EXHIBIT D

EXHIBIT D – BIOLOGICAL RESOURCES

As stated in Exhibit D of Exhibit 1 to the Rules of Practice and Procedure Before Power Plant and Transmission Line Siting Committee:

"List the fish, wildlife, plant life and associated forms of life in the vicinity of the proposed site or route and describe the effects, if any, the proposed facilities will have thereon."

The following Exhibits D-1 and D-2 describe the existing environmental conditions, including the fish, wildlife, plant life and associated forms of life, in the vicinity of the proposed routes for the Nogales Interconnection Project and the Nogales Tap to Kantor Upgrade Project, respectively, and the potential impacts of these facilities.

Exhibit D-1	Biological Resources in the Vicinity of the Nogales Interconnection Project
Exhibit D-2	Biological Resources in the Vicinity of the Nogales Tap to Kantor Upgrade Project

Pursuant to Footnote 1 of Exhibit 1 to the Rules of Practice and Procedure Before Power Plant and Line Siting Committee, Applicants refer the Committee to the following studies for additional analysis of fish, wildlife, plant life, and associated forms of life in the vicinity of the Nogales Interconnection Project:

- Exhibit B-1(a): PP EA (Sections 3.3 and 3.5, and Appendix A: Biological Field Report for the Nogales Interconnection Project, Nogales, Santa Cruz County, Arizona)
- Exhibit B-1(b): DOE Draft EA (Sections 3.3, 3.4, 4.3, 4.4, 4.16.4.2, 4.16.4.3)

Exhibit D-1 – Biological Resources in the Vicinity of the Nogales Interconnection Project

I. Introduction

The analysis area for biological resources in the vicinity of the Nogales Interconnection Project encompasses approximately 7,230 acres located entirely within the City of Nogales, Santa Cruz County, Arizona. The area analyzed by Applicants for existing environmental conditions, including the fish, wildlife, plant life and associated forms of life is a one-mile buffer of the centerline of the various alternative routes. This area falls within the Mexican Highland Section of the Basin and Range physiographic province of the Intermontane Plateaus, ranging in elevation from about 3,765 feet (near the Valencia Substation) to 4,239 feet above mean sea level (near the U.S.-Mexico border). The terrain in the analysis area is characterized by an extensive pattern of short, dissected ridges and draws formed along longer ridges descending from nearby mountains.

II. Fish

The project is found within the Santa Cruz watershed and the Santa Cruz Active Water Management Area. Perennial bodies of water that exist in the analysis area are Nogales Wash, Mariposa Wash, and Potrero Creek. The north-south reach of Nogales Wash is also classified as intermittent for most of its length in the analysis area. Additionally, numerous ephemeral streams and nine intermittent ponds/tanks occur within the analysis area. Streams identified within the analysis area contribute to tributaries of the Nogales Wash. While one federal endangered fish species and one state fish species of concern occur within three miles of the analysis area, no suitable aquatic habitat is located within the analysis area and these species are unlikely to be present. Water resources within the project area are discussed in more detail at Section 3.5 of the DOE Draft EA (Exhibit B-1(b)).

III. Wildlife

A wide variety of mammals, birds, reptiles, and amphibians are likely to use the analysis area throughout the year or during different times of the year. Common mammals include white-tailed deer (*Odocoileus virginianus couesi*), black-tailed jackrabbit (*Lepus californicus*), cottontail rabbit (*Sylvilagus sp.*), javelina (*Tayassu tajacu*), coyote (*Canis latrans*), skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), bobcat (*Lynx*

rufus), gray fox (*Urocyon cinereoargenteus*), big brown bat (*Eptesicus fuscus*), and fringed myotis (*Myotis thysanodes*). Common birds include mourning dove (*Zenaida macroura*), white-winged dove (*Zenaida asiatica*), common raven (*Corvus corax*), turkey vulture (*Cathartes aura*), and Gambel's quail (*Callipepla gambelii*). Common reptiles include the ornate tree lizard (*Urosaurus ornatus*), Clark's spiny lizard (*Sceloporus clarkii*), gophersnake (*Pituophis catenifer*), common kingsnake (*Lampropeltis getula*), and western diamond-backed rattlesnake (*Crotalus atrox*). Amphibians include Couch's spadefoot (*Scaphiopus couchii*), Mexican spadefoot (*Spea multiplicata*), and the lowland leopard frog (*Rana yavapaiensis*). White-tailed deer, black-tailed jackrabbit, cottontail rabbit, and numerous species of birds were observed during field surveys.

