Thus, the no build alternative will have no impact on cultural resources.

Cumulative Impacts

Cultural resources will not be impacted by the No Action alternative. Thus, the no build alternative would not add to cumulative impacts on cultural resources from any other projects.

3.13.3 Impacts from the Proposed Action

Direct and Indirect Impacts

The Proposed Action will have no direct or indirect impacts on cultural resources deemed eligible. All known cultural resources previously identified during Class I and Class III cultural surveys of the alternatives will be avoided. However, eligibility for site LA 162620 (railroad bed) is pending a recommendation by the state land management office.

Cumulative Impacts

The proposed alternatives for this project, in association with other activities in the area, specifically including the currently proposed expansion of the Intercontinental Potash Mine and continued extraction of oil and gas development (including ancillary developments such as collection and treatment systems and pipelines), could negatively impact cultural resources in the area. Presumably, however, any such impacts would be properly managed by the BLM or the state land management office, as appropriate. Thus, the Proposed Action will not add to cumulative impacts on cultural resources.

Mitigation Measures

If LA 162620 is determined eligible, mitigation measures decided in consultation with the State Land Office will be carried out. All other identified cultural resources will be avoided and thus, there will be no negative impacts on cultural resources. Therefore, no additional mitigation measures or procedures are necessary or proposed.

No negative residual impacts will remain to cultural resources as a result of any alternative action.

3.13.4 Impacts from Alternative A

Direct and Indirect Impacts

Alternative A would have no direct or indirect impacts on known cultural resources. The alternative has not been completely surveyed for cultural resources, but all cultural resources that may be identified during any future Class I or Class III survey of Alternative A will be avoided.

Cumulative Impacts

Alternative A, in association with other activities in the area, specifically including the currently proposed expansion of the Intercontinental Potash Mine and continued extraction of oil and gas development (including ancillary developments such as collection and treatment systems and pipelines), could negatively impact cultural resources in the area. Presumably, however, any such impacts would be properly managed by the BLM or the state land management office, as appropriate. Thus, the Alternate A will not add to cumulative impacts on cultural resources.

Mitigation Measures

All identified cultural resources will be avoided and thus, there will be no negative impacts on cultural resources. Therefore, no mitigation measures or procedures are necessary or proposed. LA 171925 should be fenced and monitored by an archaeologist during transmission line construction for avoidance.

No negative residual impacts will remain to cultural resources as a result of any alternative action.

3.13.5 Impacts from Alternative B

Direct and Indirect Impacts

Alternative B would have no direct or indirect impacts on known cultural resources. The alternative has not been completely surveyed for cultural resources, but any cultural resources that may be identified during a future Class I or Class III survey of Alternative B will be avoided.

Cumulative Impacts

Alternative B, in association with other activities in the area, specifically including the currently proposed expansion of the Intercontinental Potash Mine and continued extraction of oil and gas development (including ancillary developments such as collection and treatment systems and pipelines), could negatively impact cultural resources in the area. Presumably, however, any such impacts would be properly managed by the BLM or the state land management office, as appropriate. Thus, Alternative B will not add to cumulative impacts on cultural resources.

Mitigation Measures

All identified cultural resources will be avoided and thus, there will be no negative impacts on cultural resources. Therefore, no mitigation measures or procedures are necessary or proposed. LA 171925 should be fenced and monitored by an archaeologist during transmission line construction for avoidance.

No negative residual impacts will remain to cultural resources as a result of any alternative action.

3.13.6 Impacts from Alternative C

Direct and Indirect Impacts

Alternative C will have no direct or indirect impacts on cultural resources deemed eligible. All known cultural resources previously identified during Class I and Class III cultural surveys of the alternatives will be avoided. However, eligibility for site LA 162620 (railroad bed) is pending a recommendation by the state land management office. This alternative has been surveyed for cultural resources and all identified cultural resources (see Table 3.7 above) will be avoided. A small section of private land east of the Alternate C route (T23S, R30E, Sections 1, 12), has not been surveyed. If this alternative is selected, this area would be surveyed for cultural resources.

Cumulative Impacts

Alternative C, in association with other activities in the area, specifically including the currently proposed expansion of the Intercontinental Potash Mine and continued extraction of oil and gas development (including ancillary developments such as collection and treatment systems and pipelines), could negatively impact cultural resources in the area. Presumably, however, any such impacts would be properly managed by the BLM or the state land management office, as appropriate. Thus, the Proposed Action will not add to cumulative impacts on cultural resources.

Mitigation Measures

If LA 162620 is determined eligible, mitigation measures decided in consultation with the State Land Office will be carried out. All other identified cultural resources will be avoided and thus, there will be no negative impacts on cultural resources. Therefore, no additional mitigation measures or procedures are necessary or proposed. LA 171925 should be fenced and monitored by an archaeologist during transmission line construction for avoidance.

No negative residual impacts will remain to cultural resources as a result of any alternative action.

