Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902-1499

October 13, 2011

cc: Brenda E. Brickhouse, LP 5U-C
Christopher W. Hansen, SP 6A-C
Clinton E. Jones, WT 11C-K
Kelly A. Love, WT 6A-K
Courtney L. Stetzler, SP 6A-C
Bruce L. Yeager, WT 11D-K
EDMS, WT 11D-K

Mr. Mike LeValley
Field Supervisor, Ecological Services
U.S. Fish and Wildlife Service
2609 Anderson Avenue
Manhattan, Kansas 66502

Dear Mr. LeValley:

BIOLOGICAL ASSESSMENT: CIMARRON WIND ENERGY PROJECT - GRAY COUNTY, KANSAS

Contingent upon environmental acceptability as determined through consultation with the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA), review under the National Environmental Policy Act (NEPA), and compliance with other applicable federal laws, regulations and executive orders, the TVA would purchase up to 165 megawatts of renewable power under a 20-year power purchase agreement (PPA) with CPV Cimarron Renewable Energy Company, LLC (CPV). In order to supply this renewable energy, CPV is proposing to construct and operate the Cimarron Wind Energy Project (the Project) as a wind-powered generating facility in Gray County, Kansas. As identified in the attached Biological Assessment (BA), the Project Area is defined as the approximately 13,883 acres of private land under Easement Agreement with CPV for the Project. The USFWS Section 7 Handbook defines an Action Area as all areas that may be affected directly or indirectly by the Federal action. Accordingly, TVA has defined the Action Area as the ~13,883 acre Project Footprint, and all areas located within one mile of the footprint of the Project. The Project would interconnect to the Southwest Power Pool (SPP) electric grid via the existing on-site 345-kilovolt (kV) Sunflower Electric Power Corporation (Sunflower) transmission line that traverses the Project Area from east to west north of J Road, in Gray County.

Based on information received from the USFWS-Kansas Field Office and the USFWS endangered species website, three federally listed and one candidate species may occur in the proposed Project Area: whooping crane (*Grus americana* – endangered); least tern (*Sterna antillarum* – endangered); piping plover (*Charadrius melodus* – threatened); and lesser prairie-chicken (*Tympanuchus pallidicinctus* – candidate).

As described in the enclosed BA, TVA has made the following determinations regarding construction and operation of the Cimarron wind energy facility.

- Based on the low probability of occurrence in the Project Area, the avoidance and minimization measures discussed in the BA (most notably the burying of all collection systems), and CPV's commitment to offset potential whooping crane habitat impacts, the Proposed Action may affect but is not likely to adversely affect the whooping crane.

- No piping plovers were observed during point count surveys in Spring or Fall 2010. Given the low possibility of collisions by piping plovers with turbines or other Project facilities over the life of the Project, the Proposed Action may affect but is not likely to adversely affect the piping plover.

- No least terns were observed within the Project Area during Spring or Fall 2010 point count surveys. No least tern fatalities have been reported at a wind energy facility. The Project Area does not contain habitat that is suitable for least tern breeding. In the event of this species occurring within the Project Area, the minimization of permanent wetland impacts (i.e., no risk of turbine collisions in wetlands) and the burying of collection systems (i.e., elimination of power line collision risk) during Project construction would minimize risk to this species. Therefore, the Proposed Action may affect but is not likely to adversely affect the least tern.

- Lesser prairie-chickens could occur in the Project Area during the non-breeding season and use the agricultural areas for foraging. Reduced speed limits, the limited use of overhead power lines, and fence marking proposed by CPV if approved by land owners will limit disturbance to prairie-chickens should they occur. As a result, the Proposed Action may affect but is not likely to adversely affect the lesser prairie-chicken.

TVA and CPV are committed to their responsibility to be good stewards of the environment and to adhere to the law. As described in Section 2.2 of the attached BA, CPV has committed to implementing measures for avoiding and minimizing the effects of the Project on wildlife, including all potentially affected listed species. As described in Section 2.3 of the accompanying BA, CPV will provide funding offset the potential modification of whooping crane roosting habitat and potential direct and indirect impacts to the piping plover and least tern.

Prior to the issuance of a Biological Opinion by the USFWS, CPV and Ducks Unlimited would execute the Funding Agreement that would require CPV to provide an amount equal to $250,000 designated for the reduction of indirect effects of the potential Project impacts ($200,000) and administration costs ($50,000) for Ducks Unlimited associated with its conservation efforts. Once, and conditional upon, TVA issues a FONSI for the Project and CPV obtains construction financing, the Funding Agreement would require CPV to provide the funds in full to Ducks Unlimited within 30 days.

Under the Funding Agreement, Ducks Unlimited would have ultimate responsibility for the successful accomplishment of the proposed compensatory habitat mitigation which may include purchasing, protecting, restoring, or enhancing Suitable Habitat. Suitable Habitat is defined in the Funding Agreement as potential habitat for the endangered whooping crane within the whooping crane migratory corridor and can be comprised of suitable migratory stopover, roosting, and foraging habitat including wetlands and adjacent uplands. Ducks Unlimited would administer the funds, acquisition or enhancement activities, and management of Suitable Habitat. Provided that Ducks Unlimited adheres to the Funding Agreement, the voluntary contribution by CPV should allow for the realization of net benefits to the whooping crane and to all species that

utilize wetlands and associated uplands during their life cycles relative to potential Project impacts.

TVA appreciates the discussions with staff of the Kansas Field Office over the previous few months as we have developed this Biological Assessment. TVA respectfully requests concurrence for these determinations.

Sincerely,

John T. Baxter
Manager, Endangered Species Act Compliance
Environmental Permits and Compliance
WT 11A-K

BLY:PS:SLY
Enclosure

Biological Assessment

Cimarron Wind Energy Project – Phase 1
Gray County, Kansas

Tennessee Valley Authority

Prepared By:

CPV Cimarron Renewable Energy Company, LLC
50 Braintree Hill Office Park, Suite 300
Braintree, Massachusetts 02184

Tetra Tech EC, Inc.
160 Federal Street, 3rd Floor
Boston, Massachusetts 02110

September 2011

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 PROJECT DESCRIPTION 1
2.1 Project Summary 1
2.2 Avoidance and Minimization Measures 2
2.3 Conservation Measures 4
2.3.1 Potential Habitat Impacts 4
2.3.2 Execution and Administration 4

3.0 ENVIRONMENTAL SETTING 5
3.1 Project Area and Action Area 5
3.2 Existing Setting 5

4.0 SPECIES ACCOUNTS 6
4.1 Whooping Crane 6
4.1.1 Relevant Natural History 6
4.1.2 Status and Threats to Species 7
4.1.3 Status in Project Area 8
4.2 Least Tern 8
4.2.1 Relevant Natural History 8
4.2.2 Status and Threats to Species 8
4.2.3 Status in Project Area 8
4.2.4 Critical Habitat 9
4.3 Piping Plover 9
4.3.1 Relevant Natural History 9
4.3.2 Status and Threats to Species 9
4.3.3 Status in Project Area 9
4.3.4 Critical Habitat 9
4.4 Lesser Prairie-Chicken 10
4.4.1 Relevant Natural History 10
4.4.2 Status and Threats to Species 10
4.4.3 Status in Project Area 10

5.0 EFFECTS AND DETERMINATIONS 10
5.1 Whooping Crane 10
5.2 Piping Plover 11
5.3 Least Tern 11
5.4 Lesser Prairie-Chicken 11

6.0 CUMULATIVE EFFECTS 12
6.1 Wind Energy Development 12
6.2 Transmission Development 13
6.3 Oil and Gas Development 13
6.4 Conversion of Native Prairie 13
6.5 Wetland Degradation or Loss 13

7.0 LITERATURE CITED 13

FIGURES

Figure 1. Project Vicinity
Figure 2. Project Layout
Figure 3. Pre-existing Disturbance to Crane-Suitable Wetlands
Figure 4. Environmental Considerations
Figure 5. Whooping Crane Habitat Map

1.0 INTRODUCTION

The Tennessee Valley Authority (TVA) is an agency and instrumentality of the United States, established by an act of Congress in 1933, to foster the social and economic welfare of the people of the Tennessee Valley region and to promote the proper use and conservation of the region's natural resources. One component of this mission is the generation, transmission, and sale of reliable and affordable electric energy. TVA has contracted with CPV Cimarron Renewable Energy Company, LLC (CPV) to deliver to TVA electricity generated by the Cimarron Wind Energy Project – Phase 1 (Project) that would be developed by CPV and TVA (Proposed Action), contingent upon completion of environmental review. The Project Area is defined as approximately 13,883 acres of privately owned land in Gray County, Kansas under easement agreement with CPV for development of the Project.

The purpose of this Biological Assessment (BA) is to review the Proposed Action in sufficient detail to determine the extent to which the Proposed Action may affect species that are listed as threatened or endangered under the federal Endangered Species Act (ESA) or proposed for such listing. This BA conforms to the legal requirements under Section 7 of the ESA [19 U.S.C. §1536(c); 50 CFR 402.12(f) & 402.14]. This BA is based on consultation with the United States Fish and Wildlife Service (USFWS) and studies conducted by CPV in the Project Area to identify habitat types, including wetlands, croplands, native prairie and resting and feeding habitat for various wildlife species as well as a review of the information available regarding the natural history, habitat needs, and current status of all potential affected listed and candidate species.

Based on information received from the USFWS-Kansas Field Office and the USFWS endangered species website, three federally listed and one candidate species may occur in the proposed Project Area: whooping crane (*Grus americana* – endangered); least tern (*Sterna antillarum* – endangered); piping plover (*Charadrius melodus* – threatened); and lesser prairie-chicken (*Tympanuchus pallidicinctus* – candidate).

