Summary Table of Scoping Comments

Agency/Officer/Individual	Contact Information	Medium of Comment
Kansas Department of Agriculture	Bob Lytle, Environmental Scientist Kansas Department of Agriculture Division of Water Resources 109 SW 9th Street, 2nd Floor Topeka, KS 66612-1283	Letter (dated June 1, 2010)
Kansas Department of Health and Environment	Donald R. Carlson, P.E., Chief Kansas Department of Health and Environment Bureau of Water, Industrial Programs Section Curtis State Office Building 1000 SW Jackson St, Ste 400 Topeka, KS 66612-1367	Letter (dated May 18, 2010)
Kansas Department of Transportation	Larry L. Thompson, PE, Southwest District Engineer Kansas Department of Transportation, District 6 121 North Campus Drive; Garden City, KS 67846	Letter (dated June 3, 2010)
Kansas Historical Society	Patrick Zollner, Director, Cultural Resources Division Deputy State Historic Preservation Office Kansas Historical Society 6425 SW 6th Avenue Topeka, KS 66615-1099	Leter (dated June 29, 2010)
U.S. Army Corps of Engineers	Stephen H. Penaluna Regulatory Project Manager/Team Leader Kansas State Regulatory Office	E-mail (dated May 13, 2010)
U.S. Department of Agriculture, Natural Resources Conservation Service	Susan M. McBride Soil Conservationist 760 South Broadway Salina, KS 67401-4604	Letter (dated May 20, 2010)
U.S. Department of the Interior, U.S. Fish & Wildlife Service	Michael J. LeValley, Field Supervisor Kansas Ecological Services Field Office 2609 Anderson Avenue Manhattan, KS 66502-2801	Letter (dated June 2, 2010)
Osage Nation Tribal Historic Preservation Office	James Munkres, Archaeologist I 627 Grandview Pawhuska, OK 74056	Letter (dated August 30, 2010)

May 10, 2010

Dear: (see attached list)

REQUEST FOR COMMENTS ON SCOPE OF ENVIRONMENTAL REVIEW FOR THE PURCHASE OF RENEWABLE ENERGY FROM THE CPV CIMARRON WIND ENERGY PROJECT IN GRAY COUNTY, KANSAS

In accordance with the Council on Environmental Quality's regulations and Tennessee Valley Authority's (TVA) procedures for implementing the National Environmental Policy Act (NEPA) TVA is preparing an environmental assessment (EA) for the subject project. The environmental review will inform TVA decision-makers regarding the potential for environmental effects of purchasing approximately 165.6 megawatts of renewable power from the proposed CPV Cimarron Wind Energy Project in Gray County, Kansas.

Enclosed are a description of the proposed project and a general site map. Additional materials are available on the TVA website at tva.gov. Between May 10, 2010, and June 9, 2010, TVA is soliciting comments on the appropriate scope of review from federal, state and local agencies, as well as Native American tribes. It is anticipated that TVA will make the draft environmental review available for public and agency comment during the late summer of 2010.

You may send written or e-mail comments on the scope of environmental issues, resources, and alternatives to Bruce Yeager at the address below. Additionally, if you have questions about the process or scoping comment period, please contact him at:

Bruce L. Yeager
NEPA Program Manager
Tennessee Valley Authority
400 West Summit Hill Drive, WT 11D
Knoxville, TN 37902
Phone: 865-632-8051
E-mail: blyeager@tva.gov

Sincerely,

Linda B. Shipp

Linda B. Shipp, Senior Manager
Federal Determinations
Environmental Permits and Compliance
Environment and Technology

BLY:PER
Enclosures
cc: See page 2

(see attached list)
Page 2
May 10, 2010

cc (Enclosures):
Christopher W. Hansen, SP 6A-C
Susan J. Kelly, LP 3D-C
Louis A. Lee, WT 11A-K
Ralph E. Rodgers, WT 6A-K
Peggy L. Scissom, LP 5D-C
Gregory R. Signer, WT 6A-K
Courtney L. Stetzler, SP 6A-K
Bruce L. Yeager, WT 11D-K
EDMS, LP5U-C (Enclosure)

Prepared by Bruce L. Yeager (EP&C); reviewed by Courtney L. Stetzler (COP) with concurrence from Gregory R. Signer (OGC)

THE ATTACHED LETTER WAS SENT TO THE FOLLOWING LIST OF NAMES ON MAY 10, 2010

Mr. Eric B. Banks
State Conservationist
U.S. Department of Agriculture
Natural Resources Conservation Service
Kansas State Office
760 South Broadway Boulevard
Salina, Kansas 67401-4604

Mr. Dominic Bosco
1325 East West Highway
Building: SSMC2
Silver Spring, Maryland 20910-3283

Mr. Mark E. Busch
District #1 County Commissioner
Gray County Commissioners
15405 East Road
Cimarron, Kansas 67835

Mr. Ed Byrd
Kansas Department of Agriculture
Division of Water Resources
109 SW 9th Street, 2nd Floor
Topeka, Kansas 66612

Mr. Jerry Denney
Zoning Administrator
Gray County Courthouse
300 South Main
Cimarron, Kansas 67835

Mr. Eric Johnson, Ecologist
Kansas Department of Wildlife and Parks
Environmental Services Section
512 SE 25th Avenue
Pratt, Kansas 67124

Mr. Jim Johnson
Central Region Airports Division Manager
Federal Aviation Administration
Airports Division ACE-600, Room 335
901 Locust
Kansas City, Missouri 64106-23254

Mr. Jeffrey D. Ladner
District Conservationist
U.S. Department of Agriculture
Natural Resources Conservation Service
Cimarron Service Center
909 East Avenue A
Cimarron, Kansas 67835-0366

Mr. Lane P. Letourneau
Program Manager
Kansas Department of Agriculture
Division of Water Resources
109 SW 9th Street, 2nd Floor
Topeka, Kansas 66612-1283

Mr. David L. Loucks
District #3 County Commissioner
Gray County Commissioners
28104 2 Road
Copeland, Kansas 37837

Mr. Dan Meyerhoff
Assistant State Conservationist
U.S. Department of Agriculture
Natural Resources Conservation Service
Hays Area Office
3012 Broadway
Hays, Kansas 67601

Ms. Deb Miller
Kansas Department of Transportation
700 South West Harrison Street
Topeka, Kansas 66603-3754

Mr. Karl Mueldener, Director
Kansas Department of Health and Environment
Divisionof Environment
Bureau of Water
1000 Southwest Jackson Street, Suite 420
Topeka, Kansas 66612-1367

Mr. Glenn Oyler
District #2 County Commissioner
Gray County Commissioners
P. O. Box 833
Cimarron, Kansas 67835

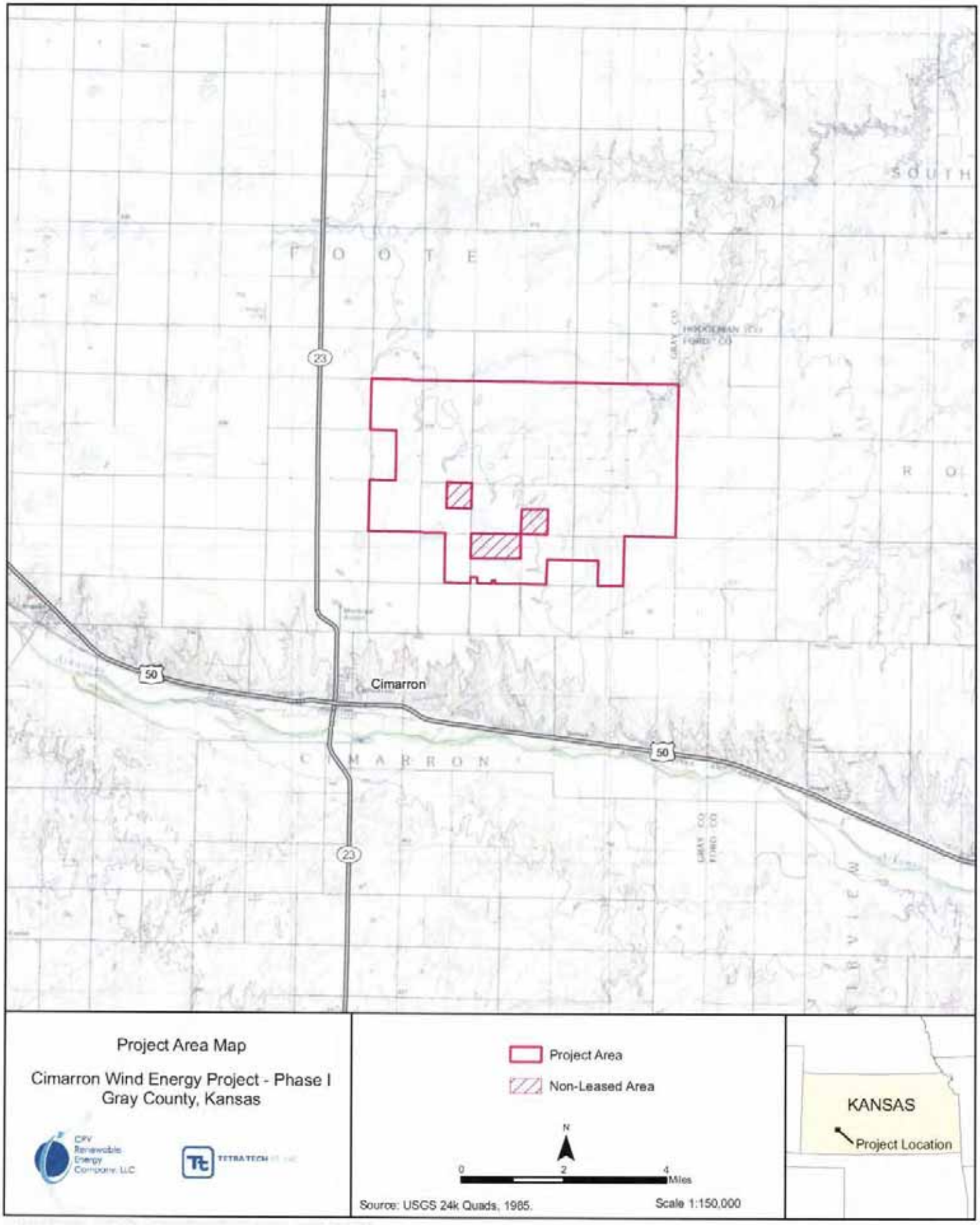
Mr. Stephen Penaluna
U.S. Army Corps of Engineers
Kansas City District
2710 ME Shady Creek Access Road
El Dorado, Kansas 67042

Mr. Adrian Polansky
State Executive Director
U.S. Department of Agriculture
Kansas Farm Service Agency
3600 Anderson Avenue
Manhattan, Kansas 66503-2511

Mr. William W. Rice
Acting Regional Administrator
U.S. Environmental Protection Agency
Region 7
901 North 5th Street
Kansas City, Kansas 66101

Ms. Bonnie Swartz
County Clerk
Gray County Courthouse
300 South Main
Ciomarron, Kansas 67835

Mr. C.Z. Thompson
County Executive Director
U.S. Department of Agriculture
Gray County Farm Srevice Agency
909 East Avenue A
Cimarron, Kansas 67835-0366


FOOTE
SOUTH
23
50
Cimarron
CIMARRON
GRAY CO
FORD CO
Project Area Map
Cimarron Wind Energy Project - Phase I
Gray County, Kansas
Project Area
Non-Leased Area
N
0
2
4
Miles
Source: USGS 24k Quads, 1985.
Scale 1:150,000
KANSAS
Project Location

KANSAS
DEPARTMENT OF AGRICULTURE

Mark Parkinson, Governor
Joshua Svaty, Secretary

www.ksda.gov/dwr

June 1, 2010

Bruce L. Yeager, NEPA Program Manager
Tennessee Valley Authority
400 West Summit Hill Drive, WT 11D
Knoxville, TN 37902

RE: A-95 DWR 2010.114

Dear Mr. Yeager:

This responds to a letter and attachments received May 13, 2010 from Linda B. Shipp, Senior Manager Federal Determinations, Environmental Permits and Compliance, in which TVA requested comments on potential environmental effects of purchasing approximately 165.6 megawatts of power from the proposed CPV Cimarron Wind Energy Project in Gray, County, Kansas. Our review and comments are limited to water resources issues over which this agency has responsibility.

Based upon the information provided to us, the proposed project does not appear likely to adversely impact water resources if steps are taken to avoid or minimize construction in streams and wetlands. It appears that there may be jurisdictional streams (draining 640 acres or more) within the project area. Any significant modification of a jurisdictional stream or its floodplain requires prior approval from this agency per the Obstructions in Stream Act, the Levee Law, and associated regulations.

Should surface water or groundwater be needed for the construction phase of the project, a temporary permit to use water may be required from this agency per the Kansas Water Appropriations Act and associated regulations, depending on the source of the water.

A review of the project area indicates that some land is irrigated and has water rights associated with it. Based on the project description, some cropland might have to be temporarily or permanently taken out of production for construction and operation of this project. Water right owners are responsible for reporting to this agency any changes in their place of use and/or reasons for nonuse of water.

Should you have any questions, please feel free to contact me at 785-296-6086 or by email at Bob.Lytle@kda.ks.gov.

Sincerely,

Bob Lytle

Bob Lytle
Environmental Scientist

PC: Garden City Field Office

Division of Water Resources • David W. Barfield, Chief Engineer
109 SW 9th St., 2nd Floor; Topeka, KS 66612-1283 • (785) 296-3717 • Fax: (785) 296-1176

KANSAS
Mark Parkinson, Governor
Roderick L. Bremby, Secretary

DEPARTMENT OF HEALTH
AND ENVIRONMENT
www.kdheks.gov
Division of Environment

May 18, 2010

Bruce L. Yeager
NEPA Program Manager
Tennessee Valley Authority
400 West Summit Hill Drive, WT 11D
Knoxville, Tennessee 37902

Re: CPV Cimarron Wind Energy Project
Gray County, Kansas

Dear Mr. Yeager:

Pursuant to your May 10, 2010 letter to Mr. Karl Mueldener, I am providing you with comments from the Kansas Department of Health and Environment - Bureau of Water regarding the proposed wind energy project. I am transmitting with this letter a copy of an information document prepared for individuals proposing to develop various types of projects in Kansas and potential regulatory issues that may need to be addressed, depending on the type of project being proposed, the site specific location, and other project specific details. Areas that we envision as potentially being involved in a wind farm project include:

- Any construction activity which disturbs 1 acre or more is required to file a National Pollutant Discharge Elimination System (NPDES) permit application for stormwater runoff resulting from construction activities. The project owner (the party responsible for the project) must obtain authorization from KDHE to discharge stormwater runoff associated with construction activities prior to commencing construction. The Kansas construction stormwater general permit, a Notice of Intent (application form), a frequently asked questions file and supplemental materials are on-line on the KDHE Stormwater Program webpage at www.kdhe.state.ks.us/stormwater. Answers to questions regarding or additional information concerning construction stormwater permitting requirements can be obtained by calling (785) 296-5549.

- Process (any non-domestic wastewater) or domestic wastewater generated by the facility which is not directed to a City sanitary sewer may require the issuance of a State Water Pollution Control Permit. To obtain information regarding the need for a permit or to obtain the appropriate application forms, please contact Donald Carlson at (785) 296-5547 or Joe Mester at (785) 296-6804.

DIVISION OF ENVIRONMENT
Bureau of Water - Industrial Programs Section
CURTIS STATE OFFICE BUILDING, 1000 SW JACKSON ST., STE. 420, TOPEKA, KS 66612-1367
Voice 785-296-5547 Fax 785-296-0086 Email dcarlson@kdheks.gov

- In the event a septic tank and lateral field system is being considered, we recommend that only domestic sanitary wastes (stools, sinks, etc.) be directed to the septic tank system. Floor drains or other connections that may introduce non-domestic wastes may subject the applicant to Underground Injection Control (UIC) Class V injection well requirements. EPA is currently reworking these regulations and these changes may have a significant impact on the facility operation and applicant. If you should have any questions regarding directing non-domestic wastes to a septic system, please contact Mike Cochran at (785) 296-5560.

- If you will utilize a private water well to supply drinking water for the proposed facility, and the facility will serve 25 people or more per day, you need to contact Dave Waldo regarding any potential State or Federal public water supply laws or requirements that may pertain to the proposed operation. If you should have any questions regarding drinking water regulations, please contact Mr. Dave Waldo at (785) 296-5503.

Should you have any questions regarding the information in this letter or the accompanying document, please feel free to give me a call at (785) 296-5547.

Sincerely,

Donald R. Carlson

Donald R. Carlson, P.E., Chief
Industrial Programs Section
Bureau of Water

KANSAS

Mark Parkinson, Governor
Roderick L. Bremby, Secretary

DEPARTMENT OF HEALTH
AND ENVIRONMENT

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Division of Environment

PROPOSED PROJECT INFORMATION

WATER AND WASTEWATER REGULATORY REQUIREMENTS

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT - BUREAU OF WATER

Prepared by: Donald Carlson
Bureau of Water - Industrial Programs Section
Date: May 1, 2009

The purpose of this document is to provide information regarding various regulatory and environmental programs, administered by the Kansas Department of Health and Environment (KDHE) Bureau of Water (BOW), that may need to be addressed for a proposed project. Without specific project information regarding the proposed facility, site location, process operations employed, water source, and the quantity and quality of the wastewater that will be produced, it is not possible for KDHE to provide project specific limits, criteria, or requirements a facility will be expected to meet. To provide guidance in developing a project, the KDHE BOW developed this document to summarize information addressing the regulation of wastewater treatment and disposal, wastewater pretreatment systems, stormwater runoff requirements, and water supply systems.

The following information addresses, in detail, requirements associated with KDHE's regulation and permitting of wastewater treatment or wastewater pretreatment systems. While this document also references requirements associated with public water supply systems, underground injection control (UIC) injection wells, water well/monitoring well construction and plugging, septic tank and lateral field systems, wastewater treatment and water supply operator certification, and wastewater treatment and water supply laboratory certification, we suggest you familiarize yourself with the detailed specific program and regulatory requirements found on the Kansas Department of Health and Environment's - Bureau of Water homepage or by contacting specific programs referenced in this document:

www.kdheks.gov/water/index.html

Information regarding other environmental regulatory programs administered by the KDHE Division of Environment, which may impact the proposed project can be accessed from the Division's homepage or by contacting program staff listed in this document:

www.kdheks.gov/environment/index.html

DIVISION OF ENVIORNMENT
Bureau of Water – Industrial Programs Section
CURTIS STATE OFFICE BUILDING, 1000 SW JACKSON ST., STE. 400, TOPEKA, KS 66612-1367
Voice 785-296-5547 Fax 785-296-0086 Email: dcarlson@kdheks.gov

Permitting Process - General Information:

We recommend that at the earliest possible date, KDHE BOW staff meet with company officials and their consultant regarding the proposed project. The BOW attempts to coordinate these meetings with other KDHE bureaus so agency staff can receive the same information and provide input regarding their respective regulatory program areas. This coordination also helps to minimize time and resources for both the company proposing the project as well as their consultant. Issues the BOW typically address at such meetings include:

- Siting options and any potential concerns the BOW may have i.e., limited receiving stream flows, water quality impacted stream segments, groundwater contamination issues associated with the site or surrounding area, available capacity of municipal sanitary sewer systems and wastewater treatment plants, water supply systems, etc.