Pollinators are an important component in the landscape of the analysis area. Arizona supports the highest native, wild bee diversity observed in the U.S., as native bees become most diverse in semi-arid to arid regions, which provide suitable dry soil conditions for nesting. Arizona also contains 17 species of hummingbirds at various times of the year, as well as western white-winged doves, and one species of nectar bat that migrates south to overwinter (the lesser long-nosed bat, which is listed as federally endangered). Additionally, over 600 species of butterflies and moths have been identified in Santa Cruz County.

The analysis area provides habitats that are used both seasonally and year-round, for both breeding and migration, by a variety of migratory bird species. Migratory bird species that may use the analysis area for breeding include: Bell's vireo (*Vireo belli*), Bendire's thrasher (*Toxostoma bendirei*), black-throated gray warbler (*Dendroica nigrescens*), Botteri's sparrow (*Aimophila botterii*), canyon towhee (*Pipilo fuscus*), Costa's hummingbird (*Calypte costae*), elegant trogon (*Trogon elegans*), grasshopper sparrow (*Ammodramus savannarum ammolegus*), Lawrence's goldfinch (*Carduelis lawrencei*), loggerhead shrike (*Lanius ludovicianus*), Lucy's warbler (*Vermivora luciae*), northern beardless-tyrannulet (*Campostoma imberbe*), olive warbler (*Peucedramus taeniatus*), red-faced warbler (*Cardellina rubrifrons*), rose-throated becard (*Pachyramphus aglaiae*), rufous-crowned sparrow (*Aimophila ruficeps*), rufous-winged sparrow (*Aimophila carpalis*), Sonoran yellow warbler (*Dendroica petechial ssp. sonorana*), varied bunting (*Passerina versicolor*), Virginia's warbler (*Vermivora virginiae*), willow flycatcher (*Empidonax traillii*), and phainopepla (*Phainopepla nitens*).

Wintering migratory bird species include Baird's sparrow (*Ammodramus bairdii*), black-chinned sparrow (*Spizella atrogularis*), Brewer's sparrow (*Spizella breweri*), fox sparrow (*Passerella iliaca*), gray vireo (*Vireo vicinior*), lark bunting (*Calamospiza*

melanocorys), Lewis's woodpecker (*Melanerpes lewis*), longbilled curlew (*Numenius americanus*), McCown's longspur (*Calcarius mccownii*), Sprague's pipit (*Anthus spragueii*), and Williamson's sapsucker (*Sphyrapicus thyroideus*).

Migrating and/or resident birds of prey expected to pass over or use habitat within the analysis area include golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaeetus leucocephalus*), red-tailed hawk (*Buteo jamaicensis*), gray hawk (*Buteo plagiatus*), common back-hawk (*Buteogallus anthracinus*), Harris's hawk (*Parabuteo unicinctus*), Swainson's hawk (*Buteo swainsoni*), zone-tailed hawk (*Buteo albonotatus*), ferruginous hawk (*Buteo regalis*), white-tailed kite (*Elanus leucurus*), northern harrier (*Circus cyaneus*), sharp-shinned hawk (*Accipiter striatus*), and Cooper's hawk (*Accipiter cooperii*).

Additionally, smaller birds of prey, such as crested caracara (*Caracara cheriway*), peregrine falcon (*Falco peregrinus*), prairie falcon (*Falco mexicanus*), merlin (*Falco columbarius*), and American kestrel (*Falco sparverius*), in addition to owl species such as barn owl (*Tyto alba*), great horned owl (*Bubo virginianus*), short-eared owl (*Asio flammeus*), elf owl (*Micrathene whitneyi*), and burrowing owl (*Athene cunicularia*), may pass over the analysis area (Arizona Field Ornithologists 2003). Of these species, Swainson's hawk, peregrine falcon, golden eagle, common black-hawk, elf owl, and burrowing owl may use the analysis area for breeding, while bald eagle and short-eared owl are wintering species (USFWS 2016a).