2.0 PROJECT DESCRIPTION

2.1 Project Summary

The Project, located in Gray County, Kansas would provide up to 165 megawatts (MW) of wind energy capacity to TVA (Figure 1). CPV has not yet selected the specific wind turbine model to be utilized at the site, but it is expected that the selected turbine will range between 2.3 and 2.5 MW in generating capacity, resulting in between 66 and 72 turbines. The selected turbine would have an 80 to 85 meter (m) hub height and up to 108 m rotor diameter. With these specifications, the estimated Rotor Sweep Area (RSA) is between 26 and 136.5 m above ground. Turbines would be constructed at the Project in rows running from west to east (Figure 2). Within rows, turbines would be spaced approximately 0.25 mile apart while the rows themselves are expected to be spaced approximately 0.75 to 1.25 miles apart. In addition to the wind turbines, the Project would likely involve: improvements to existing roads; construction of new gravel access roads; installation of underground electrical collection lines; construction of an operation and maintenance building; erection of up to three 80 to 90 m tall permanent meteorological towers as well as the potential installation of temporary Sonic Detection And Ranging (SODAR) units; and construction of an interconnection substation facility (Figure 2). A temporary staging and laydown area, as well as a temporary batch plant, is also planned for the construction phase of the Project. Four 60-m tall temporary meteorological towers and one temporary 2-m tall Triton Wind Profiler have already been installed within the Project Area and surrounding lands which are under an easement agreement with CPV. Only a single meteorological tower and the Triton Wind Profiler are located within the Project Area. A 345 kilovolt (kV) transmission line owned and operated by Sunflower Electric Power Corporation currently traverses the Project Area.

During the life of the Project, maintenance activities would occur periodically. These maintenance activities would involve use of the access roads, maintenance activities at the individual turbine locations and electrical facilities, and road and buildings infrastructure. Frequency of these maintenance activities is expected to be low considering the technology being utilized at the Project. There would be regular maintenance ongoing as turbines will undergo predictive and preventive maintenance on a staggered basis to minimize the number of maintenance personnel and corresponding equipment used on-site. Project access roads would be graded on an as-needed basis. Each turbine would be serviced periodically but approximately twice per year. Typical turbine servicing activities would include routine in-turbine maintenance including the deployment of personnel to climb the towers to service parts within the turbine nacelle. On extremely rare occasions, major maintenance requiring the temporary deployment of a crane within the construction easement of each turbine, removal of the turbine rotor, replacement of generators and bearings may be required. Typical equipment that would be used at the Project for operation and maintenance activities include: a service truck; a small multi-purpose bulldozer with a forklift and snow plow; a road grader; a 4-wheeler for remote access; and a snowmobile.

Construction of the Project could take up to 12 months from initial ground breaking to commercial operation of the facility, which could occur as early as mid-2012. The facilities, infrastructure, and equipment would be constructed and designed to have an expected life of 25 to 30 years or longer under expected operation conditions and with maintenance activities being conducted consistent with prudent industry practice and manufacturer's recommendations.

2.2 Avoidance and Minimization Measures

CPV and TVA are committed to their responsibility to be good stewards of the environment and to adhere to the law. As part of this commitment, CPV has committed to implementing the following measures for avoiding and minimizing the effects of the Project on wildlife, including all potential affected listed and candidate species:

1. CPV would minimize impacts to native prairie, thereby reducing potential impacts to all species covered in this BA but especially impacts to lesser prairie-chicken. The proposed Project will impact approximately 7.6 acres of native prairie during construction, which represents 2.6 percent of the total construction footprint. Only two of the 72 turbines proposed are sited in grassland dominated by mostly native species (Tetra Tech 2010a).
2. CPV would use the minimum amount of pilot warning and obstruction avoidance lighting specified by the Federal Aviation Administration. This would minimize the potential for attraction of whooping cranes, least terns, and piping plovers to artificial light sources during low-light conditions.
3. CPV would bury all new 34.5 kV collector lines from the turbines to the Project substation to avoid collision risk. Only a short extent of overhead line will be necessary to connect the Project substation to the existing overhead transmission line in a previously disturbed area. This section of line would be marked with bird diverters. As a result, Project construction would limit any additional risk of whooping crane, least tern, or piping plover collision with or electrocution by overhead transmission lines. Further, a generation tie transmission line is not required for the Project.
4. CPV would construct self-standing permanent meteorological towers to minimize collision risk of whooping cranes, least terns, and piping plovers as there would be no guy wires supporting the towers.
5. CPV would require contractors and construction personnel to modify or curtail construction activities such as blasting, trenching, or hydraulic use within 1 mile of whooping cranes observed onsite during the construction phase of the Project, leaving the whooping cranes undisturbed until

they are no longer observed within the Project Area, in order to minimize disturbance, displacement, and harm of roosting and foraging whooping cranes.

6. During the first two years of Project operation, CPV will ensure that an on-site, trained whooping crane observer will monitor for whooping cranes during both spring and fall migration, or until such time as the tracking database indicates that all the known Aransas-Wood Buffalo Population whooping cranes are located on the breeding grounds or wintering grounds. Starting at sunrise, the trained observer will survey the Project Area to allow timely observation of any whooping cranes that may have entered the Project Area after the end of the prior evening monitoring period. The evening monitoring period will commence one hour prior to sunset; however, the trained observer will track weather conditions during the day such that if conditions arise that are no longer favorable for migration, the observer will initiate the evening monitoring period earlier in the afternoon. Monitoring will continue until sunset to detect the presence of cranes moving into the Project Area to roost overnight. If a whooping crane is observed in the Project Area, CPV would shut down all turbines located within 1 mile of the bird, until such time as the whooping crane monitor determines that the whooping cranes are no longer observed in the Project Area. The USFWS-Kansas Field Office and USFWS Office of Law Enforcement will be notified as soon as practicable but in not more than 24 hours from the time of observation if whooping cranes are observed in the Project Area.
7. If a dead whooping crane is found in the Project Area, it will remain untouched by Project Personnel. CPV would shut down all turbines at the Project within a 1 mile radius of the found whooping crane. CPV would then immediately contact the USFWS-Kansas Field Office, USFWS Office of Law Enforcement, and TVA. Turbines would remain curtailed until the USFWS or qualified biologist determines there are no additional whooping cranes in the Project Area or the end of the whooping crane migratory season, whichever is first. A whooping crane fatality whose cause of death cannot be definitively attributed to a factor other than the Project (i.e., gunshot) would necessitate the re-initiation of consultation with the USFWS for this species.
8. CPV has developed a Wildlife Response and Reporting System (WRRS) whereby operations and maintenance personnel would report observations of injured or dead federally listed species, state-listed species, eagles, birds covered under the Migratory Bird Treaty Act, and bats. As part of the WRRS, operations and maintenance personnel will conduct turbine walk-around mortality searches when visiting turbines. The USFWS-Kansas Field Office, USFWS Office of Law Enforcement, and TVA shall be notified immediately by CPV if any injured or dead federally listed or candidate species are discovered during routine operations or mortality searches.
9. In addition to the training provided via the WRRS, CPV would provide all construction and operations and maintenance staff and any additional contractors subject to CPV's control, with training in whooping crane, least tern, piping plover, and lesser prairie-chicken identification and would provide identification guides to be kept in all Project vehicles.
10. CPV would post a speed limit of 25 miles per hour on all Project roads, thereby minimizing the potential for vehicle collisions with wildlife, including potential affected listed and candidate species.
11. CPV would conduct two years of post-construction mortality monitoring at the Project, performed by operations and maintenance staff. Monitoring protocols will include searcher efficiency and carcass removal trials and would be developed in consultation with USFWS-Kansas Field Office. CPV would submit annual reports summarizing these monitoring efforts.
12. To reduce risk to fence collision mortality to lesser prairie-chickens, CPV will mark fences around native prairie within the Project Area after landowner permission is obtained.

13. CPV and TVA have developed an Adaptive Management Plan (using guidance from the United States Department of Interior's Technical Guide on Adaptive Management; Williams et al. 2007) based on post-construction monitoring so that potential Project impacts can be assessed.
14. CPV has designed the layout of the Project's turbines and buildings to minimize permanent impacts (as defined by United States Army Corps of Engineers) to wetland areas. This measure will reduce the potential for direct impacts (e.g., turbine collisions) to whooping cranes, least terns, and piping plovers as the proposed Project turbine layout avoids habitats that may receive the highest relative use. This measure will reduce indirect impacts by minimizing disturbance to potentially used habitats.

2.3 Conservation Measures

2.3.1 Potential Habitat Impact

CPV has committed to the conservation of habitat through the funding of the purchase of land, conservation easements, or restoration and enhancement efforts to offset the potential loss of whooping crane roosting habitat. Consultations with USFWS-Kansas Field Office support conservation, enhancement, or protection of alternate wetland habitats due to the potential for whooping crane avoidance of the Project. To determine the amount of suitable whooping crane wetlands potentially affected by the Project, the proposed turbine locations were buffered by 1 mile and suitable wetland acreage was determined within the convex hull (which is also the Action Area). Overall, there are approximately 115.8 acres of suitable crane wetlands within 1 mile of the proposed turbine locations. As a surrogate for wetland value, the 2011 rate for agricultural land sales in Gray County was used ($2,440/acre). To adjust for 2012 prices, the 2011 value was increased by 20 percent and a value of $2,880/acre was used to determine the mitigation cost per acre.

As whooping cranes are thought to prefer wetlands removed from human disturbances, the value of the potentially affected wetlands in the context of pre-existing disturbances (e.g., roads). Research on whooping crane migration habitat and use highlights an inverse relationship between disturbance level and habitat value (Austin and Richert 2005, USFWS 2009). To assess the scale of pre-existing disturbances within the Action Area, the acreage of crane-suitable wetlands within the following buffers was determined:

- Crane-suitable wetlands within 0.5 mile of occupied residences; and
- Crane-suitable wetlands within 0.5 mile of paved roads and gravel roads (Figure 3).

Undisturbed wetlands were defined as crane-suitable wetlands that fell outside these buffers. Crane-suitable wetlands that fell within only one of these buffers were classified as one disturbance wetlands. Crane-suitable wetlands that fell within both buffers were classified as two disturbance wetlands in this analysis. The number of roads and occupied residences were not quantified (Table 1).

Table 1. Value of Potentially Affected Crane-Suitable Wetlands Relative to Disturbance Level

Disturbance Level	Wetlands to Mitigate (Acres)*	Percent of Land Value (%)	Market Value ($/Acre)	Relative Value of Wetlands to Mitigate ($)
No Disturbance	0	100	$2,880	$0.00
1 Disturbance	107.1	66	$2,880	$203,576
2 Disturbances	8.7	33	$2,880	$8,268
Subtotal	**115.8**			**$211,844**

*Determined based on Layout v3.