- Addressing the proposed concepts being considered in regard to wastewater treatment, wastewater pretreatment, and water supply treatment. Highlighting regulatory / design concerns and requirements.

- Advising the parties of existing regulatory requirements and potential regulations being developed or adopted by KDHE.

- Advising the parties of existing regulatory requirements and potential regulations being developed or promulgated by the U.S. Environmental Protection Agency (EPA).

- Identifying and coordinating issues which may involve other KDHE environmental programs.

- Providing information regarding the basis for potential permit limits and conditions, monitoring, and other regulatory requirements.

The normal permitting process for a project which involves the construction of a wastewater treatment system takes a minimum of four months and can typically be completed within six months, assuming no problems arise, the required information submitted is complete, and responses to KDHE inquiries are timely. KDHE issued pretreatment permits can typically be processed in two to three months.

Without project specific background information regarding the proposed wastewater treatment or pretreatment system to be employed, we have addressed the regulatory procedures employed for each separately. Both State and EPA regulations require the submission of applications a minimum of 180 days in advance of a proposed discharge or the proposed start-up of a wastewater treatment system. KDHE will make every effort to provide a timely review and processing of permit applications. While KDHE can never guarantee issuance of a permit for a proposed project, early contact and coordination with KDHE, the submission of complete application materials, and timely responses to KDHE inquiries can help

ensure timely reviews and permit processing. Identifying potential problems and resolving them in a timely fashion will help minimize the potential for delaying construction activities or the start-up of production operations at the plant.

On-Site Wastewater Treatment And Disposal:

If a facility proposes to treat and dispose of it's wastewater, there are two types of water pollution control permits issued by KDHE. KDHE received National Pollutant Discharge Elimination System (NPDES) program delegation authority from EPA in 1974. KDHE issues NPDES permits on behalf of EPA in Kansas. KDHE also administers a State water pollution control permitting program for wastewater treatment systems which do not discharge wastewater to "Waters of the U.S.". These facilities are typically exempt from NPDES wastewater permitting but require a Kansas Water Pollution Control Permit. Facilities addressed by the Kansas Water Pollution Control Permit typically employ a wastewater treatment lagoon, a buried or partially buried waste storage tank(s), a concrete basin or other similar structure which employs evaporation (natural or induced), land application for beneficial use onto agricultural cropland, or periodic removal of the wastewater and directing it to a commercial or municipal wastewater treatment system for treatment and disposal. The permitting process for either of these permit options is generally the same and includes:

1. KDHE, company officials and their consultant meeting to discuss the wastewater treatment and disposal concepts proposed for the project.

2. Development and submission of an engineering report to KDHE, for review and approval, addressing the proposed project; the source, amount, and quality of wastewater generated; the proposed method(s) of treatment and disposal; site location; etc.

   The appropriate water pollution control permit application and fee needs to be submitted with the engineering report. A water pollution control permit application can be obtained by contacting Ed Dillingham [785-296-5513], Joe Mester [785-296-6804], or Don Carlson at [785-296-5547]. At the time a permit application is requested, we will need the legal description (section, township, range) of the proposed facility site or street address if located within a city, the estimated daily volume of wastewater generated by type (domestic, process, noncontact cooling, contact cooling, or cooling water to which chemicals have been added to address scaling or biological control), and the person authorized as the facility/project contact (name, mailing address, telephone number, fax number, and email address). KDHE needs this information to assign a facility specific permit number and to calculate the required permit fee.

   Upon receipt of the engineering report, KDHE will request a preliminary site appraisal be conducted by the appropriate KDHE District Office. KDHE has District Offices located in Lawrence, Salina, Hays, Dodge City, Wichita, and Chanute.

3. KDHE reviews the engineering report and permit application and addresses outstanding issues or concerns with the applicant and their consultant. Following approval of the engineering report by KDHE, construction plans and specifications for the wastewater treatment system must be developed and submitted for KDHE review and approval. The engineering report, construction plans, and specifications are required to be prepared by/under the direction of and sealed by a professional engineer licensed to practice in Kansas.

   KDHE begins processing the draft water pollution control permit.

4. KDHE addresses outstanding issues or concerns and approves the construction plans and specifications. KDHE develops a draft water pollution control permit and places the draft permit on public notice for a period of 30 days during which the permit applicant, the public, or other interested parties can provide KDHE with comments and information for consideration regarding the project and draft permit.

5. Following the 30-day public notice period, KDHE reviews, addresses, and resolves any comments received from EPA, the permit applicant, the public, and other interested parties regarding the draft permit. Once all issues and concerns are addressed to KDHE's satisfaction, the water pollution control permit is issued. If comments received during the public notice period indicate significant public interest in the permit, or if information is raised which requires further clarification, KDHE may schedule a public hearing on the draft water pollution control permit. The scheduling of the public hearing will require a public notice period of 30 days prior to the scheduled hearing date. If it becomes obvious that significant public interest in the draft permit will exist, KDHE can concurrently public notice the draft permit and hearing notice to save time. If a public hearing is scheduled, KDHE staff conduct the hearing, summarize and evaluate the information obtained during the public notice period and at the hearing, prepares a hearing report and recommendations for the KDHE Secretary. The KDHE Secretary reviews the hearing report and recommendations then makes a determination whether the proposed permit is to be issued, denied, or modified and issued.

6. Certain Kansas water pollution control regulations prohibit the start of construction prior to issuance of a water pollution control permit. KDHE **strongly recommends** the start of construction, including site preparation or contractor mobilization, not be initiated until the water pollution control permit has been issued. KDHE can never guarantee the issuance of any permit. Starting construction prior to the issuance of a Kansas water pollution control permit, if allowed by statute and/or regulations is done solely at the permittee's risk. While certain Kansas water pollution control regulations prohibit the start of construction without an issued permit, there are other KDHE regulatory programs which not only prohibit the start of construction of pollution controls or systems, but may prohibit any type of construction activity being initiated, including site preparation. We strongly recommend the project owner and their consultant

contact the various Division of Environment bureaus regarding this matter prior to initiating construction activities.

7. Following the completion of construction, the permittee notifies KDHE that construction of the water pollution controls have been completed and forwards to KDHE, from either the design engineer or construction inspector, a certification the water pollution controls were constructed in conformance with the KDHE approved plans and specifications. KDHE District Office staff will be notified to conduct a final inspection of the water pollution control system. If the KDHE final inspection determines the construction is complete and acceptable, KDHE authorizes use of the water pollution control system.

8. The permittee begins implementing routine monitoring and reporting consistent with the water pollution control permit requirements and conditions.

9. Independent of the water pollution control permit referenced above, there is the potential need for issuance of a separate NPDES stormwater runoff permit associated with the construction activities for the project. If the project will involve construction activities that result in disturbing one acre or more, the project owner (party responsible for the project) needs to file a National Pollutant Discharge Elimination System (NPDES) permit application, for stormwater runoff resulting from construction activities, with KDHE. Any questions regarding the required permitting or a request for the permit application forms should be directed to Dorothy Geisler [785-296-5545]. KDHE currently issues an NPDES general permit for stormwater runoff associated with construction activities. Notice of Intent (application) forms, an explanation as to whom is eligible for a general permit, and a copy of the NPDES general permit can all be found at the KDHE Bureau of Water stormwater website at www.kdheks.gov/stormwater/index.html. A permit fee of $60 needs to accompany the stormwater permit Notice of Intent (NOI). Where no wetlands, threatened and endangered species, or critical water quality stream segments are associated with the proposed project, the processing time for the general permit is typically two to four weeks. Areas in which critical water quality stream segments, wetlands, or threatened or endangered species are involved may require significantly longer time frames for permit processing. If the project is controversial and there is significant opposition regarding the proposed project, there may also be legal challenges to the issued permit which may create delays. We recommend the NPDES Stormwater Construction Runoff permit be obtained as soon as possible. Upon completion of construction activities and stabilization of the disturbed areas, a request for termination of the permit is submitted to KDHE.

10. The facility may be subject to EPA NPDES stormwater runoff permitting requirements associated with industrial activities. This is different than the NPDES stormwater runoff permit associated with construction activities. Industries subject to these EPA stormwater permitting requirements are required to file with KDHE an NPDES stormwater permit Notice of Intent (application) for runoff associated with industrial activities. To obtain information regarding the need for a permit or to obtain the appropriate application form, please contact Eric Staab at [785-296-4347]. If an NPDES permit addressing cooling water, domestic wastewater, or process wastewater discharges is required for the facility, the NPDES stormwater runoff permitting requirements associated with industrial activities will typically be incorporated into the NPDES permit as a specific supplemental condition, otherwise a separate NPDES permit will be issued requiring the submission of the Notice of Intent.

11. Hydrostatic testing of piping or tankage involving water that will be wasted following the test may require permitting. If the water can be directed to a municipal sanitary sewer following the test, no permit from KDHE is required. The project owner/manager needs to advise and seek authorization from the municipal authority responsible for the operation of the municipal sanitary sewer and wastewater treatment system for this purpose. Should project conditions dictate that a discharge of water will be required following the test(s), the project owner/manager needs to inform KDHE as soon as possible regarding the proposed discharge to address the need for permitting. The project owner/manager should contact either Joe Mester at (785) 296-6804 or Don Carlson at (785) 296-5547 regarding the need for permitting.

Wastewater Directed To A Municipal Sanitary Sewer And Wastewater Treatment Facility:

If the facility will be located near a municipality and you propose to direct all or a portion of the industrial process wastewater to the municipal wastewater collection and treatment system for treatment and disposal, the facility may be subject to EPA effluent guideline pretreatment standards. While KDHE does not have full delegation regarding pretreatment program matters, KDHE administers the NPDES Pretreatment Program in Kansas for EPA. KDHE and EPA have currently authorized 18 municipalities/governmental entities to administer local municipal pretreatment programs. These 18 municipalities/governmental entities, typically referred to as publicly owned treatment works (POTWs), are authorized to issue NPDES pretreatment permits to industrial contributors which utilize their sanitary sewer system and wastewater treatment plant. The 18 municipalities/governmental entities with approved local pretreatment programs include:

Arkansas City
Chanute
Coffeyville
Emporia
Great Bend
Hutchinson
Independence
Iola

Manhattan
McPherson
Lawrence
Johnson County Unified Wastewater Districts
Kansas City
Olathe
Pittsburg
Salina
Topeka
Wichita

If the facility will employ the use of a POTW sanitary sewer for process wastewater generated at the facility, you should contact Steve Caspers at [785-296-5551]. In addition to having to comply with the EPA promulgated national pretreatment criteria and standards, all industries, regardless of whether they are subject to EPA promulgated national pretreatment criteria, must comply with local sewer use ordinance limits established by the POTW.

In municipalities which have not developed a KDHE/EPA approved local pretreatment program, KDHE will issue NPDES pretreatment permits to industries subject to EPA promulgated pretreatment standards. The permit will incorporate the EPA categorical pretreatment effluent guideline standards. The industry still needs to gain authorization from the POTW for use of the sanitary sewer and wastewater treatment plant and must comply with local sewer use ordinance requirements. The POTW retains ultimate authority as to who may utilize their wastewater collection and treatment utilities. Capacity of the collection system and wastewater treatment plant may be an issue as well as compatibility of the industrial waste with the POTW utilities and wastewater treatment system.

Unless the facility, whether located in a KDHE/EPA approved POTW or NOT, will utilize some type of earthen structure (wastewater pond, lined or unlined), buried or partially buried wastewater storage tanks, or some other type of pretreatment unit which could create a pathway for pollutants to enter groundwater, KDHE is currently not reviewing construction plans and specifications for pretreatment wastewater treatment units as many are off-the-shelf package units. KDHE still desires to receive a copy of an engineering report addressing the collection, containment, treatment, and disposal of the process wastewater and any resulting wastewater pretreatment residuals (sludge).

The processing of a KDHE issued pretreatment permit follows the same procedure as for the wastewater permits addressed previously i.e., submission of an application, appropriate forms and fee; review and resolution of any issues, concerns, or incomplete information; preparation of a draft permit; placement of the permit on public notice; receipt and resolution of any comments or issues; possible need for a public hearing; issuance of a pretreatment permit; and implementation of monitoring and reporting required by the pretreatment permit.

Permit Limits, Standards, And Criteria:

KDHE issued NPDES, Kansas Water Pollution Control, and Pretreatment Permits utilize the most stringent permit limit based on consideration of EPA promulgated effluent guideline standards, best engineering judgment, and Kansas surface water quality criteria. Without knowledge of the specific production operations proposed, production rates, wastewater volumes, treatment technology to be employed, receiving water body, proposed POTW, and other detailed information provided in the applications, forms, and engineering reports addressed previously, it is not possible for KDHE to provide specific permit limits or requirements.

Facilities proposing to discharge wastewater or cooling water have to comply with Kansas Surface Water Quality Standards. The antidegradation provision of the standards is directed at addressing either a proposal for a new wastewater discharge or an increase in an existing wastewater discharge which would lower or negatively impact the quality of the receiving water. The purpose of the antidegradation requirement is to limit discharges and other activities that will negatively impact water quality, impair designated uses, or threaten to impair designated uses of surface waters. The antidegradation process provides a baseline level of protection relative to established water quality criteria, for all classified surface waters, and a higher level of protection for those waterbodies recognized as unique ecologically, highly valued for its resources, or for having high water quality. New or expanded discharges to "Outstanding National Resource Waters" will not be allowed. New or expanded discharges to either an "Exceptional State Water" or a "General Purpose Water" will be allowed, only if the existing water quality will be maintained and protected. Existing water quality may be lowered only if KDHE determines there is an important social or economic need to lower existing water quality, as demonstrated through the guidelines provided in the U.S. Environmental Protection Agency's guidance document "Interim Economic Guidance for Water Quality Standards, March 1995" (EPA-823-b-95-002). Only after satisfaction of public participation and intergovernmental coordination requirements, and a determination is made by KDHE that based on important economic and social development of the area that degradation of existing water quality conditions in exceptional state waters or general purpose waters is acceptable and will maintain existing and attained designated uses, will the lowering of water quality will be allowed. The time required to develop and submit the antidegradation documentation to KDHE as well as time for review and processing by KDHE, should be considered when developing the project's schedule. The antidegradation documentation should be submitted with the permit application and the engineering report.

Permit Costs

Permit fees are determined by KDHE and are facility specific depending upon the classification as to the type of facility or discharge, number of outfalls and rate of wastewater/cooling water generated. The permit fee schedule is established in K.A.R. 28-16-56d. The following is provided for general information purposes only:

NPDES General Permit:	$60/year
Industrial Wastewater Permit:	$320/year/MGD of design flow or any portion thereof. $320 minimum fee
Cooling Water Surface Discharges:	Either $60/year or $120/year/MGD of design flow or any portion thereof with a minimum fee of $120/year.
Dewatering Discharge:	$60/year
Pretreatment Permit:	$320/year

Public Water Supply:

If you will utilize a private well or surface water source to supply drinking water for the proposed facility, and the facility will serve 25 people or more per day, 60 or more days per year, you need to contact KDHE regarding potential state or federal public water supply laws or requirements that may pertain. Questions regarding drinking water regulations or design requirements associated with the water treatment or distribution system, should be directed to Dave Waldo at [785-296-5503]. BOW's Public Water Supply Section can also provide advice and guidance regarding cross-connection control to prevent the introducing wastes and chemicals into the drinking water system.

Wastewater and Water Supply Operator Certification:

Wastewater treatment and water supply system operators may be required to be certified by KDHE. KDHE administers an operator certification program which provides training, assistance, continuing education, testing and certification. Information regarding the operator certification program may be obtained from the BOW homepage or by contacting Vickie Wessel [785-296-2976] or Teresa Schuyler [785-296-5511].

Septic Tanks:

In the event a septic tank and lateral field system is being considered for use anywhere at the facility, we recommend that only domestic sanitary waste (stools, sinks, etc.) be directed to the septic tank system. Floor drains or other connections that may introduce non-domestic waste into the septic tank system may subject the company to EPA Underground Injection Control (UIC) Class V injection well requirements. EPA also requires the registration of "large capacity septic tank and lateral field systems" as Class V injection wells. EPA defines a large capacity septic tank and lateral field system to be one that serves 20 or more people per day. If you should have any questions regarding directing non-domestic waste to a septic tank system or how to register a "large capacity septic tank and lateral field system", contact Mike Cochran at [785-296-5560].

Injection Wells:

Any proposal to dispose of wastewater by directing it to a disposal/injection well will be subject to both State and Federal Underground Injection Control (UIC) regulations. KDHE administers both a State and the EPA UIC Program in Kansas. If you should have any questions regarding UIC Program requirements, please contact Mike Cochran at [785-295-5560] or Kirk Hoeffner at [785-296-1843].

Water Wells:

Water wells constructed at the site which will be used for public water supply purposes will have to conform to design standards established by the Public Water Supply Section. Design requirements can be obtained by contacting Dave Waldo at [785-296-5503]. Regardless of whether the water well will be used as a public water supply or for non-potable purposes, water wells in Kansas are required to be constructed and plugged by a KDHE licensed water well contractor. This requirement also includes installation of any monitoring wells that may be employed at the facility. Information regarding water well construction and plugging, regulations, and licensed water well contractors can be obtained by contacting Richard Harper at [785-296-3565].

Laboratory Certification Program:

Water pollution control and water supply permits typically require sampling and analysis be conducted by the permittee. To assure the quality of the data generated by this monitoring, KDHE provides a laboratory certification program. The purpose of the program is to ensure that laboratory analysis conducted is done in a manner where acceptable laboratory and QA/QC procedures have been utilized by knowledgeable technical staff using proper laboratory procedures. Commercial laboratories retained to conduct analytical testing as a provision of a permit, must be certified for the specific parameter. On-site laboratories utilized by the permittee must also receive a KDHE laboratory certification. Information regarding laboratory certification requirements or to obtain a listing of certified commercial laboratories and the parameters for which they are certified can be obtained by contacting either Michelle Wade [785-296-6198] or Michelle Probasco at [7985-296-1639].