A greater abundance of wildlife is likely to occur in the undisturbed natural habitat of the western portion of the analysis area; however, wildlife would also use vegetated lands found throughout the analysis area. Wildlife occurring within the project area, including the likelihood that various threatened, endangered, and special status species will be present, is discussed in more detail at Section 3.4 of the DOE Draft EA (Exhibit B-1(b)). There is no designated or proposed critical wildlife habitat within the project area. Designated critical habitats for jaguar and the Mexican spotted owl are adjacent to the project area on Coronado National Forest lands.

IV. Vegetation

Ten types of vegetation communities are found in the area around the project, including Apacherian-Chihuahuan Mesquite Upland Scrub, Apacherian-Chihuahuan Piedmont Semi-Desert Grassland and Steppe, Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub, Chihuahuan Mixed Salt Desert Scrub, Developed, Medium – High Intensity, Developed, Open Space – Low Intensity, Madrean Encinal, Mogollon Chaparral, North American Warm Desert Riparian Mesquite Bosque, and North

American Warm Desert Wash. The majority (56%) of this is developed land of various intensities, while the remaining 44% consists of natural vegetative communities. There are no rare or sensitive vegetation communities identified in the analysis area. The western portion of the analysis area is primarily undisturbed natural habitat with some grazing and development; in the eastern portion, development has replaced or affected the majority of the existing habitat, and weedy plant species are dominant.

A diverse community of trees, shrubs, succulents, forbs (herbaceous flowering plants), and grasses is found in these vegetation communities. A greater density and diversity of plant species is found along the natural drainages. Common trees, shrubs, and succulents include one-seed juniper (*Juniperus monosperma*), alligator juniper (*Juniperus deppeana*), Mexican pinyon (*Pinus cembroides*), mesquite (*Prosopis sp.*), acacia (*Acacia sp.*), desert broom (*Baccharis sarothroides*), beargrass (*Nolina sp.*), ocotillo (*Fouquieria splendens*), agave (*Agave sp.*), yucca (*Yucca sp.*), sotol (*Dasylirion sp.*), prickly pear (*Opuntia sp.*), and various other cacti. Common native grasses include grama (*Bouteloua sp.*), tobosagrass (*Pleuraphis sp.*), muhly (*Muhlenbergia sp.*), and threeawn (*Aristida sp.*) (Brown 1994). Vegetation along the Mariposa Wash is also associated with a disturbed landscape, and the dominant vegetation includes desert broom, mesquite, acacia, and various grass species.

Plants protected from removal and destruction by the Arizona Native Plant Law (ARS 3-901 et seq.) within the analysis area include cacti, yucca, agave, mesquite, and beargrass. Vegetation within the project area is discussed in more detail at Section 3.3 of the DOE Draft EA (Exhibit B-1(b)).

V. Impacts

With respect to potentially suitable wildlife habitat, the various project alternatives are expected to disturb between 35 and 59 acres; with respect to vegetation disturbance, the impacted area increases to between 98 and 122 acres. Construction activities may result in temporary disturbance of wildlife and vegetation due to overland access, construction of upgraded or new access roads, structure work areas, pulling stations, and vegetation clearing, among others. Operational activities will also result in temporary impacts from inspection and repairs, maintenance of roads in the ROW, and vegetation management activities. These impacts are anticipated to be low and short-term in duration. Certain operational impacts are also likely to be low, but relatively permanent. Development of new access roads will result in habitat fragmentation and habitat edge effects for some species, particularly small animals that require vegetation cover for their movements as protection against predation. Such

narrow, linear clearings are generally more permeable for larger mammals. There will be no impacts on the Mexican spotted owl or jaguar or their designated critical habitats as a result of the project. Project development will likely increase human access potential in some areas. Impacts to vegetation and wildlife within the project area (as well as mitigation measures proposed by Applicants) are discussed in more detail at Sections 4.3 and 4.4 of the DOE Draft EA (Exhibit B-1(b)).

VI. Conclusion

Potential effects of the proposed project on wildlife and plants include vegetation clearing and associated habitat loss, as well as disturbance, injury, or mortality of wildlife due to construction, operation and maintenance activities. Overall, impacts to biological resources are anticipated to be low. In areas where native vegetation is cleared, there will be a permanent loss of potential habitat for small mammals, reptiles, and birds. Impacts to vegetation and wildlife will be mitigated by selective vegetation removal and the development of an Avian Protection Plan, a Noxious and Invasive Plant Species Management and Control Plan and a Reclamation, Vegetation, and Monitoring Plan.