2.3.2 Execution and Administration

Prior to TVA issuing a Finding of No Significant Impact (FONSI) for the Project, CPV and Ducks Unlimited would execute the Funding Agreement that would require CPV to provide an amount equal to $250,000 designated for the reduction of indirect effects of the potential Project impacts ($200,000) and administration costs ($50,000) for Ducks Unlimited associated with its conservation efforts. Once, and conditional upon, TVA issues a FONSI for the Project and CPV obtains construction financing, the Funding Agreement would require CPV to provide the funds in full to Ducks Unlimited within 30 days.

Under the Funding Agreement, Ducks Unlimited would have ultimate responsibility for the successful accomplishment of the proposed compensatory habitat mitigation which may include purchasing, protecting, restoring, or enhancing Suitable Habitat. Suitable Habitat is defined in the Funding Agreement as potential habitat for the endangered whooping crane within the whooping crane migratory corridor and can be comprised of suitable migratory stopover, roosting, and foraging habitat including wetlands and adjacent uplands. Ducks Unlimited would administer the funds, acquisition or enhancement activities, and management of Suitable Habitat. Provided that Ducks Unlimited adheres to the Funding Agreement, the voluntary contribution by CPV should allow for the realization of net benefits to the whooping crane and to all species that utilize wetlands and associated uplands during their life cycles relative to potential Project impacts.

3.0 ENVIRONMENTAL SETTING

3.1 Project Area and Action Area

For the purposes of this BA, the Project Area is defined as the 13,883 acres controlled by CPV under easement agreements with local land owners. The USFWS Section 7 handbook (USFWS 1998) defines an Action Area as all areas that may be affected directly or indirectly by the federal action. Accordingly and in consultation with the USFWS-Kansas Field Office, the Action Area is defined as the area within 1 mile of the Project turbine locations allowing for avoidance distance by whooping cranes (Figure 1).

3.2 Existing Setting

The Project is located on privately owned rural land under easement with CPV in Foote Township, an unincorporated portion of Gray County, Kansas (Project Area; Figure 1), approximately 1.5 miles north of the City of Cimarron (the seat of Gray County), 11 miles northwest of Dodge City, and 14 miles east of Garden City. The Project Area is characteristic of this region, with the majority of the land surface currently covered by agriculture (corn, winter wheat, soybeans, and sunflowers), rangelands (hayfields and cattle pastures), and native prairie (mixed shortgrass). The Project Area contains some small playa wetlands that consist of shallow, vegetated depressions. Patches of trees and shrubs exist throughout the Project Area, and are found primarily between agricultural fields, in drainages, and as shelter belts around homesteads and between agricultural fields. Residences and abandoned farmsteads are scattered throughout the Project.

The Project Area is located approximately 2,000 to 2,200 feet above sea level. It is characteristic of the upland portion of the region and encompasses land that consists of a mix of agricultural crops (primarily consisting of corn, winter wheat, soybeans, and sunflower), rangeland, and native prairie (Tetra Tech 2010a). The area contains numerous small wetlands that vary from shallow, vegetated depressions to open water ephemeral playas (Figure 4). Residences and abandoned farmsteads are scattered throughout the Project Area. Patches of trees and shrubs exist throughout the Project Area and are found primarily in drainages, as shelter belts around homesteads, and between agricultural fields.

Some land within the Project Area might be enrolled in the Farm Service Agency (FSA) Conservation Reserve Program (CRP) based on Gap Analysis Program (GAP) data. During field efforts, native prairie was identified in some areas indicated as CRP although the status of the land could not be verified, as

CRP is a legal designation and not a habitat (Figure 4). However, some CRP contracts may have expired and the land might have been withdrawn and returned to agriculture. Any modifications to CRP lands resulting from the Project, CPV will work with the FSA and the applicable landowner to determine the specific acreage that will be affected and must be withdrawn from CRP.

4.0 SPECIES ACCOUNTS

4.1 Whooping Crane

4.1.1 Relevant Natural History

The whooping crane is a long-lived species that may reach 28 years old in the wild. Whooping cranes have low annual reproductive output. Females typically lay two eggs, but only 10 percent of families arrive on the winter grounds with two chicks because the smaller chick usually dies within the first two weeks after hatching (CWS and USFWS 2007). The juveniles become independent of the parents on the wintering ground prior to spring migration. Sexually immature individuals (i.e., subadults) return to the breeding grounds where they may remain solitary or congregate in small groups on the periphery of breeding pairs (CWS and USFWS 2007).

Whooping cranes undertake a 5,000-mile round-trip migration from the breeding area in Canada to the wintering area in Texas every year. Individuals depart the breeding ground in Canada and travel south through Alberta, Montana, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and reach the wintering ground on the Texas coast. The migration route is well defined and approximately 94 percent of all observations occur within a 200-mile wide corridor during spring and fall migration (CWS and USFWS 2007).

Whooping cranes depart the breeding grounds at Wood Buffalo National Park in Alberta and Northwest Territories, Canada, in mid-September. Birds may travel alone, in pairs, in family groups, or in small flocks (Johns 1992). Individuals travel southeast about 300 miles to the major staging area in Saskatchewan, where they may remain for two to four weeks before resuming migration. During fall migration, birds may stay at traditional stopover sites for seven to ten days, but stays as long as six weeks have been documented at Quivira National Wildlife Refuge (NWR), Kansas (CWS and USFWS 2007). The majority of whooping cranes reach the wintering grounds by mid-November. In Kansas, most sightings occur from early October to mid-November and peak migration occurs around October 27 (Austin and Richert 2001). Whooping cranes depart the wintering ground at Aransas NWR, Texas, in late March; the last birds depart in May. Breeding pairs are typically first to depart and migration is facilitated by winds from the southeast. There is no known staging area in spring as there is in fall, and migration is completed in two to four weeks. Traditional stopover sites that are used in fall are also used in spring. However, individuals spend fewer days at stopover sites during spring migration. Whooping cranes travel through Kansas from late March to early May and peak migration occurs around April 12 (Austin and Richert 2001).

Whooping cranes are diurnal migrants and primarily fly by using static soaring, but low-level flapping flight may be used when conditions dictate. Migration is initiated after the air has warmed and thermal updrafts are present. Individuals spiral upwards on thermals of warm air to heights of 1,000 to 6,000 feet (Kyut 1992), then enter into long, descending glides. This process is repeated throughout the day until suitable habitat is reached. Whooping cranes may travel up to 500 miles per day in ideal conditions; during average conditions they may travel 250 miles per day (Stehn and Wassenich 2008). During the end of the diurnal migration flight, individuals will enter long descending glides and use flapping flight at lower altitudes until they reach suitable roosting and feeding habitat. Whooping cranes do not regularly migrate during unfavorable weather conditions such as a strong headwind, rain or other precipitation, or overcast conditions. When visibility is poor, individuals use flapping flight at lower altitudes until they

reach suitable roosting or feeding habitat. Poor weather conditions can lengthen stopover duration in a given location (USFWS 2009).

Whooping cranes require roosting habitat when they stop during migration. They often select sites with unobstructed visibility (Austin and Richert 2001). Palustrine wetlands (freshwater wetlands characterized by emergent vegetation) are most often used as roosting sites, but individuals have been found roosting at lacustrine wetlands (wetlands around a lake), and riverine wetlands (wetlands along a river). The size of wetlands used during spring and fall migration ranges from 0.4 hectare (ha) to over 500 ha (1 to 1,200 acres), and no seasonal use patterns are evident (Austin and Richert 2001). It has been observed that 75 percent of recorded roost wetlands were smaller than 4 ha (10 acres) and that whooping cranes do use wetlands as small as 0.25 acre (Austin and Richert 2001). Whooping cranes have been observed using wetlands as deep as 10 feet; however, they generally restrict their usage of these wetlands to areas where the water depth is less than 2 feet (Austin and Richert 2005).

Whooping cranes forage in wetlands and agricultural fields during migration and may travel between roosting and feeding areas. Palustrine wetlands are used most often when whooping cranes forage in wetlands, but lacustrine and riverine have also been used as feeding sites (Austin and Richert 2001). Among agricultural crops used as feeding sites, the use of winter wheat was higher than other crop types in fall and the use of row-crop stubble (comprised mostly of corn) was higher in spring than other crop types (Austin and Richert 2001). Whooping cranes have also been observed feeding in sorghum, sunflower, and soybean stubble (Austin and Richert 2001). Feeding sites are often found adjacent to roosting sites. For example, 94.9 percent and 72.9 percent of roosting sites were within 0.62 mile of feeding sites in spring and fall, respectively (Johns et al. 1997; USFWS 2009).

4.1.2 Status and Threats to Species

The whooping crane was considered endangered in the United States in 1970 and was 'grandfathered' into the ESA (CWS and USFWS 2007). Kansas Department of Wildlife and Parks (KDWP) also list the whooping cranes in Kansas as endangered (KDWP 2010). The whooping crane population in North America has experienced sharp declines and disappearance from most of its historic range, with the population reaching its lowest point in the late 1930s and early 1940s (CWS and USFWS 2007). The number of whooping cranes in North America prior to 1870 is estimated to have been between 500 and 1,400 individuals (Allen 1952; Banks 1978), but some biologists suggest that the population may have numbered as many as 10,000 individuals (CWS and USFWS 2007). Activities such as habitat destruction, hunting, and displacement due to anthropogenic activities likely lead to widespread population declines (CWS and USFWS 2007). One self-sustaining wild population of whooping cranes currently exists in the world. Members of this population breed primarily within the boundaries of Wood Buffalo National Park in Canada and migrate through the central United States in route to the wintering grounds at Aransas NWR along the Gulf Coast of Texas. This flock is referred to as the Aransas-Wood Buffalo National Park Population. Due to intensive management, this population has increased from 15 birds in 1941 to 263 as of the start of fall migration in 2010 (WCCA 2010). This number will be updated following the end fall 2010 migration period and subsequent winter surveys conducted by the USFWS. The summer 2010 breeding season fledged a record 46 chicks; therefore, the best possible increase would be to 309 birds, should all survive.