KDHE BUREAU OF WATER PROGRAM CONTACTS

Director, Bureau of Water	Karl Mueldener	785-296-5500
Water Pollution Control Permit Application	Ed Dillingham	785-296-5513
Industrial Wastewater & Stormwater Permitting	Don Carlson	785-296-5547
	Joe Mester	785-296-6804
	Eric Staab	785-296-4347
Industrial Pretreatment Program	Don Carlson	785-296-5547
	Steve Caspers	785-296-5551
Municipal Wastewater Permitting	Rod Geisler	785-296-5527
UIC Injection Wells	Mike Cochran	785-296-5560
	Kirk Hoeffner	785-296-1843
Water Wells and Water Well Contractors	Richard Harper	785-296-3565

Operator Training and Certification (Water & Wastewater)	Vickie Wessel	785-296-2076
	Teresa Schuyler	785-296-5511
Public Water Supply	Dave Waldo	785-296-5503
	Dan Clair	785-296-5516
Division of Health and Environmental Laboratories:		
Laboratory Certification	Michelle Wade	785-296-6198
	Michelle Probasco	785-296-1639

We recommend contacting the KDHE Bureau of Air and Radiation at the earliest possible date regarding the need for obtaining an air pollution control permit. If an air pollution control permit is needed, regulations may require that the permit be issued prior to starting any construction activities associated with the proposed project. You can obtain information regarding air permitting requirements by contacting Marian Massoth at (785) 296-0616.

Onsite storage tanks used for petroleum products, hazardous substances regulated by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and flammable substances regulated by the State Fire Marshall may be subject to specific regulatory requirements administered by the KDHE Bureau of Environmental Remediation - Storage Tank Section. Program specific information can be obtained by contacting Randy Carlson at (785) 296-1684.

There are a number of water related regulatory programs administered by other State agencies. If a facility proposes to utilize a surface water or groundwater source to supply the facility, water rights may be an issue. The Kansas Department of Agriculture - Division of Water Resources administers a water rights program which regulates the use and quantity of surface water and groundwater a facility can use. They also have programs which address changes to stream channels, stream obstructions, and constructing structures in flood plains. A general contact number for these programs is (785) 296-3717.

A regulatory program which KDHE does not administer, involving the on-site storage of petroleum products, is administered directly by the U.S. Environmental Protection Agency (EPA). The onsite storage of petroleum hydrocarbon products may be subject to the Spill Prevention, Control, and Countermeasure Program (SPCC Program) which, in Kansas is administered by the U.S. Environmental Protection Agency Region VII Office located in Kansas City, Kansas. EPA Region VII - Customer Service can be contacted by calling either (800) 223-0425 or (913) 551-7122.

While it may be some time before decisions are made regarding the implementation of the project, we want to direct your attention various environmental and regulatory program issues that may need to be addressed so you can take into account agency review and processing time for permits early in the project planning phase. Hopefully this information will assist you in developing a project schedule whereby permitting and environmental regulatory requirements do not create any unanticipated delays. As KDHE can never guarantee issuance of any permit, we recommend and encourage the submission of permit applications and associated materials at the earliest possible date. Should there be any questions regarding the information in this document or you desire to meet with KDHE staff, please contact Don Carlson at [785-296-5547].

Kansas Biofuel Facilities: Guide to Planning, Funding, and Regulatory Process

Building a renewable fuel facility requires careful planning and compliance with a number of local, state and federal statutes and rules and regulations. A listing of state government contacts are listed below. Please see the attached flow chart for a suggested order to make these contacts:

PLANNING, LOANS and MATCHING FUNDS

Kansas Alternative Energy Working Group

For more information on the Kansas Alternative Energy Working Group and questions about the overall regulatory process, contact the Kansas Department of Commerce's Rural Development Division.

Contact: Corey Mohn at 785-296-3034 or cmohn@kansascommerce.com.

Funding Assistance

To learn more about the Agriculture Value Added Loan program, funding for feasibility studies, business plans, and equity drives, or Economic Development Block Grants through the Community Development Block Grant program, contact the Kansas Department of Commerce's Rural Development Division.

Contact: Mari Tucker at 785-296-6080 or mtucker@kansascommerce.com.

REGULATORY ACTIONS

Above Ground Storage Tanks, Fire Protection, Life and Safety

To learn more about regulations, contact the Office of the Kansas State Fire Marshall.

Contacts: Jack Chatmon at 785-296-3401 or jack.chatmon@ksfm.ks.gov.
Stephen Fenske at 785-296-3401 or stephen.fenske@ksfm.ks.gov.

Air Quality/Emissions

To learn more about permitting requirements, contact the Kansas Department of Health and Environment, Bureau of Air and Radiation.

Contact: Terry Tavener at 785-296-1581 or ttavener@kdheks.gov.

Boiler Inspections

To learn more about the Kansas Boiler Safety Act, the Boiler Safety Program, and related regulations, contact the Kansas Department of Labor.

Contact: Steve Zink at 785-296-4386 or Steve.Zink@dol.ks.gov.

Licensing, Bonding, Motor Fuels Tax, Tax Credits

To learn more, contact the Kansas Department of Revenue.

Contact: Edie Martin at 785-296-5327 or edie_martin@kdor.state.ks.us.

Registration and Permitting of Above-Ground Storage Tanks

To learn more about regulations, contact the Kansas Department of Health and Environment, Bureau of Environmental Remediation, Storage Tank Section.

Contact: Michael Pommes at 785-296-1685 or mpomes@kdheks.gov.

Kansas Biofuel Facilities: Guide to Planning, Funding, and Regulatory Process

REGULATORY ACTIONS (cont.)

Securities Registration
To learn more about necessary registrations and filings for equity drives, contact the Kansas Office of the Securities Commissioner.
Contact: Steve Wassom at 785-296-3307 or Steve.Wassom@ksc.ks.gov.

Water and Waste Water (quality)
To learn more about permitting requirements, contact the Kansas Department of Health and Environment, Bureau of Water.
Contact: Don Carlson at 785-296-5547 or dcarlson@kdheks.gov.

Water Resource Allocation and Water Supply (quantity)
To learn more about Kansas water law and water needs for renewable fuel production, contact the Kansas Department of Agriculture's Division of Water Resources.
Contact: Ken Kopp at 785-296-3717 or Kenneth.Kopp@kda.ks.gov.

ENERGY POLICY

Agriculture
To learn more about commodities, or other agricultural policy issues, contact the Kansas Department of Agricutlure.
Contact: Lisa Taylor at 785-296-3556 or Lisa.Taylor@kda.ks.gov.

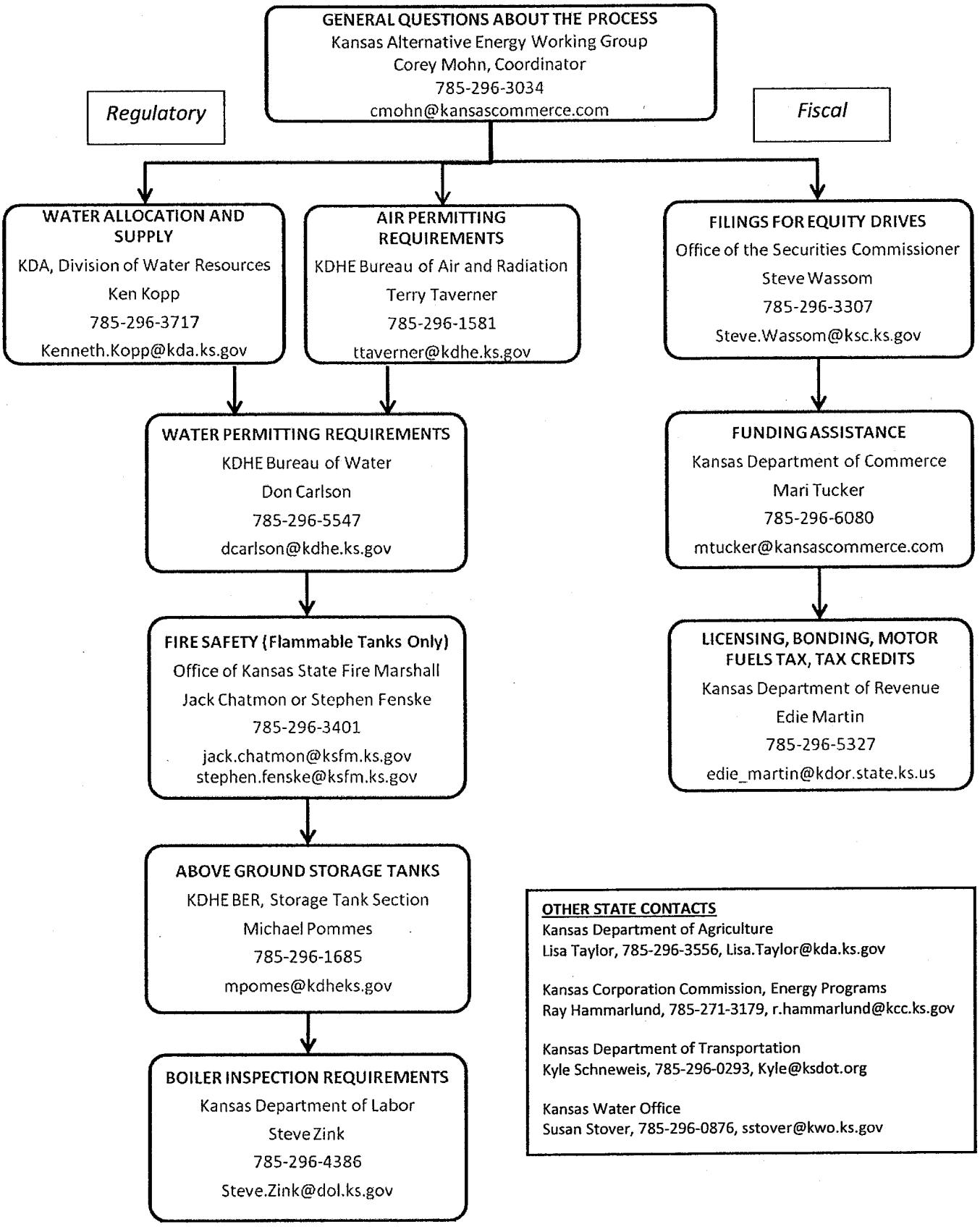
Energy Policy and Programs
To learn more about energy efficiency and other renewable energy policy and programs, contact the Energy Programs Division of the Kansas Corporation Commission.
Contacts: Liz Brosius at 785-271-3264 or l.brosius@kcc.ks.gov.
Ray Hammarlund at 785-271-3179 or r.hammarlund@kcc.ks.gov.

Transportation Issues
To learn more, contact the Kansas Department of Transportation.
Contact: Kyle Schneweis at 785-296-0293 or Kyle@ksdot.org.

Water Policy
To learn more, contact the Kansas Water Office.
Contact: Susan Stover at 785-296-0876 or sstover@kwo.ks.gov.

KANSAS ALTERNATIVE ENERGY WORKING GROUP
c/o KANSAS DEPARTMENT OF COMMERCE – RURAL DEVELOPMENT DIVISION
1000 SW Jackson Street, Suite 100, Topeka, Kansas 66612-1354
Phone: (785) 296-3034 * Fax: (785) 296-3776
TTY (Hearing Impaired): (785) 296-3487 * e-mail: cmohn@kansascommerce.com

Kansas Biofuel Facilities: Guide to Planning, Funding, and Regulatory Process



KANSAS
DEPARTMENT OF TRANSPORTATION

Mark Parkinson, Governor
Deb Miller, Secretary
http://www.ksdot.org

June 3, 2010

Mr. Bruce L. Yeager
NEPA Program Manager
Tennessee Valley Authority
400 West Summit Hill Drive, WT 11D
Knoxville TN 37902

Dear Mr. Yeager:

Secretary of Transportation Deb Miller asked that I review the information provided by the Tennessee Valley Authority (TVA) relative to the proposed purchase of renewable energy from the CPV Cimarron Wind Energy Project in Gray County, Kansas.

Your information included a Project Area Map of Phase 1 of the Cimarron Wind Energy Project. I noticed an apparent conflict between the area leased in the East half of S29 T25S R27W and a proposed improvement corridor for highway U.S. 400. In 2005, The Kansas Department of Transportation (KDOT) defined a mile wide corridor as a location for a future highway improvement between Garden City and Dodge City. The corridor would include Section 29 T25S R27W. I have attached a copy of page 29 from the concept report showing the proposed corridor in the area northeast of Cimarron.

At this time, there are no funds designated for further design work or construction in this highway corridor. The Kansas Legislature did recently pass a 10-year transportation program although projects have not yet been identified. I believe the U.S. 400 corridor should be considered in your future plans.

Thank you for the opportunity to review your proposal. Please contact me with any questions at 620.276.3241 or email at larry.thompson@ksdot.org.

Sincerely,

Larry L. Thompson, P.E.
Southwest District Engineer

Att: Page 29 US-400 Concept Report
400 106 K-8242-01

DISTRICT SIX
Larry L. Thompson, P.E., District Engineer
121 North Campus Drive; Garden City, KS 67846 • (620) 276-3241 • Fax: (620) 276-2333
Hearing Impaired - 711 • e-mail: publicinfo@ksdot.org

KANSAS

KSR&C No. 10-07-002

Kansas Historical Society
Jennie Chinn, *Executive Director*

MARK PARKINSON, GOVERNOR

June 29, 2010

A. Eric Howard
Federal Preservation Officer
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Re: Cimarron Wind Energy Project APE Concurrence, Gray County

Dear Mr. Howard:

We have reviewed the materials received June 28, 2010 regarding the above-referenced property in accordance with 36 CFR Part 800. The SHPO concurs that the proposed .5 mile APE for architectural resources is acceptable for this project. We have no objection to the submission of Phase I and Phase II information as a single volume.

Thank you for giving us the opportunity to comment on this proposal. Please refer to the Kansas State Review & Compliance number (KSR&C#) listed above on any future correspondence. Please submit any comments or questions regarding this review to Kim Gant at 785-272-8681, ext. 225 or kgant@kshs.org.

Sincerely,
Jennie Chinn
State Historic Preservation Officer

Patrick Zollner
Director, Cultural Resources Division
Deputy State Historic Preservation Officer

6425 SW 6th Avenue • Topeka KS 66615-1099
Phone 785-272-8681, ext. 205 • Fax 785-272-8682 • jchinn@kshs.org • TTY 785-272-8683
kshs.org

Cimarron

While a few southern corridors were reviewed around Cimarron, a northern corridor is chosen to deal with phased construction of crossing the Arkansas River. Nonetheless, a temporary connection is anticipated in order to accomplish phased construction. See Exhibits 54 and 55.

City of Cimarron - The corridor was selected because of reduced impacts to feed yards west of Cimarron, irrigation circles, and to reduce proximity to the airport property.

While impacts were attempted to be minimized, there are some property improvement impacted by the preferred corridor, although as a whole, they are not considered to be significant.

A temporary connection to existing US-400 may enter the Arkansas River floodplain and the Threatened and Endangered Species habitat.

Exhibit 54 Cimarron Recommended Corridor

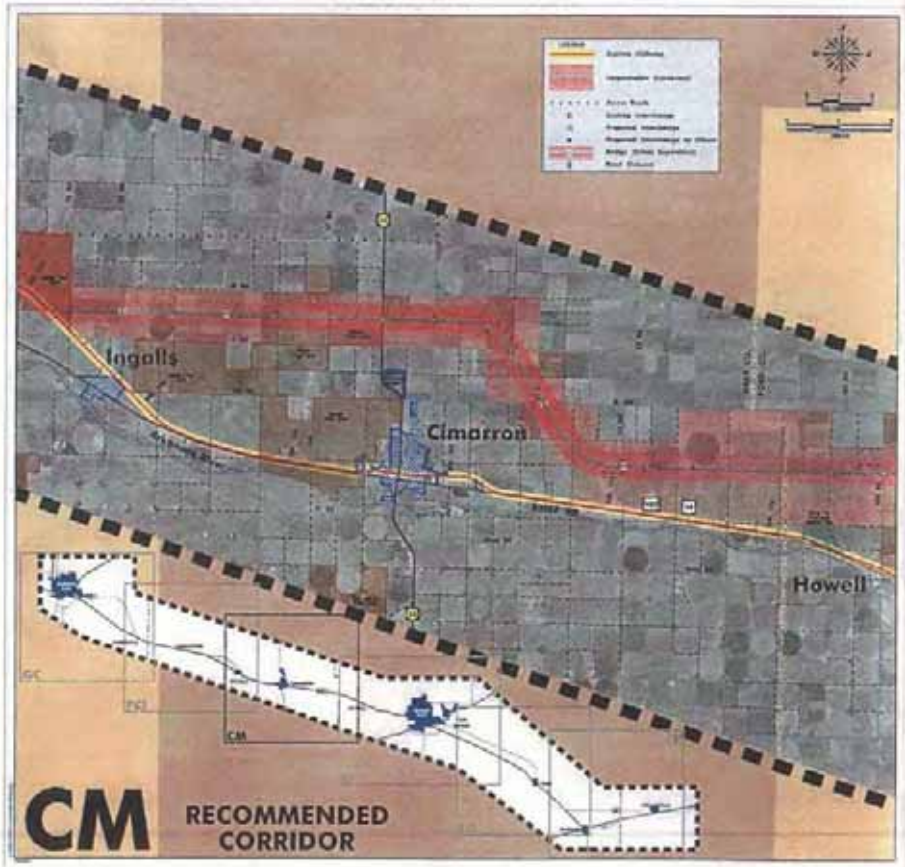
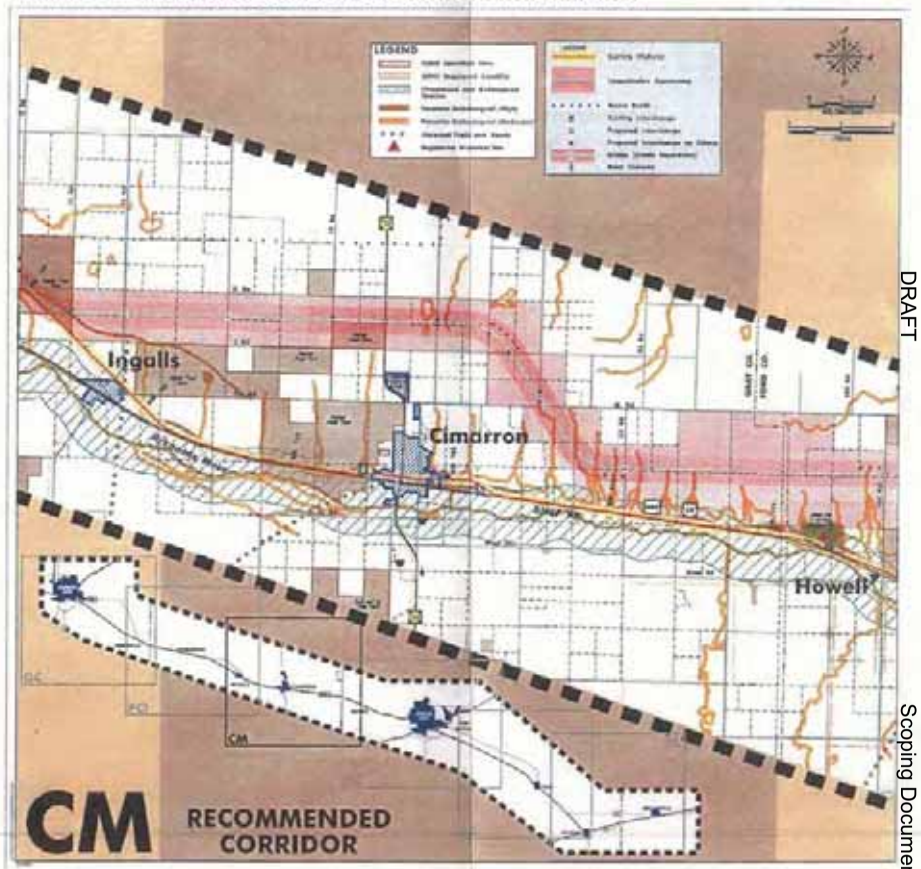


Exhibit 55 Cimarron Recommended Corridor Environmental



From: Penaluna, Stephen H NWK
To: Yeager, Bruce L;
Subject: TVA NEPA Request for Coments
Date: Thursday, May 13, 2010 4:38:34 PM

13 May 2010

Mr. Bruce Yeager,

Pursuant to our conversation this date, the Corps of Engineers has no comments to submit to the TVA on this particular action. We do anticipate however, that we will be coordinating NEPA issues with the CPV Cimarron Renewable Energy Company, LLC, as they develop their work plans and project designs.