3.14 Paleontological Resources

3.14.1 Affected Environment

Paleontological resources are any fossilized remains, traces, or imprints of organisms that are preserved in the Earth's crust and provide information about the history of life on Earth. Fossil remains may include bones, teeth, shells, leaves and wood. Paleontological resources include not only the actual fossils, but also the collecting localities and the geological deposits that contain the fossils. Paleontological resources are recognized as nonrenewable scientific resources and are protected by federal statutes and policies (BLM 2013).

Southeastern New Mexico contains 40 known Pleistocene vertebrate locations consisting of 13 Pleistocene caves and 27 significant open or stratified sites (Morgan and Lucas 2006). Although Pleistocene fauna are widely distributed throughout the region, there are three notable concentrations consisting of more than 10 sites each. One of these, a concentration from the Pecos River Valley and its tributaries in Chaves and Eddy Counties, contains 12 sites. The other two concentrations are located in the Guadalupe and Sacramento Mountains and are not considered (Morgan and Lucas 2006)

Nash Draw, located within the Pecos River Valley concentration, is a broad northeast-southwest trending draw. This draw is in eastern Eddy County, approximately 25 km east of Carlsbad, New Mexico. It was a major tributary of the Pecos River during the Pleistocene, especially during periods of more abundant precipitation.

Nash Draw has the only identified fossil concentration located in the vicinity of the project area. Most of the fossils from Nash Draw are in the University of Texas at El Paso (UTEP) collection as collected from the UTEP site 112. These consist of isolated teeth and postcranial elements of the large horse, *Equus niobrarensis*, the small horse, *E. conversidens* and the camelid, *Camelops hesternus.* The Smithsonian Institution collection has a single tooth of *E. niobrarensis* collected from another site in Nash Draw, a gypsite spring deposit located about one km west of Livingston Ridge (Morgan and Lucas 2006:327). This site is several miles to the north of the project area.

3.14.2 Impacts from No Action Alternative

Direct and Indirect Impacts

The No Action alternative would not result in any ground breaking or earth movements and would thus result in no impact to any unknown paleontological resources in the project area. Unauthorized collecting would not increase due to improved access to the resource along roads constructed or improved during the project or subsequent maintenance.

Cumulative Impacts

There are no cumulative impacts from the No Action alternative.

3.14.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

The Proposed Action and Alternatives A, B and C cross Nash Draw and thus, have the potential to damage, destroy, or increase the unauthorized collecting of both known and currently unidentified paleontological resources that may occur within the Nash Draw portion of the project area. Paleontological resources, however, tend to be widely distributed (Gary Morgan, personal communication 2013) and therefore, are unlikely to be encountered outside the known and previously documented concentrations. There are no known concentrations that occur near the project, even within Nash Draw.

Cumulative Impacts

Additional energy related activities (construction of transmission lines, well pads, potash mines and related infrastructure) could result in additional disturbance of previously undiscovered paleontological resources.

Mitigation Measures

As no significant paleontological resources are known within the project area, no mitigation measures are required during construction. However, the construction of gates to reduce vehicular access to the region would result in less chances of disturbance to paleontological resources.

3.15 Indian Trust Assets

3.15.1 Affected Environment

Indian tribes are recognized as separate sovereigns under federal law and have governmental jurisdiction over their land and people. Indian trust assets are those legal interests in property that are held in trust by the United States for Indian tribes or Indian individuals, or property that the United States is otherwise charged by law to protect. The United States has a trust responsibility to protect and maintain rights reserved by, or granted to, American Indians or individuals by treaties, federal statutes and executive orders (New Mexico-Texas Water Commission).

No Indian trust asset issues were identified at the project's public scoping meeting. In addition, a GIS analysis of land ownership data provided by the Carlsbad BLM office indicated no Indian land near the project. There are no Indian trust assets at or near the Proposed Action or any of the action alternatives.

3.15.2 Impacts from No Action Alternative

Direct and Indirect Impacts

There are no Indian Trust Assets within or near the project area. Therefore, there is no potential for adversely affecting Indian trust assets if the No Action alternative is implemented.

Cumulative Impacts

There are no Indian Trust Assets within or near the project area. Therefore, there is no potential for cumulative effects adversely affecting Indian trust assets if the No Action alternative is implemented.

3.15.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

There are no Indian trust assets within or near the project area. Therefore, there is no potential for adversely affecting Indian trust assets as a result of the Proposed Action or Alternatives A, B or C.

Cumulative Impacts

There are no Indian trust assets within or near the project area. Therefore, there is no potential for cumulative impacts to trust assets as a result of the Proposed Action or Alternatives A, B or C.

Mitigation Measures

There are no Indian trust assets within or near the project area. Therefore, no mitigation measures or procedures would be required as a result of the Proposed Action and no impacts to Indian trust assets will remain after implementation of the Proposed Action or Alternatives A, B or C.