Power lines pose a threat to whooping cranes when they are located in the vicinity of foraging or roosting habitat because individuals often fly at low altitudes (33 to 49 feet above the ground) when moving among sites (CWS and USFWS 2007; Stehn and Wassenich 2008). The majority of documented fatalities during migration are due to collision with power lines. Since 1956, 46 whooping cranes have been killed (91% of collisions) or seriously injured (9% of collisions) as a result of collisions with power lines (Stehn and Wassenich 2008). The majority of confirmed power line fatalities have occurred within the experimental populations that are maintained by the introduction of captive-reared young; power line

fatalities have also been reported for the Aransas-Wood Buffalo National Park population (at least seven fatalities and two serious injuries).

Although whooping crane mortality has not been attributed to wind turbines, the Recovery Plan considers wind power development within the whooping crane migration corridor a threat due to the construction of power lines and associated structures (CWS and USFWS 2007). It is unknown how whooping cranes will respond to the presence of wind turbines. The USFWS (2009) holds the opinion that whooping cranes will avoid stopping at areas with operational wind turbines; thus, behavioral avoidance of wind farms by whooping cranes may reduce the probability of collision, but may amount to loss of stopover habitat (i.e., an indirect impact).

4.1.3 Status in Project Area

Whooping cranes have been observed in Gray County and within 35 miles of the Project during the spring and fall migration, but there are no records within the Project Area. The most recent sightings on record were approximately 27 miles southwest of the Project (two adults and two juveniles) on October 31, 2006 and approximately 1.5 miles to the southeast (two adults) on October 30, 2006 (Tetra Tech 2010b). Potentially suitable roosting (e.g., wetlands of appropriate size and type) and foraging habitat (e.g., agricultural fields) exists within the Project Area and in the surrounding landscape (Figure 5). No whooping cranes were observed in the Project Area during the Spring or Fall 2010 avian point count surveys.

CPV estimated the amount of potential whooping crane-suitable wetlands within the Project Area. All turbines were buffered by 1 mile and these buffers were joined into a minimum convex hull (Figure 3). Within this convex hull, all wetlands greater than 0.25 acre of appropriate type and proximity to foraging habitat (Section 4.2.1) were identified. This analysis identified 115.8 acres of wetlands as potential whooping crane roosting habitat within the Action Area.

4.2 Least Tern

4.2.1 Relevant Natural History

Least terns nest on sparsely vegetated sand and gravel bars along wide, unobstructed river channels or salt flats adjacent to lakes. Nest sites are usually elevated above the water level and are no more than several hundred meters away from the shore (USFWS 1990). In Kansas, least terns breed in the Quivira NWR and along the Cimarron River in Meade County (USFWS 1990, Thomson et. al 1997). Least terns migrate to wintering grounds in Central and South America (Thomson et al. 1997).

4.2.2 Status and Threats to Species

The interior population of the least tern was listed as federally endangered in 1985. KDWP also lists the least terns in Kansas as endangered (KDWP 2010). This species historically bred along the Mississippi, Red, and Rio Grande Rivers. Today it can be found along these same rivers, but only in isolated segments that have been minimally altered by humans. Recent declines in the interior populations of least terns have been linked to decreases in nesting habitat by flooding behind dams, channelization, and untimely release of water from dams (USFWS 1990, Thomson et al. 1997).

4.2.3 Status in Project Area

The Project Area is 60 miles northwest of the closest breeding grounds on the Cimarron River, and these terns' home ranges are no larger than 4 square miles around the nest site (USFWS 1990). Migrating least terns could pass over the Project Area but, due to lack of suitable habitat, the likelihood of them stopping over or otherwise occurring in the Project Area is low. No least terns were observed within the Project Area during Spring 2010 (mid-March to mid-June) or Fall 2010 (mid-August to mid-November) avian point count surveys.

4.2.4 Critical Habitat

Although there is no federally designed critical habitat in Kansas, state-designated critical habitat includes all lands and waters within the current active main stem channel of those reaches of the Cimarron River located in Clark, Comanche, and Meade Counties; Cheyenne Bottoms Wildlife Area in Barton County; Quivira NWR in Stafford, Reno, and Rice counties; areas within 5 miles of the Jeffrey Energy Center in Pottawatomie County; and the main stem of the Kansas River from the confluence of the Smoky Hill River and Republican River on Fort Riley in Geary County to the confluence of the Missouri River in Kansas City, Wyandotte County (KDWP 2010). The nearest critical habitat to the Project is in Meade County and is approximately 60 miles away.

4.3 Piping Plover

4.3.1 Relevant Natural History

This shorebird winters along the Gulf and south Atlantic coasts and breeds in south-central Canada, the Dakotas, Nebraska, and northern Kansas (Elliott-Smith and Haig 2004). They are not known to breed in Gray County. Although knowledge of specific migratory routes is incomplete, some individuals stop over at Cheyenne Bottoms NWR, though most birds are thought to make the migratory trip nonstop (Elliott-Smith and Haig 2004). The habitat types used most often during migration are beaches and alkali flats, with predominantly muddy substrates (Elliott-Smith and Haig 2004). Some populations of piping plovers likely migrate over the Project Area; however, due to lack of suitable habitat in the Project Area, the probability of this species occurring there is low.

4.3.2 Status and Threats to Species

The Great Plains population of the piping plover was listed as a threatened species in 1985 (USFWS 1985). KDWP also list the piping plovers in Kansas as threatened (KDWP 2010). Reasons for decline of the piping plover include habitat loss and nest depredation in the wetlands. The main reason for decline of the species along the Missouri River is habitat loss due to water development projects (e.g., Fort Peck Dam, Garrison Dam, and Oahe Dam) and loss of wetlands due to agriculture and other developments. The piping plover has been documented in five counties in Kansas, primarily in wetlands in the area of Cheyenne Bottoms NWR (KDWP 2010, USFWS 1988). As with most migratory birds, piping plovers could collide with power lines and other structures during migration (USFWS 1988), but no wind-related fatalities have been reported.

4.3.3 Status in Project Area

The USFWS and KDWP list the piping plover as not occurring within Gray County. No suitable breeding habitat (i.e., alkali lakes) is located within the County or the Project Area. No piping plovers were observed within the Project Area during Spring 2010 or Fall 2010 point count surveys. However, piping plovers could occur as a migrant moving through the Project Area.

4.3.4 Critical Habitat

Critical Habitat for the piping plover was designated on September 11, 2002 and although there is no federally designed critical habitat in Kansas, state-designated critical habitat includes all the waters within a corridor along the main stem of the Kansas River from the confluence of the Smoky Hill River and Republican River on Fort Riley in Geary County to the confluence of the Missouri River in Kansas City, Wyandotte County (USFWS 2002). The nearest critical habitat to the Project is in Geary County and is approximately 200 miles away.

4.4 Lesser Prairie-Chicken

4.4.1 Relevant Natural History

The lesser prairie-chicken inhabits rangelands dominated primarily by shinnery oak (*Quercus havardii*) or sand sagebrush (*Artemisia filifolia* – Hagen and Giesen 2005). In Colorado and Kansas, lesser prairie-chickens typically inhabit sand sagebrush communities dominated by sand dropseed (*Sporobolus cryptandrus*), side oats grama (*Bouteloua curtipendula*), three-awn (*Aristida* spp.), and blue grama (*B. gracilis*). Recently, increased usage of mixed-grass prairie and CRP fields has been documented in the northern fringe of the range in Kansas (Fields et al. 2006). The areas where leks (groups of males that display to attract females) are located are characterized by sparse vegetation and are typically located on knolls or ridges. Traditional leks may change location in response to disturbances, including agricultural tillage or fires. Habitats used for nesting and brood-rearing are usually within 3 kilometer (km) of display grounds (Hagen and Giesen 2005).

4.4.2 Status and Threats to Species

The lesser prairie-chicken range is restricted to extreme southeast Colorado to southwest Kansas counties bordering along Colorado and Oklahoma, all the panhandle and northwest counties of Oklahoma to southeast New Mexico and much of central Texas and the Texas panhandle (Hagen and Giesen 2005). Its distribution and population size have been reduced by the activities of humans, even though it occurs in areas with low human population densities. Recurrent droughts, combined with excessive grazing of rangelands by livestock and conversion of native rangelands to cropland, have significantly reduced populations and the distribution of the lesser prairie-chicken since the early 1900s (Hagen and Giesen 2005). Research studies are underway to evaluate the effects of wind energy development on lesser prairie-chickens and greater prairie-chickens (*Tympanuchus cupido*). However, data from these studies has yet to be published. Conversely, several studies regarding the effects of other anthropogenic structures such as power lines and buildings on grouse have been published. Pitman et al. (2005) demonstrated that lesser prairie-chickens tend to avoid anthropogenic features, especially transmission lines, on the landscape when choosing nest locations and recommended a 1-km development buffer around suitable breeding habitat.

In July of 2009, the Kansas Ornithological Society along with six chapters of the National Audubon Society in Kansas petitioned KDWP requesting the department to consider an emergency listing of the lesser prairie-chicken as a state-threatened species (KOS 2010); however, the petition was denied in September 2010. Currently, lesser prairie-chicken is still a game species as allowed by KDWP and is not protected by the Migratory Bird Treaty Act (MBTA). The USFWS has designated the lesser prairie-chicken as a candidate species (priority 2), which implies the immediacy of the federal listing is imminent.

4.4.3 Status in Project Area

Lesser prairie-chickens were not observed within the Project Area during the Spring 2010 or Fall 2010 point count surveys (Tetra Tech 2010c). However, four active leks were observed outside of the Project Area to northeast (Figure 4); lek sizes ranged from high counts of 11 to 30 birds with leks being located 2.5 to 5 miles from the nearest proposed Project turbine (Tetra Tech 2010c).