Another potential effect of the construction of this project is the removal of state protected native plant species. Various plant species present in the project area are protected under the Arizona Native Plant Law. However, where biological surveys have not been completed, the Applicants will complete additional surveys, using the USFWS survey protocol for the Pima pineapple cactus, prior to any construction disturbance. If impacts to agaves cannot be avoided, the Applicants would be required to comply with USFWS requirements, which may include both transplanting and planting an additional agave for each transplant or replacing them at a 3:1 ratio. Finally, to the extent other protect species may be impacted, ADA notification would be provided 60 days prior to construction. The full list of relevant mitigation measures are detailed at Section 4.3.3 of the DOE Draft EA (Exhibit B-1(b)).

While Applicants' preferred route (Alternative Route 3) is approximately 10% longer than the shortest route (Alternative 4), overall it would require less ground disturbance. The preferred route also would be the most economically feasible, as approximately 3 miles of the transmission line would be constructed as double-circuit, reducing the number of poles required; the route is relatively straighter than Alternatives 2 and 4, which would result in fewer turning and dead-end structures. Additionally, this alternative would require the fewest miles of new and upgraded access roads and has relatively easier access for construction than the other alternatives.

As a result, the preferred route would have the lowest potential impacts to biological resources.

REFERENCES

Arizona Field Ornithologists. 2003. *Field Checklist of the Birds of Santa Cruz County Arizona.* Available at: http://www.azfo.org/documents/SantaCruz.pdf. Acessed July 2017.

Brown, D.E. (ed.). 1994. *Biotic Communities: Southwestern United States and Northwestern Mexico.* Salt Lake City: University of Utah Press.

Department of Energy. July 2017. *Nogales Interconnection Project Draft Environmental Assessment DOE/EA-2042* (DOE Draft EA). Available at: https://static1.squarespace.com/static/57c08aceb3db2b3f8cd728d2/t/595d18e94c8b036c0f18d4e5/1499273485932/Nogales+Draft+EA_070517.pdf.

U.S. Fish and Wildlife Service (USFWS). 2016a. Information for Planning and Consultation (IPaC) website. Available at: http://ecos.fws.gov/ipac/wizard/trustResourceList!prepare.action. Accessed July 2017.

Exhibit D-2 – Biological Resources in the Vicinity of the Nogales Tap to Kantor Upgrade Project

I. Introduction

The analysis area for biological resources in the vicinity of the Nogales Tap to Kantor Upgrade Project consists of an approximately 100-foot-wide, 27.5-mile project corridor, which covers approximately 333 acres. The topography of the project area consists of incised channels, low terraces and alluvial fan remnants composed of cobbles, sand, silt, and boulders. The project area crosses undisturbed, open space within the drainage basin of the Santa Cruz River, and crosses minor and major ephemeral drainages that discharge stormwater flows to the river. A portion of the project traverses the Santa Rita Experimental Range, an undeveloped, government-owned preserve.

II. Fish

No aquatic habitat is present in the Nogales Tap to Kantor Upgrade Project area that could support fish species.

III. Wildlife

Wildlife typical of the Sonoran Desert occurs among the project study area. Common species include large mammals such as bobcats (*Felis rufus*), coyotes (*Canis latrans*), and javelinas (*Tayassu tajacu*), and small mammals such as black-tailed jackrabbits (*Lepus californicus*), antelope ground squirrels (*Ammospermophilus spp.*), and kangaroo rats (*Dipodomys spp.*). Some common types of desert birds occurring among the project area are the Costa's hummingbird (*Calypte costae*), roadrunner (*Geococcyz californicus*), white-winged dove (*Zenaida asiatica*), red-tailed hawk (*Buteo jamaicensis*), and cactus wren (*Campylorhynchus brunneicapillus*). Common reptiles include the common side-blotched lizard (*Uta stansburiana*), tiger whiptail (*Aspidoscelis tigris*), gophersnake (*Pituophis catenifer*), and western diamond-backed rattlesnake (*Crotalus atrox*).