3.16 Social and Economic Conditions

3.16.1 Affected Environment

The project area falls within Eddy and Lea Counties. The United States Census' population estimate for Eddy County was 53,829 in 2010 and 54,419 in 2012. The population estimate for Lea County was 65,136 in 2011 and 66,338 in 2012 (US Census Bureau 2013). Eddy County had a percentage increase in population of 1.1 percent from April 1, 2010 to July 1, 2012. Lea County had a 2.5 percent increase during the same period (US Census Bureau 2013). Lea County's latest recorded percentage change in population is higher than the state of New Mexico's for the same time period (1.3 percent).

The population in Eddy County was 93.5 percent White; with 45.1 percent listed as Hispanic or Latino and 51.3 percent listed as White alone, not Hispanic or Latino. The population was equally divided between male and female, with 40.2 percent of the population between the ages of 18 and 65. Median household income in the years from 2007 through 2011 was $47,725, with 12.8 percent of the population below the poverty level.

In Lea County, the population was 91.8 percent White; with 53.3 percent reporting as Hispanic or Latino and 41 percent reporting as White alone, not Hispanic or Latino. The population was 51.4 percent male, with 59.7 percent of the population between the ages of 18 and 65. Median household income in the years from 2007 through 2011 was $46,781, with 16.7 percent of the population below the poverty level.

The oil and gas industry along with mining companies are the largest employers in Eddy County and Lea County. Overall, employment in construction related to the oil and gas industry comprises a large portion of the economic base in Eddy and surrounding counties. A major portion (17.7 percent) of the population of Eddy County is employed in forestry, fishing, hunting, agriculture and mining while 7 percent are involved in construction. Similarly, a major portion (21.9 percent) of the population of Lea County is employed in forestry, fishing, hunting, agriculture and mining while 8.6 percent are involved in construction (U.S. Census 2010). A major source of jobs for these sectors is derived from construction of oil and gas infrastructure and subsequent maintenance. Other sectors that are important for employment in these counties include trade (10.7 percent for Eddy County and 12.5 percent for Lea County) and education services, healthcare and social services (20.8 percent for Eddy County and 18 percent for Lea County).

3.16.2 Impacts from No Action Alternative

Direct and Indirect Impacts

If the project were not built, there would be a negative impact on local employment as well as short- and long-term demographic trends in Eddy and Lea Counties, in terms of population growth. Crews would not be hired for construction and maintenance of the transmission line and short-term population growth associated with jobs from the construction of the transmission line would not occur. In addition, the No Action Alternative would not alleviate the current over subscription and undersupply of power in the area.

Because of this, power shortages resulting from the inadequate power supply could led to a slowdown of growth in the number of businesses in the local economy, a slowdown in the number of jobs available from development of the oil and gas fields in the area and a reduced opportunity for job growth associated with expansion of the potash mines. These reductions would, in turn, limit or foreclose the opportunity for job creation and long-term population growth in the area. Additionally, there would be a negative impact on secondary job creation (such as additional construction jobs associated with new home construction) in the local economy related to population growth.

Cumulative Impacts

If the transmission upgrade were not to occur, while growth and expansion may be lessened, it would not be entirely unavailable. If certain planned and proposed activities, such as the expansion of the potash mines and an increase in oil and gas extraction, were to occur, then employment would increase, but at a slower pace. There would be increased pressure on the available electricity. The estimated increased demand for energy over the next ten years is 700 MW (Scott Morris, Xcel Energy, Personal Communication March 28, 2014). This increase might lead to brown outs and other such system failures during periods of high energy demand. No additional electrical power would be available as a result of this new line, as it would not be built, resulting in delays in hiring across the region over the short to medium term. These reductions would, in turn, limit or foreclose the opportunity for job creation and long-term population growth in the area. Additionally, there would be a negative impact on secondary job creation (such as additional construction jobs associated with new home construction) in the local economy related to population growth. If the line is not built, reduction in the percentage of the population below the poverty line would not occur.

3.16.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

If the project were built, there would be a positive impact on local employment and a beneficial impact on the region's short- and long-term demographic trends in terms of population growth. Crews would be hired for construction and maintenance of the transmission line. Some of these short-term employment opportunities might not be filled by locals, but instead be filled by persons traveling in to the area. However, even in such a case the construction would stimulate the local economy by introducing additional money from the spending of these workers. This, in turn, would stimulate growth in the local population. A subset of these jobs would remain in the area for the life of the transmission line for maintenance purposes.

In addition, these alternatives would help alleviate the current over subscription and undersupply of power in the area, which would alleviate the inadequate power supply in the region and allow growth in the number of businesses in the local economy, an increase in the number of jobs available from development of the oil and gas fields in the area and a greater opportunity for job growth associated with expansion of the potash mines. This would, in turn, promote job creation and long-term population growth in the area. Additionally, there would be a positive impact on secondary job creation (such as additional construction jobs associated with new home construction) in the local economy related to population growth.