5.0 EFFECTS AND DETERMINATIONS

5.1 Whooping Crane

Potential impacts to whooping cranes as a result of the Proposed Action include direct impacts, such as collisions with wind turbines, the Project substation, or other Project buildings and indirect impacts, such as actual loss of habitat due to construction activities or functional loss of habitat due to whooping crane avoidance. The likelihood of direct impacts on whooping cranes as a result of the Proposed Action is low,

primarily because of a low likelihood of whooping cranes occurring in the Project Area. The Project is located on the western edge of the whooping crane migration corridor and is outside of the 85 percentage of sightings buffer; in other words, 85 percent of whooping crane observations have occurred closer to the center of the migration corridor than have occurred at distances similar or greater than the Project's distance from the corridor center (Figure 5). There are no reported incidents of turbine-related fatalities of whooping cranes or sandhill cranes (*Grus canadensis*) at newer generation wind energy projects and CPV is planning to bury all collection systems (except for a short extent of transmission line connecting the Project substation to the existing overhead transmission line in an already disturbed area), thereby substantially reducing the possibility of a power line collision from Project infrastructure.

Based on the low probability of occurrence in the Project Area, the avoidance and minimization measures discussed in Section 2.2 (most notably the burying of all collection systems), and CPV's commitment to offset potential whooping crane habitat impacts (Section 2.3), the Proposed Action may affect but is not likely to adversely affect the whooping crane.

5.2 Piping Plover

Although the Project Area contains several wetlands, none are known to be alkaline in nature; therefore, it is unlikely that the piping plover utilizes the Project Area for breeding. Given the migratory pathway of piping plovers, it is possible that these wetland areas could be used for resting and feeding by piping plovers during migration. In the event that piping plovers utilize the Project Area, the minimization of permanent wetland impacts (i.e., no risk of turbine collisions in wetlands) and the burying of all collection systems would minimize potential direct impacts. Available evidence suggests that piping plovers are not prone to collisions with turbines or meteorological towers (i.e., no piping plover fatality has been reported at a wind energy facility); however, it is possible that this absence of fatality data is a product of small population size rather than a product of piping plover avoidance behavior or lack of susceptibility.

No piping plovers were observed during point count surveys in Spring or Fall 2010. Given the low possibility of collisions by piping plovers with turbines or other Project facilities over the life of the Project, the Proposed Action may affect but is not likely to adversely affect the piping plover.

As there would be no construction in designated Critical Habitat (Section 2.2) and no permanent changes to water quantity or quality associated with the Project (Section 2.2), the Proposed Action would not affect designated Critical Habitat.

5.3 Least Tern

No least terns were observed within the Project Area during Spring or Fall 2010 point count surveys. No least tern fatalities have been reported at a wind energy facility. The Project Area does not contain habitat that is suitable for least tern breeding.

In the event of this species occurring within the Project Area, the minimization of permanent wetland impacts (i.e., no risk of turbine collisions in wetlands) and the burying of collection systems (i.e., elimination of power line collision risk) during Project construction would minimize risk to this species (Section 2.2). Therefore, the Proposed Action may affect but is not likely to adversely affect the least tern.

5.4 Lesser Prairie-Chicken

The Project Area contains primarily agriculture, and native prairie is limited and isolated in the Project Area (Figure 4). No lesser prairie-chickens were observed in the Project Area during the Spring 2010 or Fall 2010 avian point count surveys. A lek survey was conducted in the early spring of 2010 of the Project Area and a 2-mile buffer around the Project Area. A total of four leks were found to the north and northeast of the Project (Figure 4). The closest lek was 2.5 miles from the nearest turbine with the

additional leks 3.7, 3.9, and 5.0 miles from the nearest turbine. During the Fall 2010 point counts, 30 lesser prairie-chickens were observed incidentally in the vicinity of the leks.

Given the land cover within the Project Area and existing large transmission lines and agricultural irrigation pivots, it is unlikely that lesser prairie-chickens use the Project Area for breeding or brood rearing. Native vegetation is limited and isolated and a high-voltage overhead transmission line bisects the Project Area. Given the recent results that show that lesser prairie-chickens may avoid nesting near transmission lines (Pitman et al. 2005), the Project is being developed in an already disturbed area that is of low value to breeding lesser prairie-chickens. The effect of wind turbines on leks and nesting lesser prairie-chickens is currently being studied and results are not yet available. However, Pitman et al. (2005) found that lesser prairie-chicken nests are located significantly further than expected from anthropogenic features on the landscape in Kansas. Specifically, nests were located a mean of 1,385±60 SE and 1,254±69 from transmission lines; 1,951±64 and 2,306±53 m from buildings; and 1,526±53 and 3,149±202 m from improved roads in area 1 (n = 11) and area 2 (n = 8), respectively. Thus, if lesser prairie-chickens show avoidance of wind turbines similar to transmission lines, also a tall structure, then nesting hens associated with the 4 leks outside of the Project Area should be unaffected. Lesser prairie-chickens could occur in the Project Area during the non-breeding season and use the agricultural areas for foraging. Reduced speed limits, the limited use of overhead power lines, and fence marking proposed by CPV if approved by land owners will limit disturbance to prairie-chickens should they occur. As a result, the Proposed Action may affect but is not likely to adversely affect the lesser prairie-chicken.

6.0 CUMULATIVE EFFECTS

Cumulative effects as defined at 50 CFR 402.02 include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the Action Area and may have an impact on the species covered in this BA. Future federal actions that are unrelated to the Proposed Action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

6.1 Wind Energy Development

Given the current economic situation, it is difficult to predict the continued development of wind energy within the Action Area. The United States Energy Information Association (USEIA) predicts a fairly consistent increase in wind-powered capacity until 2013, after which point the projected growth slows dramatically (USEIA 2011). This projected slowdown is based on the expiration of the Federal Production Tax Credit and the completion of most projects initiated under the American Recovery and Reinvestment Act (ARRA) of 2009. This projected near-term growth in capacity will be accompanied by a growth in the transmission infrastructure required to deliver the newly generated capacity to market. Wind energy development in the region could be supported by the ITC Great Plains V-Plan Transmission Line, a proposed transmission line through Ford County that would run south from Spearville in Ford County, Kansas and east to Wichita, Kansas developed by ITC Great Plains, Sunflower Electric Corporation, and Mid-Kansas Electric Company (ITC Great Plains 2011). As of May 2009, Kansas passed the Renewable Energy Standards Act, requiring major utilities (not municipal utilities or most Rural Electric Cooperatives) to have 10 percent of their energy capacity from renewable sources by 2010, 15 percent by 2016, and 20 percent by 2020. This projected growth in wind capacity and associated transmission will increase the potential for direct effects on birds resulting from collisions with turbines or transmission lines and for indirect effects associated with habitat fragmentation and potential disturbance effects. Careful siting of turbines (e.g., minimize siting in wetland areas) and the burying of collection systems, such as is proposed for the Project, can minimize the potential for impacts from future wind energy development.

One wind project is proposed that overlaps a portion of the Action Area; Duke Energy Renewable's Cimarron II Windpower Project, a proposed 132 MW project located approximately 0.5 mile west of the Project, also in Gray County. The project has a signed Power Purchase Agreement (PPA) with Kansas

City Power and Light (KCP&L) and is expected to begin operation in 2012 (Kansas City Business Journal 2011).

6.2 Transmission Development

No additional transmission line development is anticipated within the Action Area.

6.3 Oil and Gas Development

The Project is not located in an area of active oil and gas development (Kansas Geological Survey [KGS] 2011). However, CPV is aware of some active leases in the Action Area for oil and gas development where drilling activities could be possible in the future.

6.4 Conversion of Native Prairie

Less than 30 percent of native prairie in the Great Plains remains relative to the pre-colonial period (Stephens et al. 2008) and the pace of prairie conversion, primarily due to agricultural activity, is increasing throughout the Midwest (United States Government Accountability Office [USGAO] 2007a, Fargione et al. 2009). In part, the conversion of prairie to active agriculture is encouraged by farm program payments that eliminate the risk of farming agriculturally marginal land (USGAO 2007). With the existing federal and state agricultural incentives for farming marginal land, the conversion of native prairie could occur in the Action Area (USGAO 2007a).

6.5 Wetland Degradation or Loss

Similar to native prairie, the health and status of freshwater wetland ecosystems are tied primarily to agricultural development; in the period of 1954-2002, 66 percent of all wetland losses in the 48 contiguous states were due to agricultural conversion, despite the fact that only 15 percent of total wetlands occur on agricultural land (United States Department of Agriculture [USDA] 2006). Unlike native prairie, however, there are regulatory provisions at all levels of government that regulate impacts to wetlands. Kansas relies on Section 401 of the Clean Water Act as the sole form of state-level regulation and has not adopted regulations or policies to guide the mitigation of allowable wetland impacts (Environmental Law Institute 2008). Absent state-level guidance, careful siting of project facilities, such as is proposed for the Project, can greatly minimize the potential for direct impacts to wetlands from wind energy developments.

7.0 LITERATURE CITED

Allen, R.P. 1952. The whooping crane. National Audubon Society Resource Report 3.

Austin, J.E., and A.L. Richert. 2001. A comprehensive review of the observational and site evaluation data of migrant whooping cranes in the United States, 1943-99. U.S. Geological Survey, Northern Prairie Wildlife Research Center, Jamestown, North Dakota, and State Museum, University of Nebraska, Lincoln, NE.

Austin, J.E., and A.L. Richert. 2005. Patterns of habitat use by Whooping Cranes during migration: Summary from 1977-1999 site evaluation data. Proceedings of the North American Crane Workshop 9:79-104.

Banks, R. 1978. The size of the early whooping crane populations. Unpublished Report USFWS files.

Canadian Wildlife Service and United States Fish and Wildlife Service [CWS and USFWS]. 2007. International recovery plan for the whooping crane. Ottawa: Recover of the Nationally Endangered Wildlife (RENEW), and U.S. Fish and Wildlife Service, Albuquerque, NM.

Elliott-Smith, E. and S.M. Haig. 2004. Piping Plover (*Charadrius melodus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/002doi:10.2173/bna.2

Environmental Law Institute. 2008. State wetland protection: Status, trends, and model approaches. Environmental Law Institute, Washington, D.C.

Fargione, J.E., T.R. Cooper, D.J. Flashpoler, J. Hill, C. Lehman, T. McCoy, S. McLeod, E.J. Nelson, K.S. Oberhauser, and D. Tilman. 2009. Bioenergy and wildlife: threats and opportunities for grassland conservation. BioScience 59:767-777.