Stephen

Stephen H. Penaluna
Regulatory Project Manager/Team Leader
Kansas State Regulatory Office
(316) 322-8247 (Ofc)
(316) 322-8259 (Fax)

United States Department of Agriculture

NRCS
Natural Resources Conservation Service
760 South Broadway
Salina, Kansas 67401-4604

Phone: 785-823-4500
FAX: 785-823-4540
www.ks.nrcs.usda.gov

May 20, 2010

Ms. Linda B. Shipp
Senior Manager
Federal Determinations
Environmental Permits and Compliance
Environment and Technology
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902-1499

Date rec'd. 5/24/10
Saved: CPV Cimarron Wind Turbines
Sent to: BLY
File: ✓

Dear Ms. Shipp:

Based on the information provided in your cover letter dated May 10, 2010, the Natural Resources Conservation Service has made the following determination on the Cimarron wind energy project in Gray County, Kansas.

☐ The project is not subject to the Farmland Protection Policy Act as no farmland is being converted to nonagricultural use.

☒ Your request needs to be accompanied with Form AD-1006, Farmland Conversion Impact Rating (or Form NRCS-CPA-106, Farmland Conversion Impact Rating for Corridor Projects) with parts I and III filled out. (Form AD-1006 is available at www.nrcs.usda.gov/programs/fppa/pdf_files/AD1006.PDF and Form NRCS-CPA-106 at www.nrcs.usda.gov/Programs/fppa/pdf_files/CPA106.pdf.) Please submit the completed form(s) and a map with the legal description of the proposed site to me at the above address or by e-mail to susie.mcbride@ks.usda.gov.

Sincerely,

Susie McBride

SUSAN M. MCBRIDE
Soil Conservationist

Helping People Help the Land

An Equal Opportunity Provider and Employer

United States Department of the Interior

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

June 2, 2010

Peggy W. Shute, Manager
Biological Permitting and Compliance
Environment and Technology
Tennessee Valley Authority
400 W. Summit Hill Drive
Knoxville, TN 37902

64411-2010-CPA-0489

RE: Environmental Assessment for CPV Cimarron Wind Energy Project in Kansas

Dear Ms. Shute:

This is in reply to your May 13, 2010 request for information and comments regarding the preparation of an Environmental Assessment of TVA's proposal to purchase power from the CPV Cimarron Wind Energy Project, located north of Highway 50 and east of Highway 23, in Gray County, Kansas. The Fish and Wildlife Service has previously provided comments regarding this wind facility to Tetra Tech EC, Inc., and a copy of our April 3, 2008 letter is enclosed for your information.

Our primary areas of concern for this and all such large-scale wind power developments in Kansas is for the potential for impacting important habitats, such as wetlands or unfragmented native prairies, as well as the potential for direct take of migratory birds or bats. Tetra Tech EC, Inc. in July 2008 completed two reports estimating the likelihood of occurrence of bats and whooping cranes at this Gray County facility location (copies of reports enclosed). Of particular interest to the Service is the likelihood of impacting the endangered whooping crane. Suitable habitat occurs within the project area, and there are documented occurrences of this large wading bird within the impacted area. It would appear, therefore, that the construction and operation of this project may adversely affect this species, either through habitat modifications or the threat of direct collisions with turbines or overhead powerlines.

Unless sufficient modifications are made that may avoid these possible sources of impact, it is my recommendation that the Service and TVA conduct a formal consultation pursuant to section 7 of the Endangered Species Act prior to completing the EA. Without completing this important step, TVA and the company may be liable for any whooping crane take that may occur at a later time.

Please also give serious consideration to the other issues raised in our April 3, 2008 letter to Tetra Tech EC, Inc. These include the presence of the federal candidate species lesser prairie-chicken, possible implications of the Migratory Bird Treaty Act, and the potential for occurrence

of bats at this location. As always, fragmentation of previously intact native habitats is a primary concern for our agency.

Thank you for this opportunity to provide input to the process of completing an EA for this project. If you have questions or require additional information, please contact me or Dan Mulhern of this office.

Sincerely,

Michael J. LeValley
Field Supervisor

enclosures

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Kansas Ecological Services Field Office
2609 Anderson Avenue
Manhattan, Kansas 66502-2801

April 3, 2008

Erika J. Roberts, Project Manager
Tetra Tech EC, Inc.
133 Federal Street, 6th Floor
Boston, MA 02110

RE: Wind Energy Project; Gray County, KS

Dear Ms. Roberts: 64411-2008-B-0368

This is in response to your March 21, 2008 letter requesting information on listed threatened and endangered species and sensitive areas in the vicinity of a proposed commercial wind farm in extreme northeast Gray County, Kansas, north of the town of Cimarron. Multiple locations are included in this proposal, including nearly the entirety of Township 24, Ranges 27 and 28, and Township 25, Ranges 27 and 28. No details were provided regarding the number, height or alignment of turbines proposed. The following comments are provided for your consideration.

In accordance with section 7(c) of the Endangered Species Act, we have determined that the federally-listed endangered whooping crane (*Grus americana*) may occur as a seasonal migrant through Gray County, utilizing various open water areas for roosting and grain fields for foraging. The Arkansas River, a primary stopover site, is located immediately south of the proposed development area, and numerous playas and other wetlands appear on the quadrangle map provided with your letter. Siting turbines in close proximity to water sources could result in a higher likelihood of creating a collision hazard for this large bird, either with turbines themselves or with overhead powerlines associated with such developments. These concerns may make this site infeasible for a wind farm.

The candidate species lesser prairie-chicken (*Tympanuchus pallidicinctus*) may also occur in the vicinity of the project alignment. This species utilizes shortgrass and sandsage prairie for nesting and brood rearing, and forages in grain fields during the winter. Candidate species are those for which the Fish and Wildlife Service has substantial information to indicate they warrant protection under the Endangered Species Act. Proposed rules to begin the process of implementing this legal protection may be initiated at any time for these species. Research has shown that nesting prairie-chicken hens may exhibit a behavioral avoidance of tall vertical structures such as towers. Therefore, although the footprint of an individual turbine tower may be small, each tower can create a zone of avoidance extending for as much as a mile in every direction. You should request information from the Kansas Department of Wildlife and Parks regarding prairie-chicken populations and habitat in this area.

The Migratory Bird Treaty Act prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized

by the Department of the Interior. Takings could result from projects in prairies, wetlands, stream and woodland habitats, and those that occur on bridges and other structures if swallow or phoebe nests are present. While the provisions of MBTA are applicable year-round, most migratory bird nesting activity in Kansas occurs during the period of April 1 to July 15. However, some migratory birds are known to nest earlier than this (e.g., hawks and owls) and some later (e.g., goldfinches). If the proposed project appears likely to result in the take of migratory birds, I recommend a field survey during the nesting season of the affected habitats and structures to determine the presence of active nests. Our office should be contacted immediately for further guidance if a field survey identifies the existence of one or more active bird nests that you believe cannot be avoided temporally or spatially by the planned activities.

While the MBTA has no provision for allowing unauthorized take, we realize that some birds may be killed during project construction and implementation even if all reasonable measures to protect them are used. The Service's Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to minimize their impacts on migratory birds, and by encouraging others to enact such programs. It is not possible to absolve individuals, companies, or agencies from liability even if they implement avian mortality avoidance or similar conservation measures. However, the Office of Law Enforcement focuses its resources on investigating and prosecuting individuals and companies that take migratory birds without regard for their actions or without following recommendations to avoid take.

There is also a concern nationally for wind turbines in large numbers to impact migrating and foraging species of bats. We have no records or information regarding bat concentration areas in the vicinity of this proposed project, but this should be taken into consideration when designing assessment studies, in addition to concerns for migratory birds. I recommend you consult the resource information found at www.fws.gov/habitatconservation/wind.htm for measures to attempt to avoid and minimize impacts to wildlife. Although the Service is very supportive of alternative energy sources, we do not support the conversion or fragmentation of native habitats for development, especially when many acres of disturbed land are available which would result in little or no habitat loss.

Thank you for this opportunity to provide input on this proposal. Please contact Dan Mulhern (785-539-3474, ext. 109) of this office if you have additional comments or questions.

Sincerely,

Michael J. LeValley
Field Supervisor

cc: KDWP, Pratt, KS (Environmental Services)

Whooping Crane Likelihood of Occurrence Report for the Cimarron Wind Energy Project Gray County, Kansas

Prepared For:

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

Prepared By:

Tetra Tech EC, Inc.
133 Federal Street, 6th Floor
Boston, Massachusetts 02110

July 2008
(Updated November 2008)

Executive Summary

The likelihood of whooping cranes occurring on or near the Cimarron Wind Energy Project (WEP) is moderate. Three factors contributed to this assessment: the Cimarron WEP is within the 95 percent-sightings migration corridor; there are reported occurrences of whooping cranes within the WEP; and there is a high proportion of suitable wetland-agriculture matrix habitat within the WEP. There is one record of two juvenile whooping cranes occurring within the WEP from October 20, 1983. An additional 9 recorded occurrences of whooping cranes with a total of 11 individual cranes have been documented within a 10-mile buffer around the WEP, including 2 juvenile cranes observed very close to the WEP boundary on October 30, 2006. Eighty-four percent of the Cimarron WEP consists of suitable wetland-agriculture matrix habitat, rending the habitat highly suitable for whooping crane stopover.

Mitigation Options

The two most likely impacts of wind development on whooping cranes are: 1) direct mortality of whooping cranes due to collisions with transmission lines, turbines, or other facilities; or 2) whooping cranes' avoidance of the area around the facility. Given the moderate likelihood of occurrence based on historic recorded occurrences of whooping cranes within and in proximity to the WEP and the high proportion of suitable whooping crane stopover habitat, Tetra Tech EC, Inc. recommends the following mitigation options:

- Mark new transmission lines and power lines related to the WEP with bird diverters and recommend that transmission owners mark the same amount of nearby non-project transmission lines in the area of the WEP with bird diverters. Bird diverters reduce collisions by 70 percent; therefore, marking only the new lines does not fully offset the potential impacts. However, marking additional lines will result in a net benefit to the species.
- To the extent that suitable stopover habitat is eliminated by the WEP, consider obtaining conservation easements for suitable stop-over habitat inside the migration corridor in Kansas. Manage these areas to provide stop-over habitat for migrating whooping cranes.

Each wind resource area is unique with respect to the relationship of the facilities with potential whooping crane habitat. Thus, mitigation is site-specific and requires detailed knowledge of the proposed WEP area and surrounding landscape as well as coordination with state and federal wildlife biologists. In the current political environment, the preferred method of mitigation may change rapidly as more information about whooping crane behavior and habitat availability becomes available.

Report prepared by David Cowell, MS, and Karl Kosciuch, Ph.D.

Site visit by James Kowalsky

Report reviewed by Jason Jones, Ph.D., and Laura Nagy, Ph.D.

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1.0 INTRODUCTION

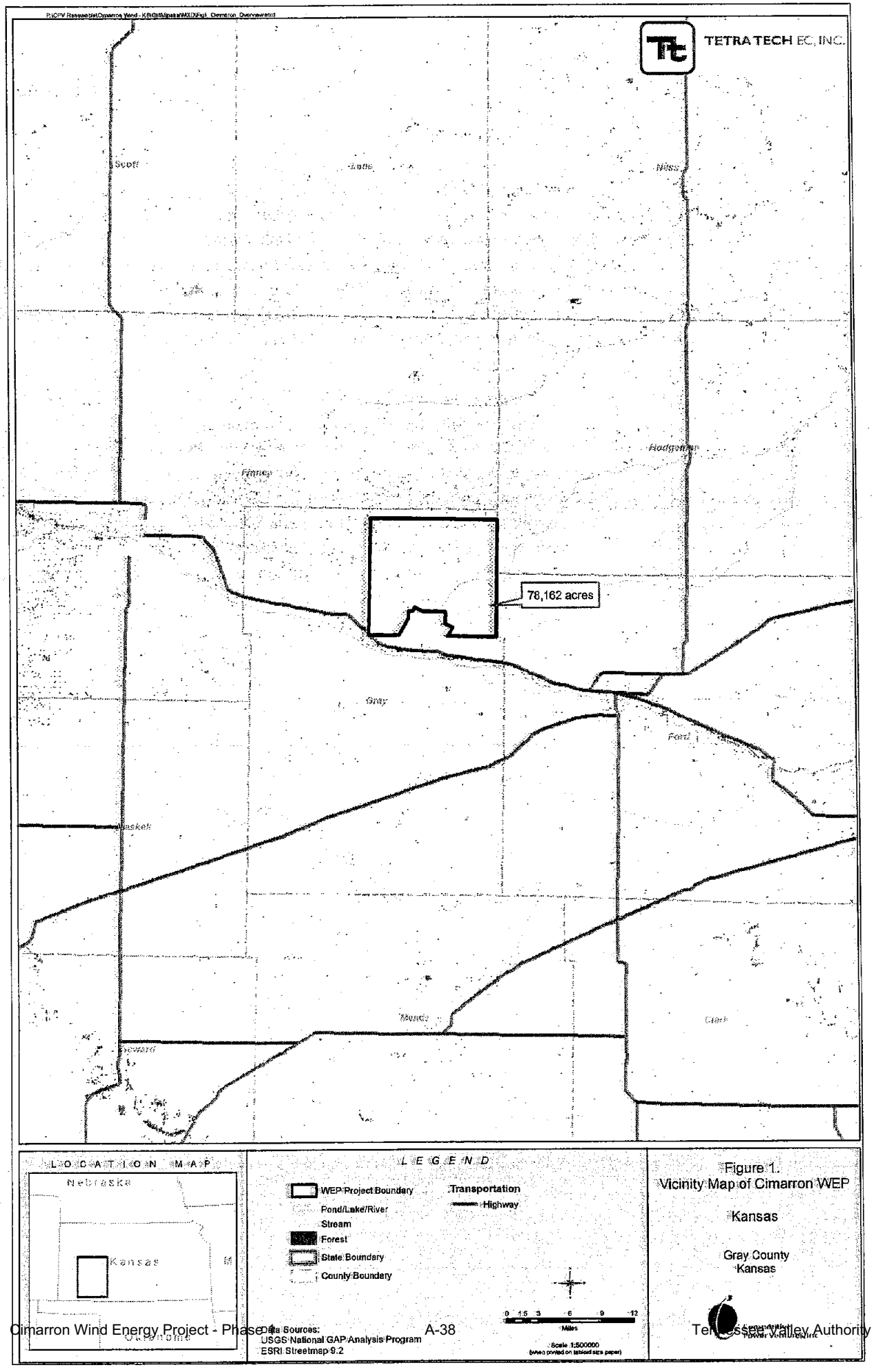
CPV Cimarron Renewable Energy Company, LLC (CPV) is currently developing plans to construct a wind energy facility in Gray County, Kansas (Figure 1). One concern when developing wind energy facilities in parts of the Great Plains is the federally endangered whooping crane (*Grus americana*). The whooping crane migrates through portions of Kansas during spring and fall. Whooping cranes have been killed by collisions with power lines, and the whooping crane recovery plan lists construction of power lines, fences, and other structures in the migration corridor as a threat to the species (Canadian Wildlife Service [CWS] and United States Fish and Wildlife Service [USFWS] 2005). Thus, the construction of wind turbines may pose a risk to whooping cranes through direct mortality or avoidance of areas where turbines are located.

To continue their efforts in environmental due diligence and to identify areas where they can minimize impacts, CPV contracted Tetra Tech EC, Inc (TtEC) to conduct a landscape-scale analysis to assess the potential occurrence and risk for whooping cranes within the Cimarron Wind Energy Project (WEP). The objective of this risk analysis is to evaluate the biological and landscape features of the WEP to determine the potential for whooping cranes to occur. Despite the small population size of whooping cranes, certain landscape features may increase the likelihood of whooping crane occurrence during migration. Thus, TtEC developed a likelihood index to evaluate the WEP based on its location in the migration corridor, the locations of historical observations of whooping cranes, the presence of feeding and roosting sites, and the availability of habitat within the WEP compared to the surrounding landscape. The likelihood index does not predict how many whooping cranes will occur in the WEP; rather it scores the site based on a suite of variables that are related to whooping crane occurrence. Higher scores denote higher potential risk.

2.0 LEGAL STATUS OF THE WHOOPING CRANE IN THE UNITED STATES

The whooping crane is protected by both state and federal laws in the United States. It was considered endangered in the United States in 1970 and the endangered listing was 'grandfathered' into the Endangered Species Act (ESA) of 1973, which prohibits "take" (CWS and USFWS 2005). "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (16 U.S.C. §1532(19)). Thus, mortality of a whooping crane at a wind facility would be considered take, even if the mortality was an unintended consequence of otherwise legal activities, and the wind power developer could be prosecuted by the USFWS. To TtEC's knowledge, no wind developer or utility has been prosecuted for crane collisions with transmission lines. The whooping crane is also considered a state-endangered species by the Kansas Department of Wildlife and Parks (KDWP 2008).