Cumulative Impacts

If the transmission upgrade were to occur and if certain planned and proposed activities, such as the expansion of the potash mines and an increase in oil and gas extraction, were to occur, then employment would increase and there would be a positive impact to demographics. The estimated increased demand for energy over the next ten years is 700 MW (Scott Morris, Xcel Energy, Personal Communication March 28, 2014). There would be less pressure on the available electricity. This would reduce the

likelihood of brown outs and other such system failures during periods of high energy demand. Additional electrical power would be available as a result of this new line, resulting in increased hiring across the region over the short to medium term and a rise in the median household income. Furthermore, these projects should contribute to a decrease in the percentage of persons below the poverty level.

Mitigation Measures

The Proposed Action and Alternatives A, B and C would have a positive effect on demographics and employment in the area and thus no mitigation measures are necessary or proposed. No negative residual impacts will remain as a result of the proposed alternative.

3.17 Environmental Justice

3.17.1 Affected Environment

As defined by the web site (US EPA 2013):

> *Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.*

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations* was issued on February 11, 1994. This executive order led to the creation of guidelines useful in conducting environmental justice analyses. The *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses* were issued in April of 1998 (viewed at http://es.epa.gov/oeca/ofa/ejepa.html). According to these guidelines, "The first step in identifying potential environmental justice concerns should be a screening-level analysis to determine the existence of a low-income and/or minority population." Data on minorities were determined from the categories of race and Hispanic or Latino origin from the 2010 Census (viewed at www.census.gov).

The 2010 Census data were collected at the state and county levels from the U.S. Census. The project area falls within Eddy County census tracts 7 and 8, as well as Lea County tract 9. All of these tracts were determined to be the screening area. Comparisons of the total minority populations and specific minority populations were undertaken to determine if any environmental justice communities of concern were present. Total minority population of census tracts within the project area to Eddy and Lea County, as well as the state of New Mexico were compared. The total minority population for the State of New Mexico is more than half of the total population (59.4 percent). Eddy and Lea County are both comprised of a lower percentage of total minority population in comparison to the rest of the state (Table 3.8). The majority of residents in the census tracts in the screening area are identified as "White alone" (51.4 percent and 54 percent, except for Eddy Co tract 8, which was 37 percent). The largest minority group in the screening area is Hispanic. In Table 3.9, Eddy Co Tract 8 has more Hispanics than the entire state and less Whites. Otherwise, the percentage of each minority group represented is less than or close to the comparison statistics for the state and counties. Additionally, the proportion of total minorities in all three tracts is less than or the same as at the state level. No environmental justice community of concern was identified based on the screening area analysis.

Table 3.9 Census 2010 total population for Eddy and Lea Counties

	New Mexico Percent	New Mexico	Eddy County Percent	Eddy County	Lea County Percent	Lea County
Hispanic & Latino Race						
Total population		2,055,287		53,693		64,670
Hispanic or Latino (of any race)	952,569	46.30%	23,702	44.10%	33,141	51.20%
Not Hispanic or Latino	1,102,718	53.70%	29,991	55.90%	31,529	48.80%
White alone	831,543	40.50%	27,897	52.00%	27,697	42.80%
Black or African American alone	35,586	1.70%	262	0.50%	2,308	3.60%
American Indian and Alaska Native alone	176,766	8.60%	533	1.00%	467	0.70%
Asian alone	25,411	1.20%	16	0.00%	156	0.20%
Native Hawaiian and Other Pacific Islander alone	989	0.00%	84	0.20%	0	0.00%
Some other race alone	3,623	0.20%	147	0.30%	37	0.10%
Two or more races	28,800	1.40%	1,052	2.00%	864	1.30%
Total minority	**1,223,744**	**59.40%**	**25,796**	**48.10%**	**36,973**	**57.10%**

Table 3.10 Total population by county and census tract

	New Mexico Percent	New Mexico	Census Tract 7 Eddy County Percent	Census Tract 7 Eddy County	Census Tract 8 Eddy County Percent	Census Tract 2 Eddy County	Census Tract 9 Lea County Percent	Census Tract 9 Lea County
Total		2,055,287		5,771		2,193		1,979
Hispanic or Latino	46.30%	952,569	43.5%	2,509	60.0%	1,316	43.2%	854
White alone	40.50%	831,543	51.4%	2,967	37.0%	811	54.0%	1,068
Black or African American alone	1.70%	35,586	0.0%	0	0.0%	0	0.8%	15
American Indian & Alaska Native alone	8.60%	176,766	0.7%	43	0.2%	5	0.3%	5
Asian alone	1.20%	25,411	0.0%	0	0.0%	0	0.0%	0
Native Hawaiian & Other Pacific Islander alone	0.00%	989	1.5%	84	0.0%	0	0.0%	0
Some other race alone	0.20%	3623	0.1%	8	0.0%	0	0.0%	0
Population of two or more races	1.40%	28,800	2.8%	160	2.8%	61	1.9%	37
Total Minority Population	**59.4**		**43.5%**		**60.0**		**43.2%**	

The percentage of persons below the poverty level in the counties located in the screening area varies somewhat, but not significantly. The percentage of persons below the poverty level in Eddy County and Lea County is significantly below that of New Mexico. Thus, no Community of Concern was identified based on income and poverty level.