Fields, T.L., G.C. White, W.C. Gilgert, R.D. Rodgers. 2006. Nest and Brood Survival of Lesser Prairie-Chickens in West Central Kansas. Journal of Wildlife Management 70:931-938.

Hagen, C.A. and K.M. Giesen. 2005. Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/364doi:10.2173/bna.364

ITC Great Plains. 2011. Our Projects: Kansas. http://www.itcgreatplains.com/1_whykansas.html. Accessed July 5, 2011.

Johns, B.W. 1992. Preliminary identification of whooping crane staging areas in prairie Canada. Proceedings of the North American Crane Workshop 6:61-66.

Johns, B.W., E.J. Woodsworth, and E.A. Driver. 1997. Habitat use by migrant whopping cranes in Saskatchewan. Proceedings of the North American Crane Workshop 7:123-131.

Kansas City Business Journal. 2011. KCP&L will boost wind power portfolio by 65 percent (May 10, 2011). http://www.bizjournals.com/kansascity/news/2011/05/10/kcpl-will-boost-wind-power-portfolio.html. Accessed June 30, 2011.

Kansas Department of Wildlife and Parks (KDWP). 2010. Threatened and Endangered Species Information. Accessed October 30, 2010. Available at: http://www.kdwp.state.ks.us/index.php/news/Other-Services/Threatened-and-Endangered-Species/Threatened-and-Endangered-Species/Species-Information

Kansas Geological Survey (KGS). 2011. Kansas Oil and Gas Online Mapper. http://maps.kgs.ku.edu/oilgas/. Accessed July 11, 2011.

Kansas Ornithological Society (KOS). 2010. Petition for emergency listing of the lesser prairie chicken as a threatened species in Kansas. Available online at: http://ksbirds.org/LPC/LPC_Petition.html.

Kyut, E. 1992. Aerial radio-tracking of whooping cranes migrating between Wood Buffalo National Park and Aransas National Wildlife Refuge, 1981-84. Occasional Paper 74, Canadian Wildlife Service.

Pitman, J. C., C. H. Hagen, R. J. Robel, T. M. Loughin, and R. D. Applegate. 2005. Location and success of lesser prairie-chicken nests in relation to vegetation and human disturbance. Journal of Wildlife Management 69:1259-1269.

Stehn, T.V., and T. Wassenich. 2008. Whooping crane collisions with power lines: an issue paper. Proceedings of the North American Crane Workshop 10:in press.

Stephens, S.E., J. A. Walker, D.R. Blunk, A. Jayaraman, D.E. Naugle, J.K. Ringelman, and A.J. Smith. 2008. Predicting risk of habitat conversion in native temperate grasslands. Conservation Biology 22:1320-1330.

Tetra Tech EC, Inc. (Tetra Tech). 2010a. Native Grassland Survey – Cimarron Wind Energy Project, Gray County, Kansas. April 2010.

_____. 2010b. Whooping Crane Likelihood of Occurrence Report –Cimarron Wind Energy Project, Gray County, Kansas. November 2010.

_____. 2010c. Spring 2010 Avian Survey Report – Cimarron Wind Energy Project, Gray County, Kansas. November 2010.

Thompson, B.C., J.A. Jackson, J. Burger, L.A. Hill, E.M. Kirsch and J.L. Atwood. 1997. Least Tern (*Sterna antillarum*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/290doi:10.2173/bna.290

United States Department of Agriculture (USDA). 2006. Agricultural resources and environmental indicators, 2006 edition. United States Department of Agriculture, Economic Information Bulletin No. EIB-16.

United States Energy Information Administration (USEIA). 2011. Electric Power Annual with data for 2009. http://www.eia.doe.gov/cneaf/electricity/epa/epa_sum.html, accessed on July 12, 2011.

United States Fish and Wildlife Service (USFWS). 2009. Whooping cranes and wind development – An issues paper. USFWS Regions 2 and 6. Available at: http://www.fws.gov/southwest/es/library/

_____. 2002. Designation of critical habitat for the Northern Great Plains breeding population of the piping plover. Federal Register 67:57637-57717.

_____. 1998. Procedures for conducting consultation and conference activities under Section 7 of the Endangered Species Act. USFWS, Washington, D.C.

_____. 1990. Recovery plan for the interior population of the least tern (*Sterna antillarum*). U. S. Fish and Wildlife Service, Twin Cities, Minnesota. 90 pp.

_____. 1988. Recovery plan for piping plovers (*Charadrius melodus*) of the Great Lakes and the Northern Great Plains. Twin Cities, MN.

_____. 1985. Determination of endangered and threatened status for the piping plover. Federal Register 50:50720-50734.

United States Government Accountability Office (USGAO). 2007. Farm program payments are an important factor in land owners' decisions to convert grassland to cropland. GAO-07-1054.

United States Government Accountability Office (USGAO). 2007a. At the current pace of acquisitions, the U.S. Fish and Wildlife Service is unlikely to achieve its habitat protection goals for migratory birds. GAO-07-1093.

Whooping Crane Conservation Association (WCCA). 2010. Whooping Crane Current Reports – Whoopers doing well at Aransas, February 18, 2010. Available at http://www.whoopingcrane.com/WCCA_report/

Williams, B.K., R.C. Szaro, and C.D. Shapiro. 2007. Adaptive Management: The U.S. Department of the Interior Technical Guide. Adaptive Management Working Group, U.S. Department of the Interior, Washington, DC.

FIGURES

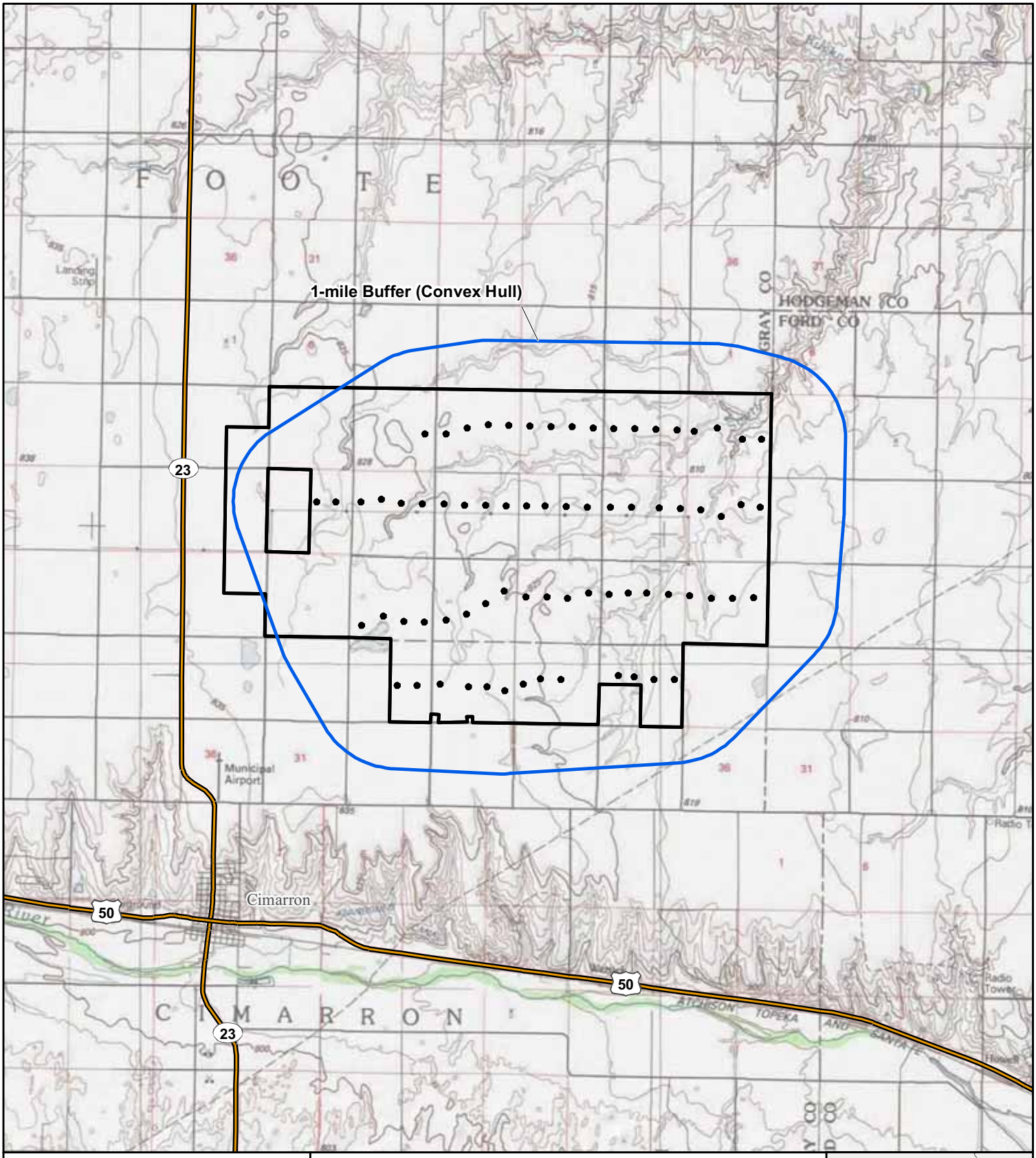

Figure 1
Project Vicinity

Biological Assessment
Cimarron Wind Energy Project - Phase 1
Gray County, Kansas

Proposed Turbine
Project Area
Action Area
Major Road

N
0 1 2 Miles

Source: Layout v3, USGS 100k Quad, 1985.

CPV Renewable Energy Company, LLC
TETRA TECH EC, INC.