The whooping crane population in North America has experienced sharp declines and disappearance from most of its historic range (CWS and USFWS 2005). 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 2005). Activities such as habitat destruction, hunting, and displacement due to anthropogenic activities likely lead to widespread population declines (CWS and USFWS 2005). 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 National Wildlife Refuge along the


P:\CPV Renewable\Cimarron Wind - KS\GIS\Spatial\MXD\Fig1_Cimarron_Overview.mxd
TETRA TECH EC, INC.
Scott
Lane
Ness
Finney
Hodgeman
78,162 acres
Gray
Ford
Haskell
Meade
Clark
Seward
LOCATION MAP
Nebraska
Kansas
Oklahoma
LEGEND
WEP Project Boundary
Pond/Lake/River
Stream
Forest
State Boundary
County Boundary
Transportation
Highway
0 1.5 3 6 9 12
Miles
Scale 1:500000
(when printed on tabloid size paper)
Data Sources:
USGS National GAP Analysis Program
ESRI Streetmap 9.2
Figure 1.
Vicinity Map of Cimarron WEP
Kansas
Gray County
Kansas

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 236 (WCCA 2008).

3.0 ENVIRONMENTAL SETTING AND PROJECT AREA DESCRIPTION

3.1 Environmental Setting

The proposed WEP is located in southwestern Kansas in Gray County. The regional topography is characterized as relatively flat with some shallow stream drainages and a range in elevation from about 2,700 to 2,800 feet above mean sea level (TtEC 2008). The United States Geological Survey (USGS) 1:100,000 scale quadrangle for the region is the Dodge City Quadrangle.

Only a few water courses are present in the region, including Buckner Creek, which passes through the eastern portion of the WEP, and the Arkansas River, located approximately 1.5 miles south of the WEP. The Ogallala/High Plains Aquifer underlies the entire WEP area, and a large portion of western Kansas, as a whole. The WEP lies primarily within the Buckner Watershed (HUC 11030006), though northern portions of the WEP may drain into the Pawnee Watershed (HUC 11030005), and southern portions of the WEP may drain into the Arkansas-Dodge City Watershed (HUC 11030003).

According to the 2000 United States Census Bureau (USCB), the largest industries in Gray County are agriculture, forestry, fishing and hunting, and mining (23.6 percent), and educational, health, and social services (19.1 percent). Other substantial industries include retail trade (9.1 percent), construction (8.8 percent), transportation, warehousing, and utilities (6.6 percent), manufacturing (6.3 percent), and wholesale trade (5.2 percent) (USCB 2000). A 170-turbine, 110-megawatt wind farm is currently operating in the central portion of Gray County. Developed by Florida Power and Light (FPL) Energy, Aquila, Inc. is the power purchaser of the Gray County Wind Farm, which is located northeast of Montezuma (Aquila, Inc. 2008). No major national or state parks or forests are located in the region.

3.2 Project Area Description

The WEP area consists of a roughly rectangular, approximately 11 mile by 12 mile, 78,162-acre region of rural land in Foote Township, an unincorporated portion of Gray County. The WEP area is located southwest of central Kansas, 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 WEP area extends northward from the village of Cimarron and bluffs above the Arkansas River for 11 miles to the headwaters of Bunker Creek, and encompasses sections from Township (T) 24 South (S) Range (R) 27 West (W), T24S R28W, T25S R24W and T25S R28W. The Town of Ingalls, an incorporated part of Gray County, borders the southwestern corner of the WEP.

According to the Kansas Geographic Analysis Program (GAP), primary plant communities within the WEP area boundaries include:

- 81 percent cultivated land;
- 10 percent Conservation Reserve Program (CRP);
- 4 percent shortgrass prairie; and
- 2 percent western wheatgrass (*Pascopyrum smithii*) prairie.
- There are also small (less than one percent cover each) areas of cottonwood (*Populus* spp.) floodplain, alkali sacaton (*Sporobolus airoides*) prairie, sandsage (*Artemisia filifolia*) shrubland, marsh, and salt cedar (*Tamarix* spp.) according to the GAP data (KGCC 2007).

4.0 WHOOPING CRANE BIOLOGY

The whooping crane is a long-lived species that may reach 28 years old in the wild (Binkley and Miller 1983). Individuals reach sexual maturity at 3 to 5 years of age and form life-long breeding pairs while on the wintering grounds or during spring migration (Stehn 1997, CWS and USFWS 2005). Whooping cranes have low annual reproductive output. Females typically lay 2 eggs, but only 10 percent of families arrive on the winter grounds with 2 chicks because the smaller chick usually dies within the first two weeks after hatching (CWS and USFWS 2005). 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 2005).

4.1 Reasons for the Population Decline

Populations of long-lived species with low annual reproductive output such as the whooping crane are sensitive to changes in adult survival (Stahl and Oli 2006). Hunting, especially during spring migration, from 1870 to 1930 resulted in 274 documented whooping crane fatalities (Allen 1952). In addition, Hahn (1963) tallied 309 mounts and 9 skeletons in museum collections throughout the world. Because many of these specimens do not contain information regarding the date and location of collection, it is unlikely that the majority were collected by museum personnel. It is possible that mortality from shooting exceed annual production of juveniles during the early 1900s (CWS and USFWS 2005).

Degradation and loss of breeding habitat eliminated the whooping crane from much of its core breeding range in North America. Whooping cranes once bred from the southern edge of Lake Michigan north through southern Minnesota to northeastern North Dakota through Manitoba, Saskatchewan, and Alberta (Allen 1952). Conversion of prairie and pothole ecosystems to agriculture and ranching made much of the breeding habitat unsuitable (CWS and USFWS 2005). Due to their high degree of site fidelity, members of the Aransas-Wood Buffalo Population are unlikely to naturally recolonize the historic whooping crane range in North America.

4.2 Threats to Whooping Cranes

Several factors threaten the whooping crane because of its small population size and concentration of all members of the Aransas-Wood Buffalo National Park population at breeding and wintering locations. Threats to the whooping crane identified in the recovery plan that are related to wind power development include collision with power lines, fences, and other structures, and loss and degradation of stop-over and wintering habitat (CWS and USFWS 2005).

Power lines pose a major 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 2005, Stehn and Wassenich 2006). The majority of documented fatalities during migration are due to collision with power lines. Since 1956, 30 whooping cranes have been killed or seriously injured as a result of collisions with power lines (Stehn and Wassenich 2006). Further, 2 of 9 radio-marked whooping cranes died within the first 18 months of life as a result of power line collisions. Collisions with power lines have resulted in fatalities of whooping cranes in other experimental populations that are maintained by the introduction of captive-reared young. Fourteen individuals from the Florida non-migratory population and 1 individual in the migratory Wisconsin population have died from colliding with power lines.

Although whooping crane mortality has not been attributed to wind turbines, the whooping crane recovery plan considers wind power development within the whooping crane migration corridor a threat because of the construction of power lines and associated structures (CWS and USFWS 2005). It is unknown how whooping cranes will respond to the presence of wind turbines. Tom Stehn (USFWS; pers. comm., 2006) believes 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 stop-over habitat.

5.0 WHOOPING CRANE MIGRATION

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, Canada, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and reach the wintering ground on the Texas coast. The migration route is well defined and 94 percent of all observations occur within a 200-mile wide corridor during spring and fall migration (CWS and USFWS 2005, Figure 2). Whooping cranes may occasionally travel with sandhill cranes during migration, and stop-over sites used by sandhill cranes may indicate potential whooping crane stop-over areas (CWS and USFWS 2005).

During migration, whooping cranes can occur where suitable habitat is available. Some sites in the migration corridor are used consistently and have high annual use. Four traditional stop-over sites are found in Nebraska (Platte River), Kansas (Cheyenne Bottoms Wildlife Management Area, Quivira National Wildlife Refuge), and Oklahoma (Salt Plains National Wildlife Refuge). These sites are designated as critical habitat under the Endangered Species Act (CWS and USFWS 2005).

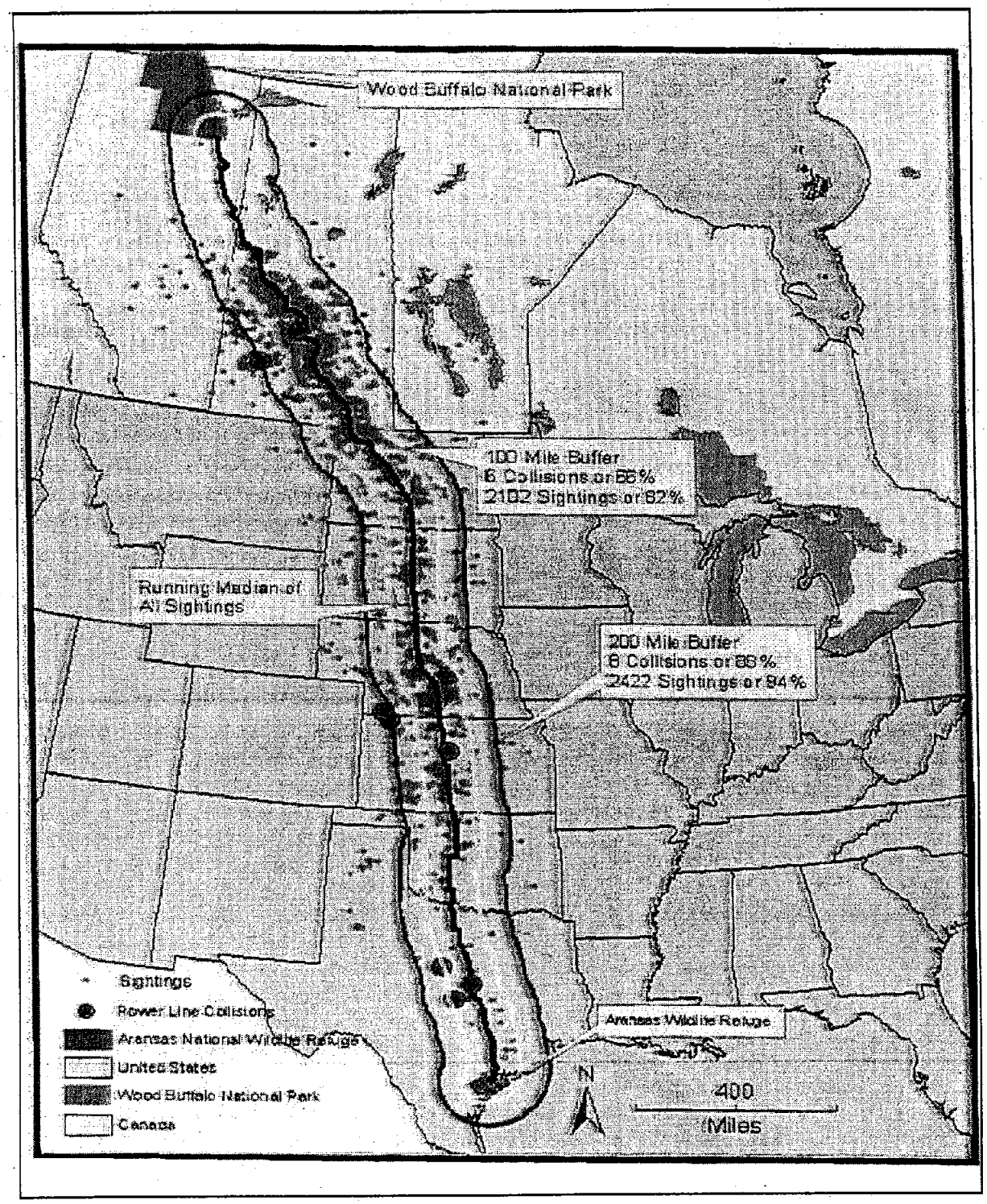
5.1 Fall Migration

Whooping cranes depart the breeding grounds at Wood Buffalo National Park in mid-September and parents with young are usually the last to depart. 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 2 to 4 weeks before resuming migration. During fall migration, birds may stay at traditional stop-over sites for 7 to 10 days, but stays as long as 6 weeks have been documented at Quivira National Wildlife Refuge (D. Hilley, pers. comm., 2007). The majority of whooping cranes reach the wintering grounds by mid-November. In Kansas most sightings occur from early October to mid-November; peak migration occurs around October 27 (Austin and Richert 2001).

5.2 Spring Migration

Whooping cranes depart the wintering ground at Aransas National Wildlife Refuge 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 2 to 4 weeks. Traditional stop-over sites that are used in fall are also used in spring. However, individuals spend fewer days at stop-over sites during spring migration. Whooping cranes travel through Kansas from late March to early May; peak migration occurs around April 12 (Austin and Richert 2001).

Figure 2. Whooping Crane Migration in North America. Source: Stehn and Wassenich (2006)



5.3 Migration Flight Behavior

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. Static soaring is energy efficient as birds seldom flap after they are airborne. 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 2006). During the end of the 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.

5.4 Stop-over Habitat Characteristics

Whooping cranes require roosting habitat when they stop during migration. They often stop at areas that are within 0.8 kilometer of human development and select sites with unobstructed visibility (Austin and Richert 2001). Palustrine wetlands (freshwater wetlands characterized by emergent vegetation) are used 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). Size of wetlands used during spring and fall migration ranges from 0.4 hectare (ha) to over 500 ha, and no seasonal use patterns are evident (Austin and Richert 2001). Although size of the wetlands used for roosting varies, water depth ranges 18 to 20 inches and little variability is found among sites.

Whooping cranes forage in wetlands and agricultural fields during migration and may commute 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, use of winter wheat was higher than other crop types in fall and 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 and 72.9 percent of roosting sites were within 0.62 mile of feeding sites in spring and fall, respectively (Johns et al. 1997).

6.0 ASSESSMENT OF WHOOPING CRANES LIKELIHOOD OF OCCURENCE

The primary threats of wind energy development to whooping cranes are mortality due to collision with transmission lines and associated structures and loss of habitat. Because of the high levels of concern regarding whooping cranes, the ability to evaluate the risk to whooping cranes at individual WEPs is a critical component to understanding the environmental impacts of a proposed wind facility. Here, TtEC presents a method used to evaluate the likelihood of whooping cranes to occur at a WEP located in southwest Kansas. This evaluation method incorporates the location of the WEP in the migration corridor, the locations of historical observations of whooping cranes, the presences of feeding and roosting sites, and the availability of habitat within the WEP compared to the surrounding landscape (Table 1). TtEC expects whooping cranes to be more likely to occur over the life of a project at WEPs with high scores, thus indicating high risk.

Table 1. Parameters used in the likelihood index calculation.

Parameter	Score	Justification
Location in the Migration Corridor (L)		
Within the 75-percent buffer	7.5	75% of all whooping crane observations occur within the 75-percent buffer
Between the 75-percent and 95-percent buffers	2.0	20% of all observations occur between 75-percent and 95-percent buffers
Outside the 95-percent buffer	0.5	5% of observations occurred outside the 95-percent buffer
Attractiveness on the Landscape (A)		
Ratio of wetlands per total acreage for WEP / wetland per total acreage for 10-mile area not including WEP	Actual ratio	Indicates if the WEP is similar (=), less (<), or more (>) attractive than the surrounding landscape to migrating cranes searching for roosting habitat
Historical Whooping Crane Observations (H)		
Within WEP	3	Whooping cranes were historically observed within the WEP
Within 10 miles of WEP	2	Whooping cranes historically in the vicinity
Within 25 miles from WEP	1	Whooping cranes historically in the area
Presence of Foraging and Roosting Habitat (W)		
Proportion of WEP that is a wetland-agricultural matrix	Actual proportion	Indicates the proportion of the WEP that is favored by cranes for foraging and roosting habitat

For the purposes of this report, the scores calculated for each parameter were totaled and the likelihood of occurrence for whooping cranes in the Project Area was ranked accordingly: Low (0-4); Moderate (5-10); High (10+).

6.1 Location of a WEP in the Migration Corridor (L)

Biological Justification

The location of a potential wind facility influences the likelihood of whooping crane occurrence due to the well defined migratory pattern of the cranes. The median location of all crane observations was statistically derived and was used to describe the migration route from the breeding grounds to the wintering grounds (CWS and USFWS 2005). Buffers were then calculated based on the percentage of observations (Figure 3). For example, 75 percent of all observations occurred within the 75-percent buffer. If two sites are compared, whooping cranes are more likely to stop over at a site within the 75-percent buffer than at a site outside the 95-percent buffer.

Scoring

TtEC developed scores for the location of a WEP based on the percent of observations within each buffer. If a WEP fell within the 75-percent buffer, it was scored 7.5. If a WEP fell between the 75-percent and 95-percent buffers, it was scored 2.0 because 20 percent of all observations occur between these buffers. If a WEP fell outside of the 95-percent buffer, it was scored 0.5 because 5 percent of all observations occur outside the 95-percent buffer.

Assumptions

- The likelihood of whooping crane occurrence in the future will not deviate from the patterns observed through 2007.

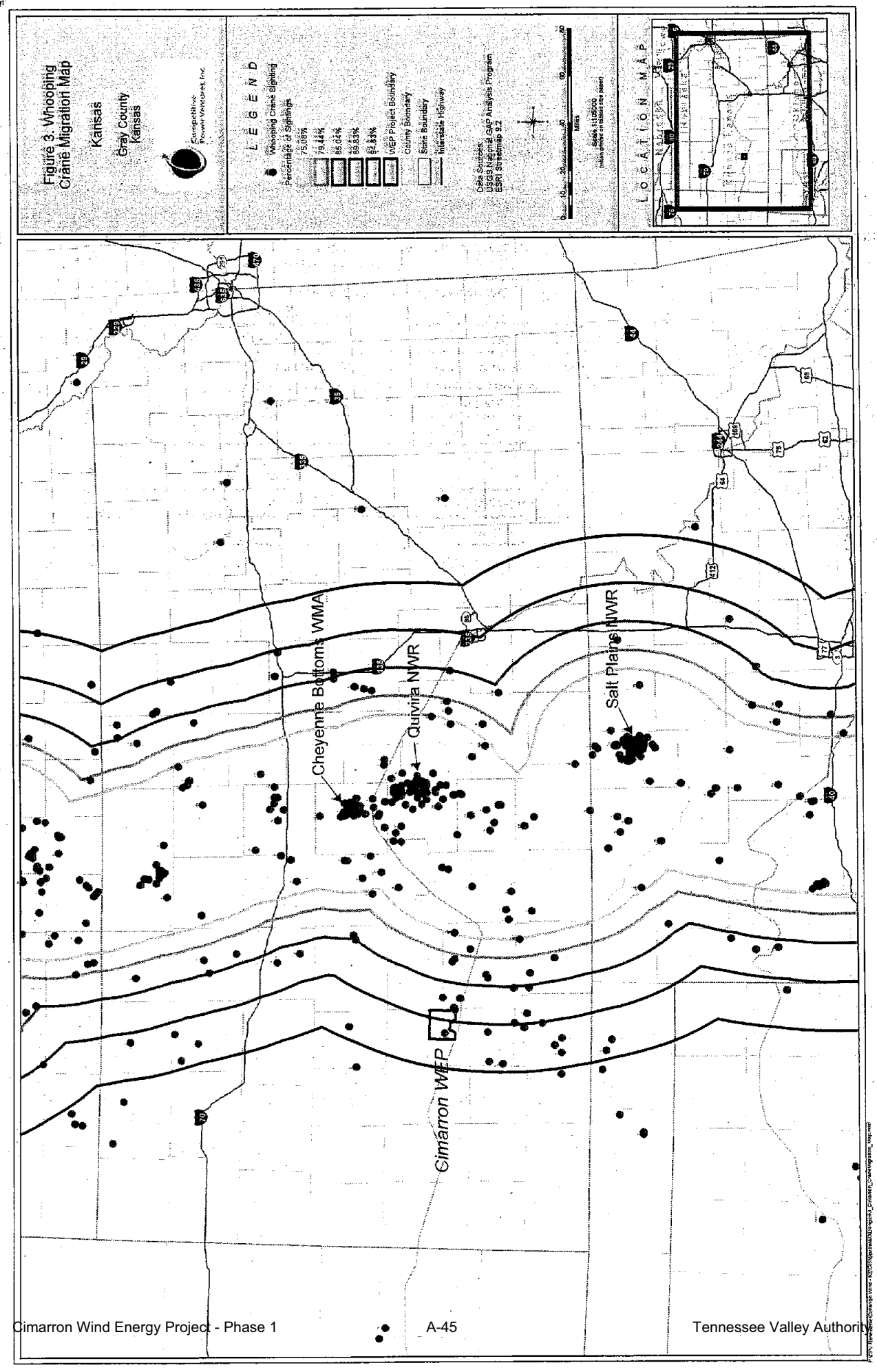


Figure 3. Whooping Crane Migration Map
Kansas
Gray County Kansas
Competitive Power Ventures, Inc.
LEGEND
Whooping Crane Sighting
Percentage of Sightings
75.06%
79.44%
85.04%
89.83%
94.85%
VEP Project Boundary
County Boundary
State Boundary
Interstate Highway
Data Sources:
USGS National GAP Analysis Program
ESRI Streetmap 9.2
Miles
LOCATION MAP
Cheyenne Bottoms WMA
Quivira NWR
Salt Plains NWR
Cimarron WEP

If a portion of the WEP fell on the boundary of a buffer or in two buffers, the WEP was assumed to be within the buffer closer to the middle of the migratory corridor.