IV. Vegetation

The project is located within the Arizona Upland Subdivision of the Sonoran Desert Scrub Community and the Semidesert Grassland Community (Brown 1992). The

Sonoran Desert Scrub Community generally occurs in the northern portion of the project area in Pima County. In this community, associations vary among dominant plant species. Some areas are dominated by species more often associated with the Lower Colorado Subdivision such as creosotebush (*Larrea tridentate*), cholla (*Opuntia spp.*), prickly pear (*Opuntia spp.*), barrel cacti (*Ferocactus wislizenii*), hedgehog cactus (*Echinocereus engelmannii*), white thorn acacia (*Acacia constricta*), triangle bursage (*Ambrosia deltoidea*), and velvet mesquite (*Prosopis velutina*), which mainly occurs among swales, washes, or other areas where water collects. Along washes, shrubs and cacti, mainly cholla and prickly pear, often form dense stands. Upland areas are similarly comprised of the species named above; however, more upland species such as paloverde (*Cercidium floridum*), false mesquite (*Calliandra humilis*), buckwheat (*Eriogonum fasciculatum*), and ocotillo (*Fouquieria splendens*) are prevalent. In drier areas the vegetation is more openly spaced and generally less shrubby with more dominant ground cover.

Common ground cover species include shrubby coldenia (*Coldenia canascens*), wild zinnia (*Zinnia grandiflora*), dingy chamaesaracha (*Chamaesarach sordida*), and snakeweed (*Gutierrezia sarothrae*).

The southern portion of the project area, from southern Pima County to Kantor, is in the Semidesert Grassland Community. The Semidesert Grassland Community contains similar dominant plant species to the Sonoran Desert Scrub Community. Desert grasses once dominated this community, but many areas have been invaded by the shrub, tree, and cacti species common in the Sonoran Desert Scrub Community. Common desert grass species include grama grasses (*Bouteloua spp.*), three-awn grasses (*Artistida spp.*), tobosa grass (*Hilaria mutica*), fluffgrass (*Tridens pulchellus*), burrograss (*Scleropogon brevifolius*), and invasive grasses such as Lehmann lovegrass (*Eragrostis lehmanniana*).

V. Impacts

Construction and operation of the project will impact the habitat of regionally common wildlife species. Common reptiles and small mammals currently occupying the area may be temporarily displaced.

The project may temporarily impede wildlife movement through existing corridors during construction but would not create further fragmentation of habitat. Impacts to common wildlife are not significant because the poles and access road improvements would not create a barrier to wildlife movement and the area of habitat

permanently committed to the project (such as monopole footings) is minor. Potential Impacts to special status species are addressed in Exhibit C-2(a), Biological Evaluation of the Nogales Tap to Kantor Upgrade Project.

The amount of vegetation permanently or temporarily impacted by the Nogales Tap to Kantor Upgrade Project varies by alternative. Use of the existing ROW limits the amount of new disturbance. Temporary impacts from trimming and brush hogging will occur in areas not requiring permanent clearing and would allow plant species to grow back. Small areas around pole structures will require permanent clearing of vegetation for placement of pole structures.

VI. Conclusion

Mitigation would be accomplished by first completing plant inventories of the proposed pole locations, access road improvements, and staging areas in order to avoid high vale biological features (such as saguaros and Pima pineapple cacti). Where avoidance is not possible, a botanist would determine if the specimen can be transplanted or if it would need to be replaced. Transplant and replacement ratios have not been determined at this time, but would be determined pre-construction through coordination with the appropriate agencies (ASLD, U.S. Fish and Wildlife Service). Potential long-term impacts to vegetation are not expected to be significant given the application of avoidance and mitigation measures.

Project implementation of the Alternative 1 (Preferred Alternative) would result in up to 137.4 acres of additional disturbance in the existing ROW and up to 198.6 acres of new disturbance.

Project implementation of Alternative 2 would result in up to 195.4 acres of additional disturbance in the existing ROW and up to 141.2 acres of new disturbance.

Project implementation of Alternative 3 would result in up to 267.95 acres of additional disturbance in the existing ROW and up to 0 acres of new disturbance.

REFERENCES

Brown, D. E. 1982. *Biotic Communities of Southwestern United States and Northwestern Mexico.* University of Utah Press, Salt Lake City, Utah.