Z:\Gdrive\Projects_2008\CPV_Cimarron\Maps\BA\v3\Figure1_Project_Vicinity.mxd

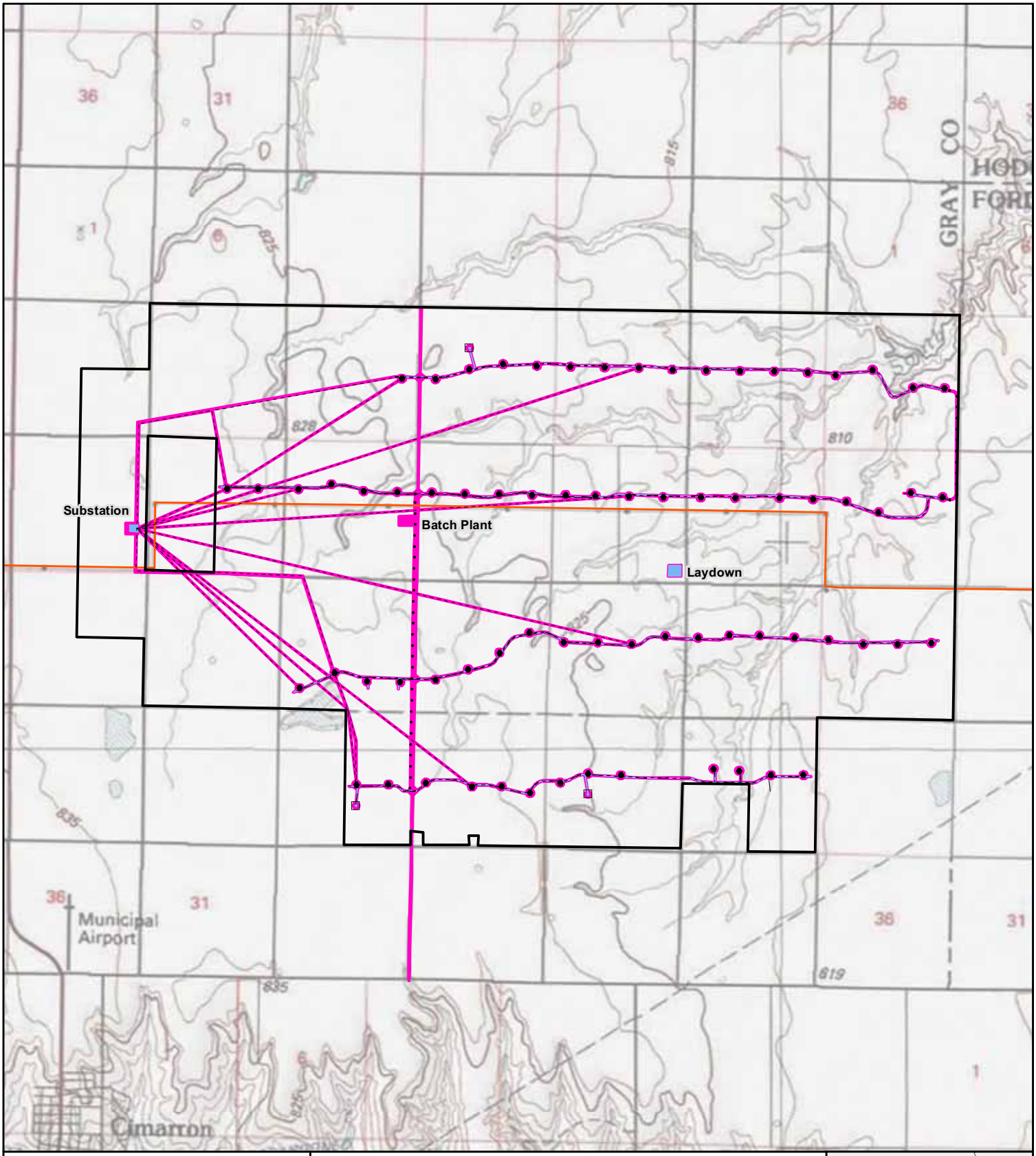

Figure 2
Project Layout

Biological Assessment
Cimarron Wind Energy Project - Phase 1
Gray County, Kansas

CPV Renewable Energy Company, LLC

TETRA TECH EC, INC.

- Proposed Turbine
- Permanent Met Tower
- Access Road
- Crane Path
- Collection Lines
- Existing Transmission Line
- Project Area
- Temporary Impacts
- Permanent Impacts

N

0 0.5 1 Miles

Source: Layout v3, USGS.

Z:\Gdrive\Projects_2008\CPV_Cimarron\Maps\BA\v3\Figure2_Layout.mxd

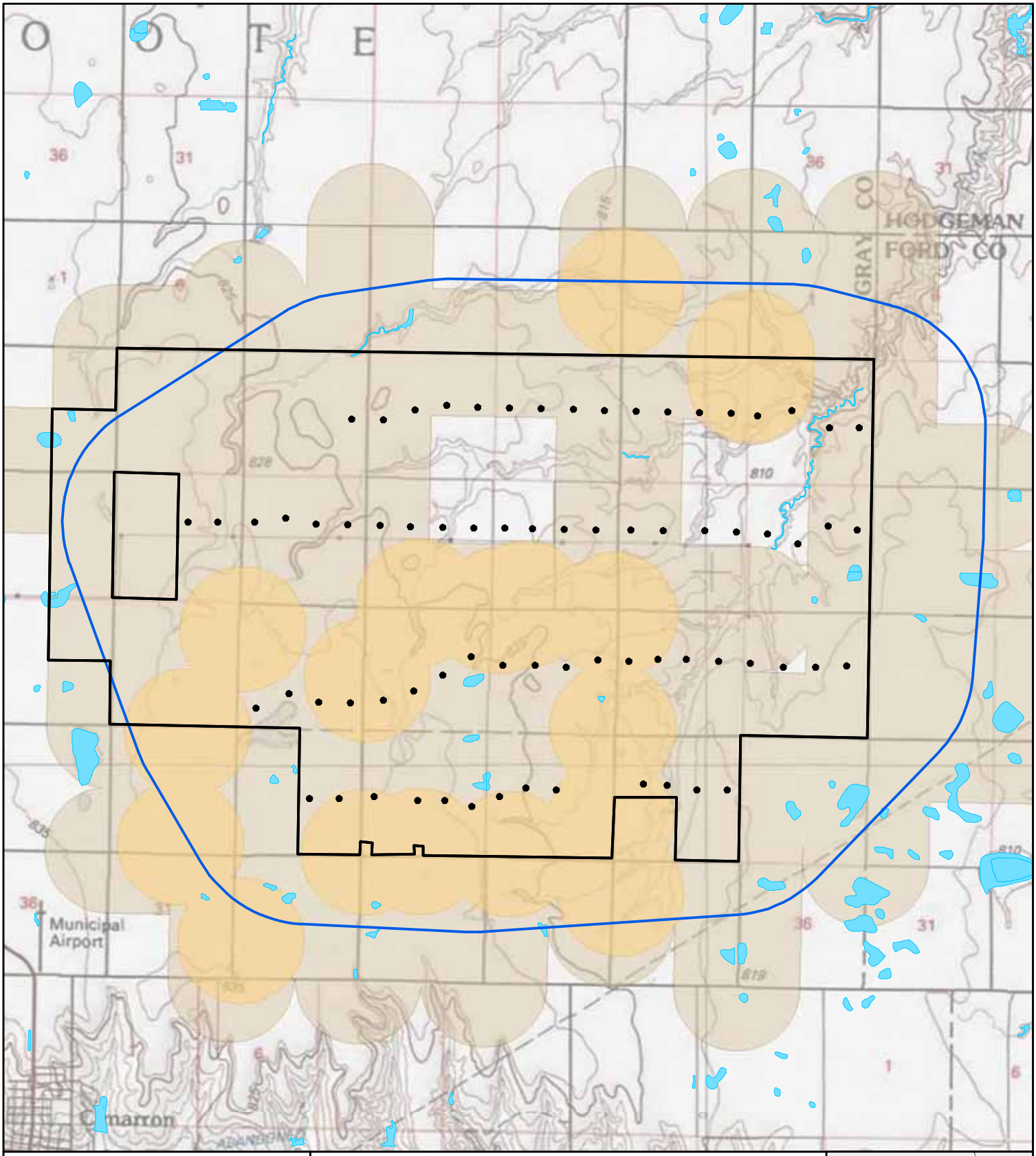

Figure 3
Pre-existing Disturbances to
Crane-Suitable Habitat

Biological Assessment
Cimarron Wind Energy Project - Phase 1
Gray County, Kansas

Proposed Turbine
Project Area
1-mile Convex Hull Turbine Buffer
Crane-Suitable Wetlands
Occupied Structure 1/2-mile Buffer
Roads 1/2-mile Buffer

N
0 0.5 1 Miles

Source: Layout v3, USGS, NWI.

KANSAS
Project Location

CPV Renewable Energy Company, LLC
TETRA TECH EC, INC.