6.2 Attractiveness on the Landscape (A)

Biological Justification

Wetlands are used by whooping cranes for feeding and roosting and the amount of wetlands within the WEP compared to the surrounding landscape may influence whooping crane use of a site during migration. After whooping cranes have descended from migration flight altitudes, they may travel up to 10 miles in search of suitable roosting habitat (T. Stehn, pers. comm., 2006). Therefore, TtEC determined if each WEP contained a higher proportion of wetlands than is found within the 10 miles surrounding the WEP to determine if the WEP is more attractive than the surrounding area.

Scoring

TtEC used GAP data for Kansas to determine the total acreage of wetlands within the WEP and within 10 miles of the WEP. TtEC then calculated the proportion of the total acreage of the WEP that was comprised of wetlands and the proportion of the total acreage of a 10-mile area around the WEP that was wetlands (excluding the WEP). TtEC divided the proportion of the WEP that was wetlands by the proportion of the 10-mile buffer that was wetlands to determine if the WEP contained more wetlands than the surrounding area. TtEC used the ratio as the score in the likelihood index equation. If the ratio was >1, the WEP contained more wetlands and is more attractive than the surrounding 10-mile buffer. If the ratio was equal to 1, the WEP contained a similar proportion of wetlands and is as attractive as the surrounding 10-mile buffer. If the ratio was <1, the WEP contained less wetlands and is less attractive than the surrounding 10-mile buffer.

Assumptions

- The distribution of wetlands in the Geographic Information System (GIS) data is an accurate representation of the location of wetlands in the WEP.
- Wetlands are "available" and "suitable," regardless of type, size, or location.
- 10 miles is an appropriate scale to examine whooping crane habitat use.

6.3 Historical Whooping Cranes Observations (H)

Biological Justification

Whooping cranes are readily identified by biologists and bird watchers and tend to be conspicuous on the landscape and thus are well documented for a rare species during migration. The United States Geological Survey (USGS) has compiled a report documenting the locations and habitat of whooping cranes during migration from 1943-1999 (Austin and Richert 2001). These observations indicate that a whooping crane, or group of whooping cranes, was seen at some point between 1943 and 1999. The USFWS has produced an updated map showing the location of whooping crane observations though 2007 (Figure 3). It is important to note that while these are the best data available, they are largely non-standardized and incidental; as such these data are not suitable for assessing habitat preferences or shifts in migration patterns.

Scoring

TtEC developed scores for the historical observations of whooping cranes in relation to the location of the WEP. Because the occurrence of 1 whooping crane at a WEP is significant and because of the bias associated with the observations, TtEC did not place weight on the number of observations, only on the

general distance of the nearest observation to a WEP. If at least 1 observation occurred on or within the project boundary, it was scored 3; if at least 1 observation occurred within 10 miles of the boundary, it was scored 2; if at least 1 observation occurred within 25 miles of the boundary, it was scored 1.

Assumptions

- Whooping crane locations represent the best approximate location of the observation.
- The locations in the report and the map provided by the USFWS represent the full extent of whooping crane locations known to the USGS and USFWS.
- Each observation is at least one whooping crane, although some observations may represent groups of whooping cranes.
- Because spatial data were not available, whooping crane locations were digitized from maps and therefore the actual location may not be depicted exactly on the maps presented.

6.4 Presence of Foraging and Roosting Sites (W)

Biological Justification

Whooping cranes often make low altitude flights between roosting and foraging habitat and are thus at risk of collision with power lines and other structures (CWS and USFWS 2005, Stehn and Wassenich 2006). Austin and Richert (2001) found that agricultural crops, especially corn, sorghum, and winter wheat were the habitat most often contiguous to roosting areas and that most cranes traveled 0.62 miles from a roosting site to a foraging site. Therefore, wetlands located within 0.62 mile of agricultural crops form a wetland-habitat matrix that is often used by whooping cranes during migration (Austin and Richert 2001). TtEC determined the proportion of the WEP that was comprised of wetland-agricultural matrix. TtEC included waterbodies of any type (hereafter wetlands), but restricted the analysis to wetlands greater than 1 acre because most observations of cranes occurred at areas >1.0 acre (Austin and Richert 2001). TtEC limited the analysis to crop agriculture because it is most often used for feeding habitat and restricted the analysis to agriculture >1 acre because most observations of cranes occurred in agriculture >1.0 acre (Austin and Richert 2001).

Scoring

To quantify the amount of roosting and foraging habitat in a WEP, geographic information system (GIS) landcover data (GAP data) was obtained for Kansas (Fisher and Gregory 2001). Water features and the spatial extent of waters were verified with National Wetlands Inventory (NWI) data (Stahlecker 1992). The GIS analysis was designed to calculate the total area of wetland-agricultural matrix, which may include other habitat types between patches of wetlands and agriculture. Thus, based on the size restrictions and spatial configuration, the total acres of wetland-agricultural matrix could be greater or less than the sum of the acres of wetland and agriculture. TtEC calculated the proportion of the WEP that was wetland-agricultural matrix by dividing the total acres of wetland-agricultural matrix by the total acres of the WEP. TtEC used the proportion as the score in the likelihood index; therefore, scores may range from 0 to 1.

Assumptions

- The optimal distance of foraging habitat from roosting habitat is 0.62 mile.
- Wetlands and agricultural areas in the dataset are considered "available" and "suitable," regardless of type or location.
- Habitats not classified as wetlands or agriculture are of neutral value and do not influence the availability of wetlands or agriculture on the landscape.

6.5 Likelihood Index Formula (LI)

The likelihood index of whooping cranes occurring at the WEP was calculated by evaluating the landscape features in and around the WEP. TtEC used the following formula to calculate the likelihood index:

$$LI_i = (L_i \times A_i) + H_i + W_i$$

Where Li = location of WEP in relation to the migration corridor score, Ai = attractiveness score, or the ratio of wetlands in a WEP to wetlands in a 10-mile area around a WEP, Hi = historical observation score, and Wi = wetland-agricultural matrix score. The equation places the most weight on the location in the migration corridor because of the wide range of scores (8.2, 1.2, 0.6). Thus, a WEP within the 100-mile corridor will tend to score higher than a WEP within the 200-mile corridor unless the attractiveness score for the WEP within the 100-mile corridor is low (e.g., <0.50) or the attractiveness score for the WEP within the 200-mile corridor is high (>4.0), when other values are equal. WEPs located outside of the 200-mile corridor will tend to score low unless the attractiveness score is high because the location score is less than 1.0.

6.6 Site Visit

To better assess the habitat of the WEP, TtEC made a two-day visit to the WEP on October 31 and November 1, 2008. The purpose of this visit was to ground truth the desktop-identified wetland locations and to evaluate the quality of the wetlands with respect to whooping crane foraging and roosting requirements. Each of the wetlands was surveyed as to the condition (natural or human-made), water capacity (full to empty), and shoreline condition (open to obscured with vegetation). The timing of the site visit coincided with the fall whooping crane migration period in Kansas.

7.0 WEP RISK ASSESSMENT AND SUMMARY

The likelihood index score for the Cimarron WEP was 6.0 (Table 2) implying a moderate likelihood of occurrence. The historical reported occurrence of whooping cranes within the WEP and the high proportion of suitable wetland-agriculture matrix habitat within the WEP were the primary factors that influenced the moderate likelihood index score for the WEP.

Table 2. Likelihood index scores for the Cimarron WEP in Gray County.

Location in the Migration Corridor (*L*)	Attractiveness on the Landscape (*A*)	Historical Whooping Crane Observations (*H*)	Presence of Foraging and Roosting Habitat (*W*)	Likelihood Index Score (*LI*)
2.0	1.1	3.0	0.84	6.0

The whooping crane observations should be used for general inference regarding use of an area and cannot be used for micrositing features away from whooping crane sightings because some of the observations may lack precise locations. Further, the absence of a sighting in a specific area should not be construed as a whooping crane having never occurred in that area. There is one record of two juvenile whooping cranes occurring within the WEP reported on October 20, 1983 (Austin and Richert 2001); therefore the Historical Whooping Cranes Observations value (*H*) was 3. There have been an additional 9 recorded occurrences of whooping cranes with a total of 11 individual cranes within 5.5 miles of the

proposed WEP boundary, including 2 juvenile cranes observed within 0.25 mile of the WEP on October 30, 2006.

Eighty-four percent of the Cimarron WEP consists of suitable wetland-agriculture matrix habitat, of which 770 acres are wetlands; therefore the Presence of Feeding and Roosting Sites (*W*) value was 0.84 (Figure 4). The Cimarron WEP is located between the 75-percent and 95-percent buffers; therefore the Location (*L*) parameter was 2.0. The percentage of available wetlands within the WEP is slightly higher than the surrounding 10-mile buffer area, with a calculated Attractiveness on the Landscape (*A*) value of 1.1.

During the site visit, no whooping cranes were observed on or near the WEP. The majority of the wetlands from the GAP data were found to be present, more than half full of water and with open unobscured shorelines. The best habitat for cranes was observed just south of where county roads H and 16 intersect and south of the intersection of roads H and 15. This area has two large playa wetlands that were being used by migrating waterfowl and shorebirds. This localized area also has recently planted pasture lands and recently harvested agriculture crops, both of which are highly desirable for whooping crane foraging habitat. This area is also the site of the only historical observation of whooping cranes on the WEP. The least desirable wetlands were found around the Cimarron Dairy (intersection of roads G and 20). This area has a high amount of human disturbance from activities at the dairy and most of the wetlands in the vicinity are being used for cattle. The intermittent streams that run through the WEP were mostly dry and most were obscured or partially obscured by overgrown vegetation. A driving survey of the 10-mile buffer around the WEP found ~2,000-5,000 sandhill cranes roosting and foraging in open unoccupied cattle grazing fields not far from the intersections of roads C with 11 and the Gray County line road with Ingalls road (7-8 miles northwest of land under the Project's control in the WEP). While no whooping cranes were observed with the sandhill cranes, the area is considered suitable habitat for whooping cranes as both species commonly migrate and use the same types of habitat. This site visit supported our conclusion that the overall likelihood of occurrence of whooping cranes at the WEP is moderate.

8.0 REGULATORY CONSIDERATIONS

The whooping crane is listed as an endangered species under the ESA. Injury or death of a whooping crane from any WEP feature would be considered "take" under the ESA and subject to penalties. Under the ESA, the potential impact of wind facilities on whooping cranes will need to be addressed by the USFWS under section 7 of the ESA if the WEP has a federal nexus or under Section 10 of the ESA if there is no federal nexus and there is the potential of a take. Under a Section 7 consultation, the USFWS must have a finding of no significant impact in order to concur with the WEP. Under a Section 10 consultation, the applicant develops a mitigation and conservation plan to offset losses due to the proposed project by way of a habitat conservation plan (HCP), at which point the USFWS will issue an incidental take permit if they are in agreement. Currently, there are no incidental take permits or habitat conservation plans for the whooping crane. The USFWS is currently engaged in internal discussions to determine how to address the potential take of whooping cranes at wind facilities.

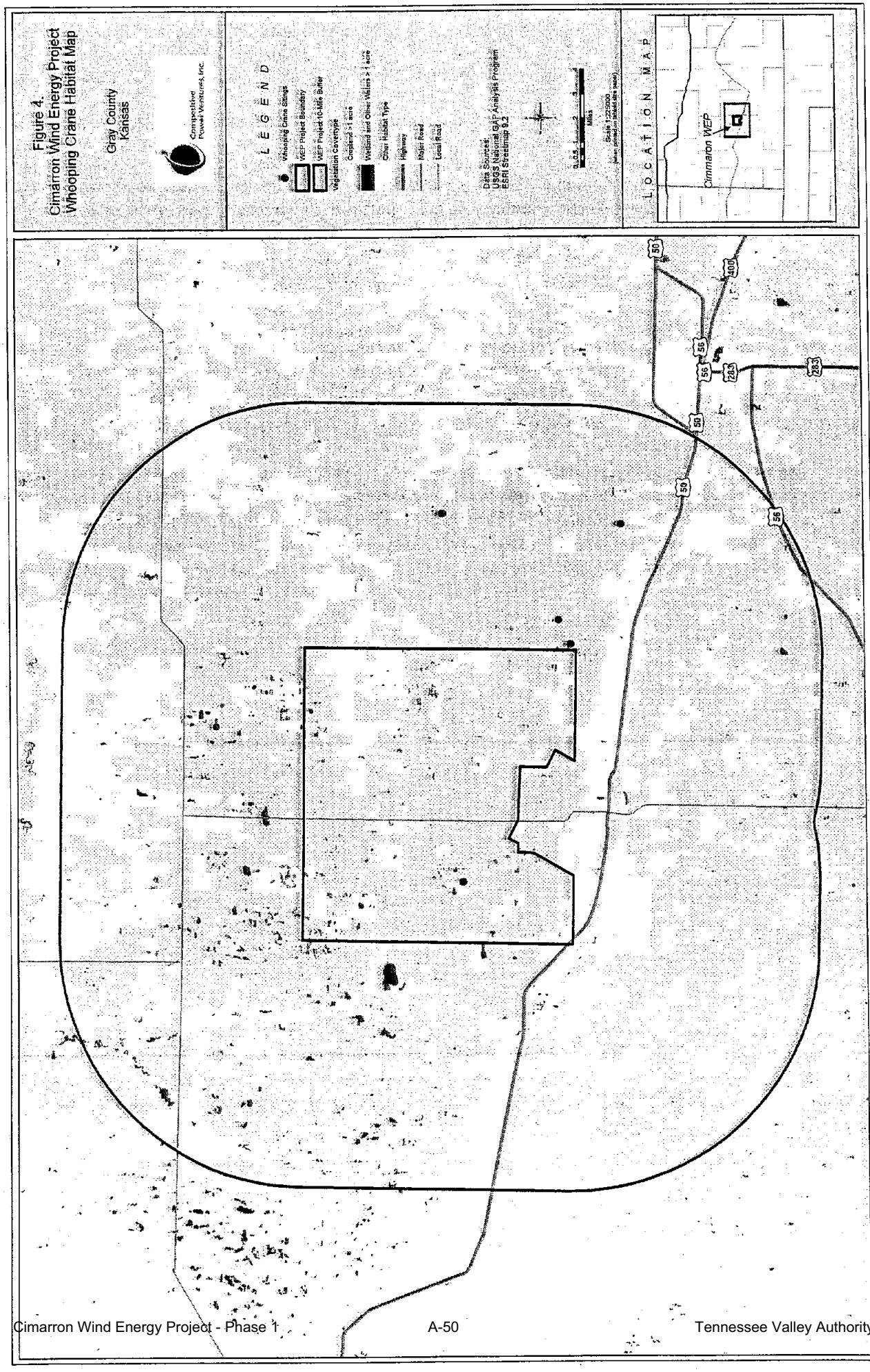


Figure 4.
Cimarron Wind Energy Project
Whooping Crane Habitat Map
Gray County
Kansas
Competitive Power Ventures, Inc.
LEGEND
Whooping Crane Sitings
WEP Project Boundary
WEP Project 10-Mile Buffer
Vegetation Covertype
Grassland >1 acre
Wetland and Other Waters >1 acre
Other Habitat Type
Highway
Major Road
Local Road
Data Sources:
USGS National GAP Analysis Program
ESRI Streetmap 9.2
Miles
Scale 1:225000
LOCATION MAP
Cimmaron WEP
56
405
55
283
50
53

9.0 RECOMMENDATIONS AND MITIGATION OPTIONS

Risk to whooping cranes inside the migration corridor can be minimized by selecting sites that are not as attractive as the surrounding landscape and that do not contain a high proportion of wetland-agricultural matrix habitat, although any wetland of suitable size may be utilized by whooping cranes. Conducting a broad scale analysis of the risks associated with potential project sites is the first step to determining potential impacts to whooping cranes.

Determining the optimal mitigation plan for whooping cranes is challenging because the actual impacts associated with the construction and operation of a wind energy project are not known. The two most likely possibilities are: 1) direct mortality of whooping cranes due to collisions with transmission lines, turbines, or other facilities; or 2) whooping cranes avoidance of the area around the facility. If avoidance of a previously utilized region occurs, the area occupied by the wind facility would constitute stop-over habitat loss. Therefore, in the former case, mitigation should be directed at increases in survival or reproduction of the cranes. In the latter case, mitigation could be directed at the creation or preservation of stopover habitat. In lieu of specific data about impacts, a range of mitigation options and additional research needed are presented below. As additional species and WEP data become available, minimization and mitigation options can be refined.