Table 3.11 Percentages of persons below the poverty level, 2008–2012 model-based estimate

	New Mexico	Eddy County	Lea County
Percent of persons below poverty level	19.5	9.2	15.2
Median Household Income	$44,886	$46,583	$43,910

3.17.2 Impacts from No Action Alternative

Direct and Indirect Impacts

There would be no impacts to Environmental Justice related issues if the transmission line was not built.

Cumulative Impacts

There would be no cumulative impacts to Environmental Justice related issues if the transmission line was not built.

3.17.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

Since no environmental justice community of concern was identified in the screening level analysis, the proposed project is considered to have no impact on environmental justice.

Cumulative Impacts

Since no environmental justice community of concern was identified in the screening level analysis, the proposed project is considered to have no cumulative impact on environmental justice.

Mitigation Measures

None.

3.18 Range/Livestock Grazing and Other Land Use

3.18.1 Affected Environment

Eddy County encompasses a total of 2,675,200 acres. Of the total acreage, 1,627,826 are Federal lands, 577,225 are state lands and the remaining 470,149 are private lands (Eddy County web site viewed at http://www.carlsbadnm.com/ecourt/costats.htm). The population of Carlsbad is 26138. The population of Artesia is 11,301 (censusviewer.com 2012).

Lea County encompasses a total of 2,810,195 acres. Of the total acreage, 422,394 are Federal lands, 950,695 are state lands and 1,438,176 are private lands (BLM Base Map CD). The population of Hobbs, NM is 28,657. The population of Lovington is 11,009.

Table 3.12 Federal, state and private land ownership in Eddy and Lea County (acres)

Owner	County	County
	Eddy	Lea
Federal land	1,579,490.1	422,393.5
State	509,476.2	950,695.1
Private	595,568.4	1,438,175.9

BLM managed lands make up approximately two thirds of the project affected area, with state land comprising nearly a third of the project affected area is located. The remaining is private. Most of the lands surrounding the proposed project corridor are used for oil and gas production, potash mining and seasonal livestock grazing, predominantly by cattle. There is minimal agricultural and residential use.

Table 3.13 Potash leases in Eddy and Lea County (acres)

Potash Mining Lease	Lessee
NMLC 0036092B	Intrepid Potash NM Llc
NMLC 0044311A	Mosaic Potash Carlsbad Inc
NMLC 0044311B	Mosaic Potash Carlsbad Inc
NMLC 0044311C	Mosaic Potash Carlsbad Inc
NMLC 0044312C	Mosaic Potash Carlsbad Inc
NMLC 0048730A	Western Ag-Minerals Co
NMLC 0048730B	Western Ag-Minerals Co
NMLC 0065209	Mosaic Potash Carlsbad Inc
NMNM 006829	Mosaic Potash Carlsbad Inc
NMNM 006830	Mosaic Potash Carlsbad Inc
NMNM 069499	Mosaic Potash Carlsbad Inc
NMNM 121109	Intercontinental Potash (USA)
NMNM 0009118C	Mosaic Potash Carlsbad Inc
NMNM 032920801	Mosaic Potash Carlsbad Inc
NMNM 035915701	Mosaic Potash Carlsbad Inc
NMNM 035915801	Mosaic Potash Carlsbad Inc

There is no cultivation for pasture or hay within the project area and there are no prime and unique farmlands in the area (Natural Resources Conservation Service 2001). Land cover includes grasses and shrubs and is discussed in detail in Section 3.7.1.

The proposed project corridor crosses nine existing BLM grazing allotments (Table 3.13). Range improvement projects such as windmills, water delivery systems (pipelines, storage tanks, and water troughs), earthen reservoirs, fences, and brush control projects are located within the allotments

Table 3.14 Grazing allotments located along the project corridor

Allotment Number	Name	Area Affected (Proposed Route)	Area Affected (Alt. A)	Area Affected (Alt. B)	Area Affected (Alt. C)
		Acres			
76038	Fairview	139.70	139.21	139.21	139.21
76137	Red Tank II	113.35	113.35	113.35	113.35
77012	Twin Wells	86.02	86.05	86.05	85.52
77026	Quahada Ridge	41.47	35.25	35.25	41.47
77027	Livingston Ridge	156.95	113.15	152.03	156.72
77032	Antelope Ridge	110.28	54.35	54.35	115.30
77033	Nash Draw	11.78	80.44	80.44	11.56

Allotment Number	Name	Area Affected (Proposed Route)	Area Affected (Alt. A)	Area Affected (Alt. B)	Area Affected (Alt. C)
77045	Lindsey Lake	17.35	75.68	36.12	17.35
77049	Mimosa	55.89	55.84	55.84	55.84
	Total Area	**732.79**	**753.33**	**752.65**	**736.34**

3.18.2 Impacts from No Action Alternative

Direct and Indirect Impacts

Energy shortages would be expected in the area's potash mining and oil and gas development industries, reducing growth in land use for extractive purposes and resulting in a reduction in a major driver of the regional economy. The population of Carlsbad, New Mexico and other cities and towns in the two counties may experience recurring electrical "brownouts." No vegetation would be cleared in grazing areas and cattle would not be affected by disruption due to construction or maintenance of the line.