Z:\Gdrive\Projects_2008\CPV_Cimarron\Maps\BA\v3\Figure3_Crane_Wetlands.mxd

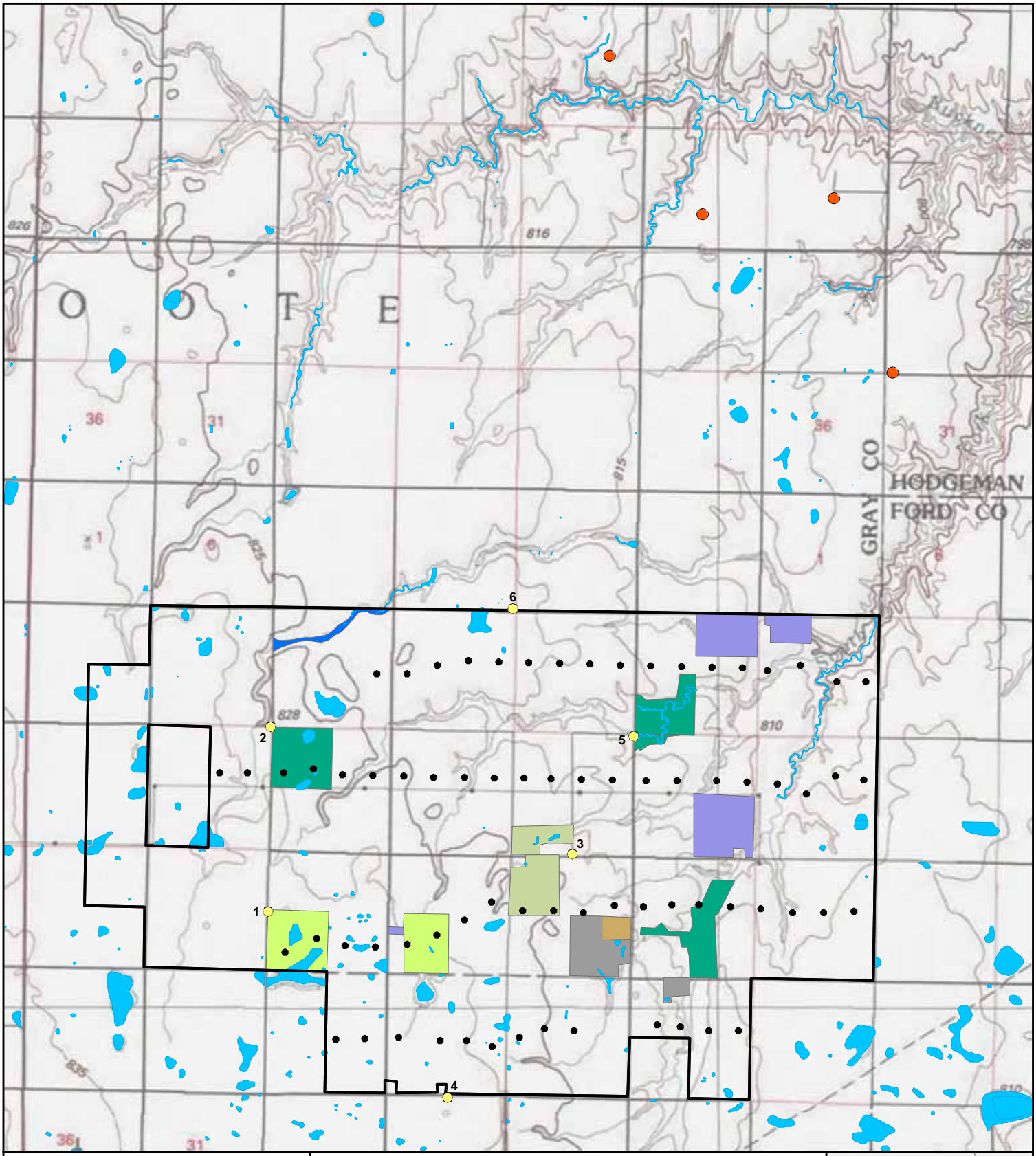

Figure 4
Environmental Considerations

Biological Assessment
Cimarron Wind Energy Project - Phase 1
Gray County, Kansas

Project Area
Proposed Turbine
Point Count Location
Lesser Prairie-Chicken Lek
NWI Wetlands

Grassland Cover Types
Grassland
Grassland used as Hayfield
Invaded Grassland
Grassland dominated by mostly native species
Grassland that has been planted
Grassland that may have been planted
Grassed Waterway

N
0 0.5 1 Miles

Source: Layout v3, USGS, NWI, Tt.

KANSAS
Project Location

CPV Renewable Energy Company, LLC
TETRA TECH EC, INC.

Z:\Gdrive\Projects_2008\CPV_Cimarron\Maps\BA\v3\Figure4_Env_Considerations.mxd

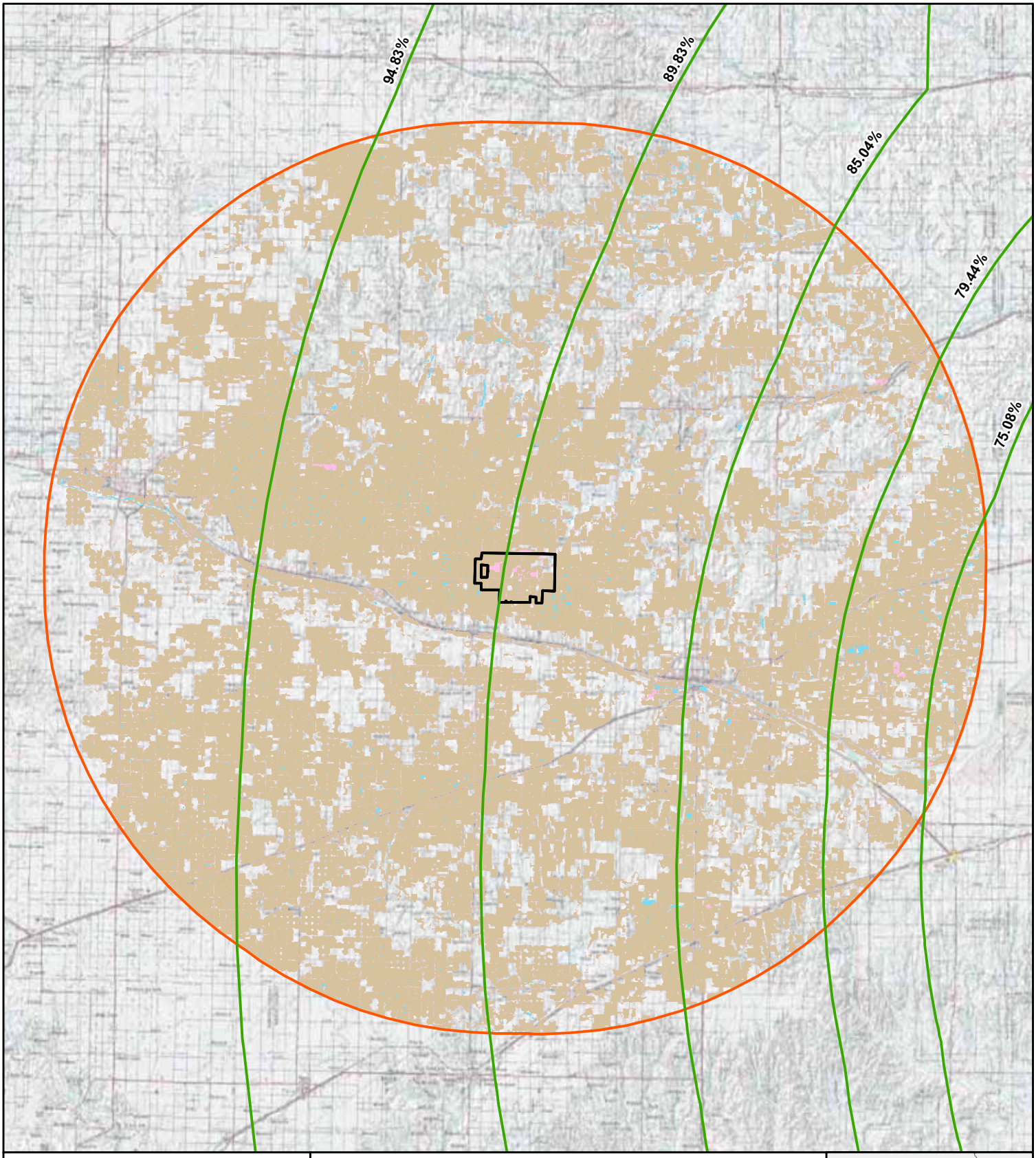

Figure 5
Whooping Crane Habitat

Biological Assessment
Cimarron Wind Energy Project - Phase 1
Gray County, Kansas

Project Area
35-mile Buffer
Proportion of Whooping Crane Obseravations

Whooping Crane Habitat
Wetland
Agricultural
Wetland/Agricultural Matrix

N
0 5 10 Miles

Source:USGS, NLCD, NWI, Tt.

KANSAS
Project Location

CPV Renewable Energy Company, LLC
TETRA TECH EC, INC.

Z:\Gdrive\Projects_2008\CPV_Cimarron\Maps\BA\v3\Figure5_Crane_Habitat.mxd

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kansas Ecological Services Field Office
2609 Anderson Avenue
Manhattan, Kansas 66502-2801

November 10, 2011

John T. Baxter, Manager
Endangered Species Act Compliance
Tennessee Valley Authority
400 W. Summit Hill Drive
Knoxville, TN 37902-1499

RE: BA for Cimarron Wind Energy Project; Gray County, KS 64411-2012-CPA-0033

Dear Mr. Baxter:

This is in reply to your October 13, 2011 letter transmitting the Tennessee Valley Authority's Biological Assessment (BA) reviewing the potential impacts on federally-listed and candidate species resulting from the purchase of wind-generated energy from the CPV Cimarron Wind Energy Project, proposed for construction in Gray County, Kansas. The facility is designed to generate 165 megawatts of power, and will occupy approximately 23 square miles of land. The following comments are provided for your consideration.

The BA assesses impacts to the federally-listed whooping crane, interior least tern, piping plover and the candidate lesser prairie-chicken, and concludes the action may affect, but is not likely to adversely affect, any of these species. The conclusions are based at least in part on measures to be employed which will avoid direct impacts to species and offset indirect impacts to habitats. These measures are outlined in section 2.2 "Avoidance and Minimization Measures" on pages 2-4 of the BA. The Service concurs that implementation of these measures represents a good faith effort on the part of CPV and TVA to avoid and minimize environmental impacts, especially to listed and candidate species.

As long as the Kansas Department of Wildlife, Parks and Tourism agrees with the grassland protection measures, the Service concurs there is not likely to be any adverse affect to the candidate lesser prairie-chicken. Also, the measures proposed would appear to minimize any potential for impacts to the least tern and piping plover, and would reduce the likelihood of impacting the whooping crane. To provide further conservation benefit to the whooping crane, in an effort to result in a net zero impact to this species, CPV is also proposing to execute a Funding Agreement with Ducks Unlimited (DU) for $250,000 to provide off-site wetland conservation. This should provide an alternative to the wetland stopover habitat within the project that will be avoided by whooping cranes after turbines are constructed. We have also reviewed the proposed Funding Agreement, and request that the Service be allowed to review any proposed actions by DU prior to funding and implementation.

Given the measures proposed for implementation in the BA, the Funding Agreement between CPV and DU, and the overall habitat condition of the project site and surrounding lands, the Fish and Wildlife Service concurs with TVA's determination that this action may affect, but is not likely to adversely affect, the whooping crane, interior least tern, piping plover and lesser prairie-chicken. We anticipate continued coordination with CPV and DU in the planning and implementation of wetland mitigation measures.

Thank you for this opportunity to review the Biological Assessment. Please contact me or Dan Mulhern of this office if you have comments or questions.

Sincerely,

Michael J. LeValley
Field Supervisor

cc: KDWPT, Pratt, KS (Environmental Services)