Potential Minimization and Mitigation Options:

- Mark new transmission lines and power lines related to the WEP with bird diverters and recommend that transmission owners mark the same amount of nearby non-project transmission lines in the area of the WEP with bird diverters. Bird diverters reduce collisions by 70 percent; therefore, marking only the new lines does not fully offset the potential impacts. However, marking additional lines will result in a net benefit to the species.
- To the extent that suitable stopover habitat is eliminated by the WEP, consider obtaining conservation easements or purchasing suitable stop-over habitat inside the migration corridor in Kansas. Manage these areas to provide stop-over habitat for migrating whooping cranes.

Each wind resource area is unique with respect to the relationship of the facilities with potential whooping crane habitat. Thus, mitigation is site-specific and requires detailed knowledge of the proposed WEP area and surrounding landscape as well as coordination with state and federal wildlife biologists. In the current political environment, the preferred method of mitigation may change rapidly as more information about whooping crane behavior and habitat availability becomes available.

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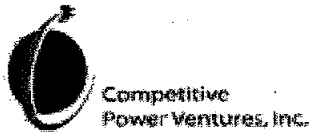
Bat Likelihood of Occurrence Report for the Cimarron Wind Energy Project Gray County, Kansas

Prepared For:



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June 2008
(Updated November 2008)

EXECUTIVE SUMMARY

Tetra Tech EC, Inc. (TtEC) was contracted by CPV Cimarron Renewable Energy Company, LLC, to assess the potential occurrence of bats at the proposed Cimarron Wind Energy Project (WEP) in Gray County, Kansas. The objective of this risk analysis was to evaluate the biological and landscape features of the WEP to determine the potential for bats to occur. Thus, TtEC developed a likelihood index based on two types of variables – habitat-based variables and species-based variables. Habitat-based variables include the amount of suitable foraging and roosting habitat, the number of natural areas, number of perennial streams, and number of human developments. Species-based variables included bat species known to occur in the region and behavioral characteristics. The likelihood index does not predict how many bats will occur or the anticipated bat mortality level, rather it scores a site based on a suite of variables that are related to bats. Bat presence is more likely to occur over the life of a project at a WEP with a higher score, thus indicating higher risk given the patterns of bat fatalities at other wind farms in the United States.

Of the 46 bat species in the United States, 18 occur in Kansas. Of these 18 species, 11 potentially occur within the proposed WEP based on known distribution ranges. None of these species are federally listed as threatened or endangered. Several species for which there are high documented levels of mortality at wind farms have ranges that overlap with the WEP site boundary; however, this is balanced by limited suitable foraging habitat within the WEP that may provide a marginal attractiveness of the WEP for migrating bats. Overall, TtEC calculates a moderate likelihood of occurrence for bat species for the WEP.

Recommendation

The precise mechanisms that determine risk of bat mortality at wind farms remain unclear. However, several guidance documents outlining bat-specific recommendations discuss the importance of preserving existing roosting and foraging habitats, minimizing the use of pesticides, maintaining interagency and stakeholder coordination, and continuing public education programs. These guidance documents vary in content but share common themes. Two of these themes are relevant to the Cimarron WEP in Kansas.

- **Preserve Forest-Aquatic Matrix Habitat**

  Locating turbines, access roads, substations, and interconnects within forest-aquatic matrix (FAM) habitats may constitute a direct loss of bat foraging and roost habitat. Minimize, to the extent practical, direct impacts to FAM habitat to retain roost and foraging habitats for bats.

- **Preserve Roost Habitat/Snag Retention**

  Agricultural practices and development activities pose a risk to the remaining forested areas in prairie habitats that bats may use for summer roosting. Minimize, to the extent practical, direct impacts to these forested areas by avoiding tree removal during construction. Snags – dead trees in the early to middle stages of decay – provide suitable habitat for tree-roosting bats and should also be retained to maximum extent possible.

Report written by: Erik Jansen and David Cowell

Site visit by: James Kowalsky

Report reviewed by: Jason Jones, Ph.D., Karl Kosciuch, Ph.D.

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1.0 INTRODUCTION

CPV Cimarron Renewable Energy Company, LLC (CPV) is currently developing plans to construct the Cimarron Wind Energy Project (WEP) in Gray County, Kansas (Figure 1). Recent monitoring studies indicate that utility-scale wind energy facilities have had greater bat mortality than was expected based on early monitoring studies where birds were the primary focus of attention (NRC 2007). The potential for bat collisions with turbines is highest in the forested regions of the eastern part of the United States (NWCC 2004); however, relatively high numbers of bat fatalities have been documented in the mixed-grass plains and agricultural regions of Iowa (Jain 2005), Oklahoma (Piorkowski 2006) and Minnesota (Johnson et al. 2004).

To continue their efforts in environmental due diligence and to identify areas where they can minimize impacts, CPV contracted Tetra Tech EC, Inc. (TtEC) to conduct an in-depth literature review and landscape scale analysis to assess the potential occurrence and risk for bat species that may occur within the WEP. Although, to date, there is no clear relationship between pre-construction occurrence and post-construction mortality, certain features of the WEP may make it more or less attractive to bats, thus increasing or decreasing the relative mortality risk. TtEC developed a likelihood index to evaluate the WEP based on the number of species potentially occurring at the WEP, the amount of suitable foraging and roosting habitat within the WEP and surrounding landscape, and several additional factors that were likely to increase the presence of bats including the presence of perennial streams, number of human developments, and number of natural areas. The likelihood index does not predict bat occurrence or mortality. Rather, it scores the WEP site based on a suite of variables that are related to occurrence and potential mortality; higher scores denote higher potential risk given the patterns of bat fatalities at other wind farms in the United States.

2.0 BATS AND WIND ENERGY

Wind energy is one of the fastest growing sectors of the energy industry (NRC 2007) and has led to unexpected levels of bat mortality (Kunz et al. 2007). Several variables may contribute to the fatalities of bats at wind facilities including, but not limited to, biology of the bat species, season, region, and turbine design (Kunz et al. 2007). Species that have the highest risk of fatalities at wind facilities are tree, foliage, or cavity roosting migratory bats (Kunz et al. 2007; Arnett et al. 2008). Nearly 75 percent of all bat fatalities have been associated with migratory tree bats including the hoary bat, eastern red bat and silver-haired bat, all three of which occur within the range of the WEP. Migratory bats travel long distances at altitudes occupied by wind turbine blades, making them susceptible to collisions. The probability of mortality events increases during periods of poor weather, such as just before or after the passing of a storm front (Arnett et al. 2008).

There is a seasonal trend with bat fatalities at wind facilities, with spikes occurring in the late summer and early autumn which coincide with fall migration or dispersing juveniles that may be more prone to collisions with structures (Johnson 2004, 2005); however, Kunz et al. (2007) speculate this is a function of intensive carcass searches during this time and not due to seasonal factors. Many, if not most, of the bat species killed at wind facilities in the United States are also residents during spring and summer months (Barbour and Davies 1969).

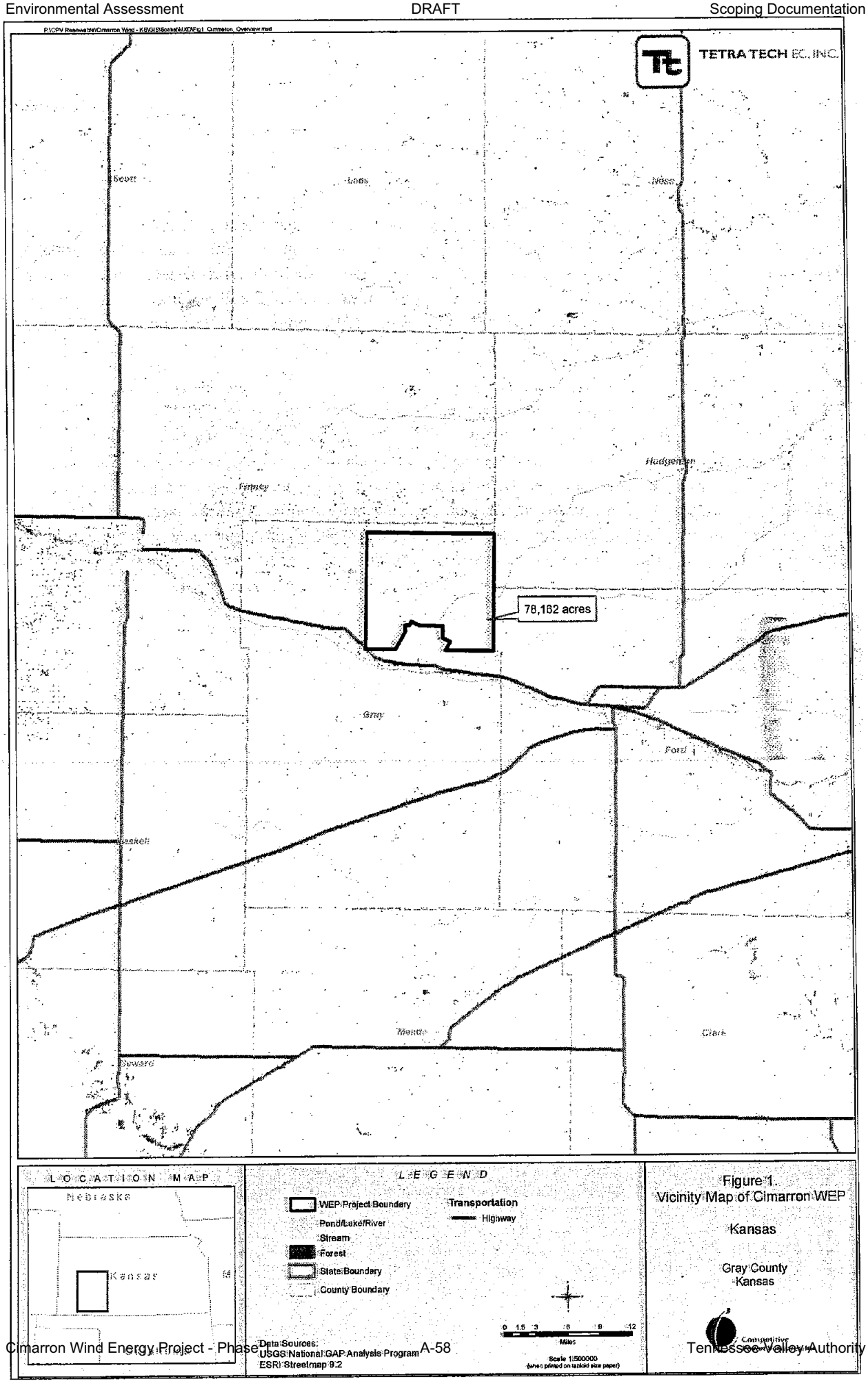

Figure 1.
Vicinity Map of Cimarron WEP

Kansas

Gray County
Kansas

There are geographic differences in fatalities/megawatt(MW)/year among bat species, ranging from 0.2 to 53.3 bats/MW/year, with the highest fatalities reported along forested ridges in the eastern United States (Arnett et al. 2008). However, relatively large numbers of bat fatalities have been reported from the agricultural regions of northern Iowa (Jain 2005) and the mixed-grass prairie of north-central Oklahoma (Piorkowski 2006). Therefore, caution must be taken in assuming that only facilities in the forested eastern United States have the potential of producing high bat fatalities because of the small number of studies to date and the possibility of other regions being underrepresented.

3.0 STATUS OF BATS IN KANSAS

Of the 46 bat species in the United States, 18 occur in Kansas (ASM 2007). Of these 18 species, 11 potentially occur within the Cimarron WEP based on known distribution ranges (ASM 2007, BCI 2008, NatureServe 2008; Table 1). None of the species found in this region are federally listed as threatened or endangered. Two species – pallid bat and Townsend's big-eared bat – are listed as Species in Need of Conservation in Kansas (KDWP 2008). A Kansas Species in Need of Conservation is defined as "any nongame species deemed to require conservation measures in attempt to keep the species from becoming a threatened or endangered species." These species are monitored by state wildlife agencies but do not receive any formal protection or regulatory provisions at a state level. Three of the 10 species that could potentially occur on the WEP – hoary bat, silver-haired bat, and eastern red bat – are highly migratory and are found in the greatest abundance in Kansas during May through September (Cryan 2003).

Bats rank among North America's least studied wildlife, yet declines in population numbers among all species have been documented since the 1960s (Tuttle 2004). Compared to bird species, there are relatively few laws that protect bats. On federal lands such as National Forests, National Wildlife Refuges, and lands administered by the Bureau of Land Management, agencies have developed habitat management guidelines and other regulations to enhance or minimize disturbance to habitats. Existing environmental laws primarily address the protection of caves and wanton destruction of wildlife. The protection and regulation of non-threatened bat species on private lands is typically left at the state wildlife agencies' discretion.

4.0 ENVIRONMENTAL SETTING AND PROJECT AREA DESCRIPTION

4.1 Environmental Setting

The proposed WEP is located in southwest Kansas, in Gray County. The regional topography is characterized as relatively flat with some shallow stream drainages and a range in elevation from about 2,700 to 2,800 feet above mean sea level (TtEC 2008). The United States Geological Survey (USGS) 1:100,000 scale quadrangle for the region is the Dodge City Quadrangle.

Only a few streams are present in the region, including Buckner Creek, which passes through the eastern portion of the WEP, and the Arkansas River, located approximately 2.5-3 miles south of the WEP. The Ogallala/High Plains Aquifer underlies the entire Project Area, and a large portion of western Kansas, as a whole. The WEP lies primarily within the Buckner Watershed (HUC 11030006), though northern portions of the WEP may drain into the Pawnee Watershed (HUC 11030005), and southern portions of the WEP may drain into the Arkansas-Dodge City Watershed (HUC 11030003).

According to the 2000 United States Census Bureau (USCB), the largest industries in Gray County are agriculture, forestry, fishing and hunting, and mining (23.6 percent), and educational, health, and social services (19.1 percent). Other substantial industries include retail trade (9.1 percent), construction (8.8 percent), transportation, warehousing, and utilities (6.6 percent), manufacturing (6.3 percent), and

Table 1. Life history, behavior, and habitat preferences of bat species likely to occur within the Cimarron WEP.

Common Name	Scientific Name	Listing Status	Abundance	Kansas Distribution	Habitat/Foraging Habits	Summer Maternity Colony Size	Bachelor Summer Roosts	Winter Hibernacula Colony Size	Winter Roosts or Hibernacula
big brown bat	*Eptesicus fuscus*	None	Common year-round resident	Statewide	A generalist, most common in deciduous forests. Adapted to human development. Forages over land and water, open areas and forests. Aerial hawking.	25–75 individuals.	Roosts in hollow trees, crevices in cliffs, buildings, bridges and bat houses.	Rarely more than a few hundred individuals.	Winters in caves, mines, and man-made structures.
eastern red bat	*Lasiurus borealis*	None	Common migratory species	Statewide	Conifer and deciduous trees in floodplain preferred. Aerial hawking.	Small family groups of 2-3 individuals.	Roosts on foliage.	Solitary; groups up prior to migration.	Not believed to winter in Kansas.
hoary bat	*Lasiurus cinereus*	None	Common migratory species	Statewide	Conifer and deciduous trees in floodplain preferred. Found near water. Aerial hawking.	Small family groups of 2-3 individuals.	Roosts on foliage.	Solitary; groups up prior to migration.	Not believed to winter in Kansas.
northern myotis	*Myotis septentrionalis*	None	Common	Eastern half and north-central portions of state	Associated with large forest galleries in floodplains, plains and badland habitat. Forages in the area of the tree canopy. Aerial hawking and gleaning insects.	Typically small numbers (5 individuals) but has been documented as up to 75 individuals in the forested areas.	Diverse range of roost substrates: tree cavities, under loose bark, in buildings, caves, mines. Seeks cooler temperatures.	Rarely more than a hundred individuals per hibernation colony.	Winters in caves and mines.
cave myotis	*Myotis velifer*	None	Uncommon year-round resident	South-central quarter of state	Deserts, grasslands, frequents watercourses.	Wide range from 50 to 15,000+, Average 2,000 to 5,000.	Roosts in caves and mines. In summer occasionally in buildings.	Large clusters, up to thousands.	Winters in caves, mines, and tunnels. Prefers moist situations.
eastern pipistrelle	*Perimyotis subflavus*	None	Uncommon year-round resident	Eastern third and southeast half of state	Weak erratic flyers, early evening foragers, often over water or shaded groves.	30-35 individuals.	Little known, probably solitary, roosts in crevices, caves, and mines.	Usually solitary.	Winters in caves and mines.
pallid bat	*Antrozous pallidus*	Kansas Species in Need of Conservation	Uncommon year-round resident	South-central edge	Arid deserts or grasslands, often near rocky outcrops and water.	Usually small, but up to 200+ individuals, sometimes include males.	Roosts in rock crevices or buildings, less often in caves, tree hollows, and mines.	Solitary or in small groups.	Narrow fissures in mines, caves, and buildings.
Townsend's big-eared bat	*Corynorhinus townsendii*	Kansas Species in Need of Conservation	Uncommon year-round resident	Southwest eighth of the state	Mesic habitats with mosaic of woodland, grassland, and/or shrubland.	Up to 200 in the west U.S. and 1000 in the east U.S.	Caves, buildings, and tree cavities.	Wide range from solitary to several hundred.	Caves and mines, prefers cold areas, often near entrances.
Mexican free-tailed bat	*Tadarida brasiliensis*	None	Common year-round resident	Statewide	Prefers desert, shrublands, and grasslands. Crepuscular, typically feeds within 50-miles of day roost, but up to 150 miles recorded.	Large colonies, sometimes > 1 million bats. Maternities less than 20,000 often are abandoned.	Abandoned buildings, caves, ridges, and rock outcrops. Sometimes cliff swallow nests.	Little known, smaller colonies than maternity roosts, some remain active overwinter in southeastern U.S.	Winters in mines and caves.
silver-haired bat	*Lasionycteris noctivagans*	None	Common	Statewide	Found in forested areas, most abundant in mature conifer forests. Forages over ponds and streams in woods. Aerial hawking.	6-65 individuals.	Roosts on tree foliage, tree cavities and under loose bark.	Usually solitary.	Winters in small tree hollows, underneath bark, in woodpiles and cliff faces.
western small-footed myotis	*Myotis ciliolabrum*	None	Uncommon year-round resident	Western tenth and northwest corner of state	Associated with cliffs and rock canyons in arid areas. Also found in ponderosa pine and mixed conifer forests. Aerial hawking and gleaning over rocks.	Solitary or 2–6 individuals.	Roosts in rock crevices, under boulders, sometimes under bark.	Small numbers usually between 1-6 individuals.	Winters in abandoned caves and mines as well as crevices in rocks.

Sources: Whitaker and Hamilton 1998, ASM 2007, USFWS 2007, KDWP 2005, BCI 2008, NatureServe 2008, and Western Bat Working Group 2008

wholesale trade (5.2 percent) (USCB 2000). A 170-turbine, 110-megawatt wind farm is currently operating in the central portion of Gray County. Developed by Florida Power and Light (FPL) Energy, Aquila, Inc. is the power purchaser of the Gray County Wind Farm, which is located northeast of Montezuma (Aquila, Inc. 2008). No major national or state parks or forests are located in the region.