Cumulative Impacts

Increased pressure upon the energy infrastructure from extractive industries will cause strain to the existing energy infrastructure. Brownouts will not be averted as the line would not be built.

Mitigation Measures

No adverse impacts are expected from the No Action alternative and thus no mitigation measures are required.

3.18.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

The Proposed Action and Alternatives A, B and C would have a beneficial impact on the region's land use. In the short term, constructing the ~41-mile long transmission line will bolster the electricity supply infrastructure and allow for more reliable delivery of inexpensive power. The growth of extractive industries will continue.

Grazing/ranching activities will be minimally affected. Considerable acreages of vegetation will be disturbed in the short term when the right-of-way is constructed for the placement of the power line (Table 3.13). However, since this loss of vegetation is spread across several grazing allotments, it will not affect the Animal Unit Months (AUMs) which are authorized for livestock use. Additionally, some re-vegetation will occur over the next two to three growing seasons to alleviate impact in the medium term. There are occasional livestock injuries or deaths due to accidents such as collisions with vehicles, and ingesting plastic or other materials present at the work site. If further development occurs, the resulting loss of vegetation could reduce the AUMs authorized for livestock use in this area. If fences are damaged, cattle can cross from one pasture to the next or from one allotment to another. This could disrupt any rest/rotation grazing scheme currently in place. If water lines are damaged, animal health can be impacted.

Cumulative Impacts

Additional development of extractive industries in the region would remove an additional minimal amount of land from availability for grazing. However, this will not be a significant change in proportionate land use. The BLM performed a cumulative effects GIS analysis for the Proposed Action.

The cumulative area of analysis for the purposes of quantifying cumulative impacts for this project was set at 0.25 mile from the centerline of the proposed route. This area was established to identify any other actions within the range of the Proposed Action that might affect nearby surface acreage. Estimations for surface disturbance were aligned with BLM CFOs lease sale EAs disturbance analysis wherein we apply 0.2 acres of disturbance per linear ROW or access road and 2 acres of disturbance per well pad.

For Reasonably foreseeable future actions: According to the BLM database records, there are 22 pending well pads, or portions of pads, and 13 proposed ROWs that fall within the identified cumulative area of analysis. All together these actions can be expected to create approximately 46.6 acres of disturbance within the cumulative area of effect for the Proposed Action.

For Past and Present Actions: Within the cumulative impact area of analysis defined above, approximately 126 access roads fall within the identified cumulative area of analysis creating 25.2 acres of road disturbance.

A similar analysis will be carried out if any of the Alternative Routes are chosen.

Mitigation Measures

Impacts to the ranching operation are reduced by the following standard practices which include: avoiding damage to existing range improvement projects (fences and pipelines), utilizing existing surface disturbance, minimizing vehicular use, placing parking and staging areas on caliche surfaced areas, reclaiming the areas not necessary for production, and quickly establishing vegetation on the reclaimed areas. All and any allotment and pasture fences crossed by the line will be gated and daisy chain locked, and tenants/ landowners will have the ability to access the allotment/pasture with a key that operates one of those locks. SPS employees and sub-contractors will be instructed to not leave gates unlocked and thus prevent cattle from crossing allotment/pasture boundaries. Mitigation of effects to well pads and access roads will be carried out using Best Management Practices as specified in the Plan of Development (Appendix H) namely: 1) The contractor shall limit movement of crews, vehicles and equipment on the right-of-way and approved access roads to minimize damage to property and disruption of normal land use activity. 2) The contractor shall maintain all fences and gates during the construction period. Any fence or gate damaged during construction will be repaired immediately by the contractor and 3) The contractor shall eliminate, at the earliest opportunity, all construction ruts that are hazardous to agricultural operations and/or movement of vehicles and equipment. Such ruts shall be leveled, filled and graded, or otherwise eliminated in an approved manner. Damage to ditches, tile drains, culverts, terraces, local roads and other similar land use features shall be corrected as necessary by the contractor. The land and facilities shall be restored as nearly as practicable to their original condition.

3.19 Transportation

3.19.1 Affected Environment

The existing transportation system in the region is an extensive system of private and county roads and state highways. Principal roads in the project area include US 62, US 285, NM 31, NM 128, NM 176, NM 243 and NM 360 and various county roads. Numerous gravel and dirt roads occur in the area for oil and gas exploration as well as cattle ranching in the area and are used to service oil and gas wells and pipelines as well as for fence maintenance. Local traffic is moderate throughout the day and higher at peak travel times (rush hour) due to the large number of extractive industry related vehicles entering and exiting the region.

3.19.2 Impacts from No Action Alternative

Direct and Indirect Impacts

There would be no impacts to transportation from the No Action alternative as the line would not be built and no additional traffic would be put on the road.

Cumulative Impacts

There would be no cumulative impacts to transportation from the No Action alternative.

3.19.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

The project area presently experiences moderate levels of vehicle traffic. Currently, most local traffic is associated with oil and gas production, potash mining and livestock management. The Proposed Action would introduce additional traffic into the area, such as, construction vehicles, the workers' personal vehicles and materials delivery vehicles traveling to the segment of the transmission line under construction.

Increased vehicular traffic would potentially affect local air quality by increasing the levels of dust (Particles between 2.5 and 10 micrometers in diameter, or PM10), allergens and petroleum fumes in the air. Noise levels also would likely increase. The risk of motor vehicle accidents would increase during construction and the dirt roads would have to be maintained more frequently. All of these impacts, however, would be non-significant, temporary and mainly confined to the initial construction period. The need to acquire, lease, operate, maintain and/or repair construction-related vehicles would have a temporary positive impact on that section of the local economy devoted to transportation needs.

Cumulative Impacts

The Proposed Action and Alternatives A, B and C, in association with other activities in the area, including the currently proposed expansion of the Intercontinental Potash Mine and continued extraction of oil and gas (including ancillary developments such as collection and treatment systems and pipelines), would lead to additional measureable impacts to transportation. A more robust power transmission infrastructure would contribute to the conversion of more land from use as range land to extractive industry related uses and consequently add to the local traffic as construction on other projects continued at a greater pace than if the line were not to be built.

Mitigation Measures

The building contractors shall make all necessary provisions for conformance with federal, state and local traffic safety standards and shall conduct construction operations so as to offer the least possible obstruction and inconvenience to public traffic.

3.20 Public Safety

3.20.1 Affected Environment

This section addresses the possibility of an effect of electromagnetic fields to public health and safety. Electric transmission lines produce electric and magnetic fields (EMF) when they are in operation. Magnetic fields are produced whenever an electrical current flows in a conductor. An example of this is the plugging of a lamp into a wall outlet in a home. If the lamp is turned on allowing electricity to flow to the lamp, a magnetic field is created around the lamp cord.

Electric and magnetic fields are produced by an electric charge that produces an electric field and a flow of current that produces a magnetic field (EPA 1992a). Electric fields are blocked by grounded materials, but magnetic fields can flow through most materials, including body tissue (Heath 1996). Sources of EMF include most electric devices such as power lines, electric ovens, hair dryers, electric razors, copying machines and power saws (EPA 1992a).

Scientists have debated the effect of EMF on human health. Some researchers have proposed a relationship between EMF and certain cancers, especially childhood leukemia (London et al. 1991; Savitz et al. 1988; Werteimer and Leeper 1979). These studies use a "surrogate" exposure methodology of coding or characterizing houses according to the type of nearby power lines and developed correlations with cancer rates (EPA 1992b).

The 1992 Energy Policy Act instructed the National Institute of Environmental Health Sciences (NIEHS), National Institute of Health (NIH) and the Department of Energy (DOE) to "direct and manage a program of research and analysis aimed at providing scientific evidence to clarify the potential for health risks from exposure to weak electric and magnetic fields (EMF) and electrical energy in the extremely low frequency (ELF) range" (NIEHS 1999). The Executive Summary of the 1999 NIEHS Report of Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields states, "the scientific evidence suggesting that ELF–EMF exposures pose any health risk is weak."

Mechanical and toxicological studies have failed to show any consistent pattern, though sporadic biological effects have been noted. No increased leukemias in experimental animals have been observed. "Virtually all of the laboratory evidence in animals and humans and mechanistic work in cells, fail to support a causal relationship between exposure to ELF–EMF at environmental levels and changes in biological function or disease" (NIEHS 1999). The report cited over 300 studies concerned with health effects to ELF–EMF exposure. The NIEHS feels that the evidence is insufficient to warrant aggressive regulatory concern. They do not believe that other cancers or non-cancer health outcomes show adequate evidence of a risk to currently warrant concern. Nearly everyone in the country uses electricity and, therefore, is exposed to ELF–EMF and the complicated interaction of humans with ELF–EMF will most likely continue to be an area of public concern. The NIEHS will continue to emphasize education of the public and the regulated community on reducing exposures. NIEHS also suggests that the power industry continue its current process of siting power lines to reduce exposure and explore ways to reduce power line magnetic fields without creating other hazards. NIEHS recommends that research continue in areas designated as requiring further study (NIEHS 1999).

However, because the general public has such interest and concern in the issue, the Electro-Magnetic Health Effects Committee (the Committee of the Public Utility Commission of Texas (PUCT) recommended the following policy:

> *The Committee recommends that the PUCT continue its policy of de facto "prudent avoidance" in the siting of transmission lines. We further recommend that, at this time, the PUCT not expand existing routing criteria to include concerns regarding health effect of EMF exposures (PUCT 1992:xxi).*

Following suit, many state commissions are adapting the same policy of "prudent avoidance." This concept is simply the idea that when no-cost or very low-cost (< 4 percent of the project cost) alternatives are available that would reduce potential exposure of humans to EMF, utility companies will opt for these alternatives (Horton and Goldberg 1995). SPS follows this policy.

3.20.2 Impacts from No Action Alternative

Direct and Indirect Impacts

There would be no impacts if the transmission line was not built as no new source of EMF would be created.

Cumulative Impacts

There would be no cumulative impacts from the No Action alternative.

3.20.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

The Proposed Action and Alternatives A, B and C go over BLM and State land for >97 percent of the distance that they cover and thus there is minimal effect to private land and property. Where these routes are closest to private residences they are still > 1.5 miles distant. The 1999 NIH, NIEHS Report states that scientific evidence suggesting ELF–EMF exposure poses a health risk is weak and the conclusions are insufficient to warrant aggressive regulatory concern. Thus, there would be no impacts from construction of the line on the Proposed Action route or Alternatives A, B and C.

Cumulative Impacts

There would be no cumulative impacts from the Proposed Action or Alternatives A, B and C.

Mitigation Measures

SPS will follow the policy of "prudent avoidance" and opt for available no- cost or very low-cost alternatives in siting transmission lines that reduce potential exposure of humans to EMF.

3.21 Infrastructure

3.21.1 Affected Environment

Buried natural gas pipelines, telecommunications lines, water wells, aboveground telephone lines and aboveground electric transmission/distribution lines are found along all routes. This infrastructure serves rural residents, agricultural, oil and gas operations in the region. In addition, a significant part of the landscape is occupied by oil and gas extraction machinery and supporting infrastructure (above ground pipelines, access roadways, electrical transformers, etc.).

3.21.2 Impacts from No Action Alternative

Direct and Indirect Impacts

If no line were built there would be no negative effect to local infrastructure as there would be no construction activity.

Cumulative Impacts

There would be no negative cumulative effect to local infrastructure.

3.21.3 Impacts from the Proposed Action and Alternatives A, B and C

Direct and Indirect Impacts

If the line were built on the Proposed Action route or on the Alternative A, B or C route (with the associated expansion and construction of substations), there is the potential for construction activities to encounter and

damage local infrastructure through earth moving, equipment storage and general wear and tear on local access roads. Additionally, in regions where the local geology is of karst, any new construction could impact other infrastructure through changes in the structure of the ground. This is addressed in greater detail in Section 3.1.

Cumulative Impacts

There would be no cumulative effects from building the line.

Mitigation Measures

The Proposed Alternative, as opposed to alternatives A, B and C, avoids the right of way of a soon to be built power distribution line (operated by Yate's Petroleum), as well as a number of oil well pads crossed by the remaining alternatives. In addition, SPS would work with oil/gas companies, communication companies and electric power engineers to accurately locate all infrastructure along the selected right-of-way. Buried infrastructure would be mapped or flagged to ensure that construction activities avoid buried pipelines and/or telecommunication lines. Any karst zones detected during surveys would be avoided. Because of these measures, no adverse impacts would occur. No mitigation measures would be needed.

4.0 Consultation and Coordination

4.1 Agencies Consulted

Agency personnel are listed below and agency letters are included in Appendix B.

Table 4.1 Agencies consulted

Agency	Individual	Title or Program
Army Corps of Engineers	William Oberle	Regulatory Division - Albuquerque
Bureau of Land Management	Tammie Hochstein	Realty Specialist
Bureau of Land Management	John Chopp	Wildlife Biologist
Bureau of Land Management	Aaron Stockton	Cave/Karst Resource Specialist
Bureau of Land Management	Deanna Younger	Recreation Specialist
Bureau of Land Management	April Rabuck	Planning and Environmental Specialist
Fish and Wildlife Service	IPAC database	Information, Planning and Conservation System
NM Dept. of Cultural Affairs	ARMS database	Archeological Records Management Section

4.2 List of Preparers

The following employees of TRC participated in the preparation of this EA.

Table 4.2 List of preparers

Person	Position
Howard Higgins	QA/QC
Aaftab Jain	Biology/GIS. Primary Author
Erin Degutis	Visuals
James Wedekind	Geology
Jesse Papez	Geology/GIS
Kenneth Brown	Cultural Resources
David Vaughan	Cultural Resources, Soils
Susan Crespin	Document Production

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