4.2 Project Area Description

The Project Area consists of a roughly rectangular, approximately 11 mile by 12 mile, 78,162-acre region of rural land in Foote Township, an unincorporated portion of Gray County. The Project Area is located southwest of central Kansas, 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 extends northward from the village of Cimarron and bluffs above the Arkansas River for 11 miles to the headwaters of Bunker Creek, and encompasses sections from Township (T) 24 South (S) Range (R) 27 West (W), T24S R28W, T25S R24W and T25S R28W. The Town of Ingalls, an incorporated part of Gray County, borders the southwestern corner of the WEP.

Of the various soil types occurring in the region, the majority are variations of silty loam and, less commonly, silty clay loam or clay loam. The underlying surficial geology in the WEP is predominantly loess, with undifferentiated alluvium along stream drainages and scattered upland intermittent playa deposits.

According to the Kansas Geographic Analysis Program (GAP), primary plant communities within the Project Area boundaries include:

- 81 percent cultivated land;
- 10 percent Conservation Reserve Program (CRP);
- 4 percent shortgrass prairie; and
- 2 percent western wheatgrass (*Pascopyrum smithii*) prairie.

There are also small (less than one percent cover each) areas of cottonwood (*Populus* spp.) floodplain, alkali sacaton (*Sporobolus airoides*) prairie, sandsage (*Artemisia filifolia*) shrubland, marsh, and salt cedar (*Tamarix* spp.) according to the GAP data (KGCC 2007).

5.0 GENERAL BAT BIOLOGY

5.1 Roosting Habitat

Bats depend on roosts for hibernation, mating, rearing of young, protection from predators, and protection from adverse weather conditions (Lacki et al. 2007). Due to bats' dependence on these structures during all stages of their life cycle, they have been identified as the key factor in the survival (and consequently the decline) of bats in North America (Kunz 1982, Pierson 1998, Kunz and Lumsden 2003).

Generally, bats can be divided into three broad roosting categories: tree roosting, cave roosting, and species adapted to roosting in multiple habitats. Many bat species that are found in Kansas exhibit a seasonal shift in habitat where they may use trees for roosting in the summer and then use rocky outcrops, caves, or other structures for hibernation during the winter; other species may utilize a single habitat year-round. Studies have examined variables that influence roost selection at local (Hutchinson and Lacki 2000) and larger spatial scales (Elmore et al. 2004); however, little information is available on the roosting preferences of bats at the landscape scale (Carter and Menzel 2003, Duff and Morrell 2007). In states such as Kansas where roost habitat is limited due to the fragmentation of tree stands caused by

agricultural activities; roost availability may be a limiting factor in bat species occurrence and distribution (Carter and Menzel 2003).

5.2 Foraging Ecology

The need for resources occurs during three general life-history periods: maternity, migration, and hibernation (Lacki et al. 2007). This section focuses on foraging behavior during the summer maternity season. All the bat species found in Kansas are insectivorous and feed on a variety of prey including moths, beetles, flies, and mosquitoes – many of which are agricultural pests. Their importance for controlling these pests equates to millions of dollars in savings from loss of crops, and by minimizing the application of pesticides (BCI 2001).

Selection of resources is a hierarchical process of behavioral choices by bats that results in a differential use of habitats (Block and Brennan 1993). Resources such as type and size of foraging habitat and the selection of prey are species-specific and dependent of the species' energetic needs, sex and reproductive status. The availability and suitability of resources in a landscape may affect the size of the foraging areas and commuting distances to them (Lacki et al. 2007). Species typically choose areas high in prey concentrations in a number of diverse habitats such as riparian areas (Waldien and Hayes 2001), water bodies (Henry et al. 2002), streetlights (Rydell 1992) or forest edges; however, the commonality in most studies is the proximity to water (Carter et al. 2002).

5.3 Migration Behavior

Bat migration is defined as a seasonal, usually two-way, movement from one place or habitat to another to avoid unfavorable climatic conditions and to seek more favorable energetic conditions (Fleming and Eby 2003). This annual shift in distribution is generalized by individuals occupying northern latitudes during the summer and southern latitudes during the winter (Cryan 2003). Migratory tree-roosting species that travel long distances tend to form larger aggregations than species that exhibit partial migration or year-round residents (Fleming and Eby 2003). How species form groups is unclear, yet there is evidence that sexes separate during migration (BCI 2001, Cryan 2003). Typically, mating occurs in the fall either during migration or prior to hibernation and young are born the following spring.

6.0 ASSESSMENT OF BAT LIKELIHOOD OF OCCURENCE

The primary threats of wind energy facilities to bats are fatalities from collisions with wind turbines and loss of roosting and foraging habitat. Because of the high levels of concern regarding bats, the ability to evaluate the risk to bats at an individual WEP is a critical component to understanding the environmental impacts of a proposed wind facility. There is no clear relationship between pre-construction occurrence and post-construction mortality; however, certain features of landscapes may make them more attractive to bats. Here, TtEC presents a method used to evaluate the likelihood of bat occurrence at the Cimarron WEP in Kansas using an index. This evaluation method included the location of the use of two types of variables: habitat-based variables and species-based variables. Identifying the habitat-based variables essential to the species' requirements during roosting and foraging is key in determining the suitability of the habitat (Duchamp et al. 2004), whereas understanding the species' ecology and behavior is key in developing a model that leads to understanding the relative risk from wind energy development. Habitat-based variables include the amount of suitable foraging and roosting habitat, the number of natural areas, the number of perennial streams, and the number of human developments. Species-based variables included using bat species known to occur in the region and behavioral characteristics. For the purposes of this report, the scores calculated for each variable were totaled and the likelihood of occurrence for bats in the Project Area was ranked accordingly: Low (0-10); Moderate (10-20); High (20+). Specific details about each variable and how they were used to estimate likelihood are presented below.

6.1 Forest-Aquatic Matrix

Biological Justification

WEPs that contain a greater amount of roosting and foraging habitat are expected to be more attractive to bats. Specifically, research shows there is a strong relationship between the number of individuals and species composition with the presence of water and forests or small tree stands (Everette et al. 2001). In southwestern Kansas, roosting habitat includes trees found in forested patches, along riparian corridors, and around homesteads. Water features are typically used for foraging and include ephemeral and perennial wetlands, streams, rivers, ponds and lakes (Carter et al. 2002). For the purposes of this analysis, the foraging distance was defined as a radius of 0.8 mile, which corresponds to the average maximum foraging distance of species found in Kansas (Hutchinson and Lacki 1999). In addition, habitats within 3 miles of the WEP were evaluated to determine the attractiveness of the WEP on a landscape scale and account for species' movement into and out of the WEP's boundaries. Three miles was selected as an appropriate analysis distance because it was approximately triple the maximum foraging distance; therefore, 3 miles should provide a conservative estimate of bat use into and out of the WEP.

Scoring

To quantify the amount of roosting and foraging habitat in the WEP, Geographic Information Systems (GIS) land-cover data was obtained for Kansas. The degree of resolution incorporated in the datasets accurately depicted shelterbelts, field windbreaks and other planted woodlands represented on USGS 7.5-minute maps (National Geographic 2002). The accuracy and spatial extent of waters was verified with National Wetlands Inventory (NWI) data and hydrologic features represented on USGS topographic maps. However, it is possible that agricultural conversion and long term drought have substantially reduced the extent of hydrologic features on the site, and thereby reduced the amount of available bat habitat.

Using these datasets, minimum thresholds for habitat sizes were generated. The minimum area for forest features was set at one acre (43,560 feet^2) whereas the minimum area for water features was set at 0.004 acre (200 feet^2). All wetlands within 0.8 mile of a forested area represent a forest aquatic patch (FAP). Each habitat type (forest and wetland) included an additional 75-foot area beyond the habitat to account for foraging and flight behavior immediate adjacent to each habitat (i.e., a buffer area; Figure 2). The total area of the FAP includes the bat habitat, the buffer area around the habitats, and the area between them. The model is nonrestrictive and includes FAPs if they are within 0.8 mile of another FAP, provided an additional forested area is within the WEP. When multiple FAPs are combined, they are referred to as a forest-aquatic matrix (FAM).

The total area of FAM was calculated within and three miles surrounding the WEP separately. Areas that contained 1 to 25,000 acres received a score of 1.0, areas that contained 25,001 to 50,000 acres received a score of 2.0, and more than 50,001 acres received a score of 3.0. The greater amount of FAM in a particular WEP, the higher the score and likelihood bats would occur.

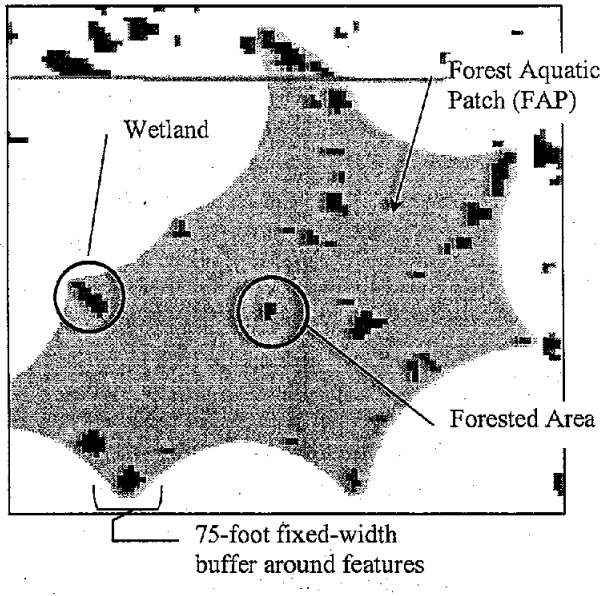

Figure 2. Representation of elements used to calculate FAP. Distance from the forested area is 0.8 mile. Multiple FAPs such as this constitute FAM.

FAM Assumptions

- The maximum foraging area includes the estimated foraging range expected by bat species found in Kansas regardless of sex, reproductive condition, age, energetic requirements or other life history traits.
- Each woodland feature in the dataset is considered available and suitable, regardless of plant species composition, age, density, or patch size. Similarly, each water feature in the dataset is considered available and suitable, regardless of type or size.
- Those habitats not classified as forest or water are considered of neutral value to bats.
- The GIS datasets used in this analysis accurately reflect current land cover conditions.

6.2 Natural Areas

Biological Justification

Wildlife management areas, wildlife refuges, state parks and recreation sites, hereafter natural areas, typically have woodland and water habitats that are attractive to bats (Everett et al. 2001, Swier 2003, Jain 2005). Swier (2003) selectively sampled in these natural areas due to the increased possibility of detections, whereas a study in Iowa found higher bat activity at a natural area than in the adjacent WEP (Jain 2005). In contrast, Jain's study did not find a significant relationship between distance to the nearest natural area and bat activity in the WEP. Nonetheless, TtEC believes natural areas may play a role in the habitat selection process by providing suitable roosting and foraging habitat.

Scoring

The total number of natural areas within and 2-miles surrounding the WEP were counted using readily accessible landownership data. Two miles was arbitrarily chosen as a distance from the WEP to account for species movement during nightly foraging activity. Lands enrolled in the CRP, coverlocks, or state wetland reserve program may be of benefit to bats but complete information regarding the locations of

these types of lands is not always publicly available and was therefore not included in the evaluation. The total number of natural areas was counted in the WEP, and assigned to a category with a corresponding score based on the total number of natural areas found. Scores were 0.5 for 1 to 10 natural areas, 1.0 for 11 to 30 natural areas, and 1.5 for 31 or more natural areas.

Natural Area Assumptions

- Each natural area provides an equal value to bat species regardless of size, current habitat and management objective.
- Easement data obtained represents the most current data available.

6.3 Perennial Streams

Biological Justification

There is a lack of studies investigating bat foraging requirements in Kansas. However, inferences can be taken from other studies, typically those involving forest-dwelling bats. One common theme among studies of foraging bats is the importance of perennial streams, rivers, riparian areas, ponds or other forms of open water. From arid habitats (Bell 1980) to forested habitats (Wilhide et al. 1998) studies suggest that the proximity of water (suitable foraging habitat) to suitable roosting habitat is a critical variable in determining species occurrence (Carter et al. 2002). Bats have been documented to travel longer distances to reach these types of foraging areas that provide higher concentrations of prey and water quality (Hayes and Loeb 2007).

Scoring

The presence of perennial streams in the WEP was evaluated using hydrological data from the Environmental Systems Research Institute (ESRI) Streetmap dataset (ESRI 2007) and existing resource reports produced for the Project Area. The WEP was given a score based on the presence or absence of this type of water feature. A WEP that contain perennial streams would receive a score of 0.5 whereas a WEP with no perennial streams would receive a score of 0.

Perennial Stream Assumptions

- All perennial streams are used equally, regardless of size, length and characteristics of riparian habitat.
- Water qualities of all perennial streams are similar and produce the same type of density of prey items.
- Perennial streams depicted on topographic maps have not been altered (diverted, dewatered, drought) to produce ephemeral conditions.

6.4 Human Development

Biological Justification

Planted vegetation and human structures can serve as suitable roost habitat for some species due to the overall increased availability of natural (trees, caves, outcrops) and man-made (houses, barns, bridges) roosts across the landscape (Everette et al. 2001, Swier 2006). This availability of suitable roosting habitat may lead to a higher abundance of species that are adapted to multiple roosting substrates, provided there is also suitable foraging habitat available nearby (Evelyn et al. 2004).

Scoring

All towns in and within 2 miles of the WEP were identified using the ESRI Streetmap dataset (ESRI 2007). Towns with populations greater then 50, as of the 2000 census, were tallied, and a corresponding score was assigned. A WEP would receive a score of 0.33 for 1 to 2 towns, 0.5 for 3 to 4 towns, and 1.0 for 5 or more towns.

Structure and Human Development Assumptions

- The housing/population density of developments within a town has no affect on the suitability for bats.
- Habitat availability and suitability is similar between towns regardless of surrounding habitat features.
- Smaller communities or isolated residences such as farms and structures such as bridges, overpasses and culverts are assumed to be uniformly distributed over the area and therefore do not vary by WEP.

6.5 Species Ranking Index

Biological Justification

The defining characteristic that differentiates mortality rates among bat species at operating wind facilities appears to be correlated with species life-history traits. Migratory tree-roosting bats are known to have a higher risk of mortality at wind facilities then resident bat species (Kunz et al. 2007), although large numbers of resident bat species have also been reported during post-construction mortality searches (Kerns and Kerlinger 2004, Jain 2005). In order to reflect this differential risk, a species-based index was calculated to reflect the relative risk to all bats found at a WEP based on individual species' life history traits and documented mortality at other existing wind energy facilities.

Scoring

A species ranking index was calculated to provide a single score that incorporates the species diversity and the relative morality risk for each species found within the WEP. Species occurrence was estimated using range maps, historic occurrences, and habitat characteristics from landcover data. Because mortality events are not uniform among species, species were assigned a score that reflected their mortality risk. Higher scores were assigned to common, migratory tree bats and lower scores were assigned to less abundant species that are not common mortalities at wind farms. For the WEP, the scores of all species likely to occur on the WEP were summed and then divided by the number of species to provide a relative index of occurrence and risk.

Species Ranking Index Assumptions

- Risk of mortality is equal for a given species across its range. *Example:* For a hoary bat, the risk of collision with a wind turbine in Kansas is equal to that in West Virginia.
- Data on distribution and occurrence accurately reflects current species distribution.

6.6 Species Landscape Index

Biological Justification

Landscapes that provide greater amounts of available and suitable roosting and foraging habitat have a greater probability for bats to occur (Duchamp et al. 2004, Lacki et al. 2007). However, the threshold at which landscapes become more attractive to bats remains unclear and makes predicting species

occurrence difficult (Jaberg and Guisan 2001, Duchamp et al. 2004). Therefore, some assumptions about attractiveness were necessary. First, we assumed that attractiveness was based on the presence of the FAM. Second, we assumed that bats make landscape-based decisions based on an area within 3 miles of the WEP.

Scoring

The objective of this index was to recognize the attractiveness of habitat within a landscape. WEPs that have a greater amount of suitable foraging and roosting habitat, expressed as FAM, than that of their surrounding areas may have a greater potential for species to occur. First, the amount of FAM in the WEP was compared to the amount of FAM within 3 miles outside of the WEP. Those values were divided by the total size of their respective areas, in acres, and a habitat index (*HI*) was produced, using:

$$HI = \left(\frac{FAMI / PA}{FAMO / BA} \right)$$

Where *FAMI* is the amount of FAM inside the WEP, *PA* is the total area of the WEP, *FAMO* is the amount of FAM outside the WEP and *BA* is the total area of the 3-mile buffer surrounding the WEP. This index provided a habitat index value where values:

> 1.0 indicate that the total acres of FAM inside the WEP is greater then surrounding area; hence, more unique and potentially more attractive to bats; and,

< 1.0 indicate that the total acres of FAM inside the WEP less then surrounding area; hence, less unique and potentially less attractive to bats.

This value was multiplied by the potential number of species (*P*) occurring in the WEP and a species landscape index (*SL*) was calculated as:

$$SL = \sum P * HI$$

Species Landscape Index Assumptions

- The suitability and availability of FAM habitat is restricted to distinct project and buffer boundaries.
- The spatial distribution of bat species and the scale of their decision making coincides with the boundaries of the WEP and 3-mile buffer.
- Patch dynamics are not influencing bat behavior.
- The increasing uniqueness of habitat in the landscape increases the attractiveness to bats.

6.7 Site Visit

To better assess the habitat of the WEP, Tetra Tech made a two-day visit to the WEP on October 31 and November 1, 2008. The purpose of this visit was to ground truth the desktop-identified wetland locations and to evaluate the quality of the wetlands with respect to bat foraging requirements. Each of the wetlands was surveyed as to the condition (natural or human-made) and water capacity (full to empty).

7.0 RESULTS

7.1 Forest-Aquatic Matrix

The Cimarron WEP contained 10,921 acres of FAM (Table 2; Figure 3) and the 3-mile buffer contained 19,739 acres of FAM. Because the total acreage of FAM within the WEP and 3-mile buffer is 30,660, the score for this variable was 2.0.

Table 2. Total amount of forest-aquatic matrix (FAM) habitat and percent composition within the WEP and 3-mile buffer.

Area	Size of Area (acres)	Acres of FAM	% FAM in Area
WEP	78,162	10,921	13.9
WEP + buffer	189,453	30,660	16.2

7.2 Natural Areas

There were no natural areas within the WEP or within the 2-mile buffer used to assess this variable. The score for this variable was 0.

7.3 Perennial Streams

There were no perennial streams within the WEP. The score for this variable was 0.

7.4 Human Development

There are two towns with more than 50 people (Ingalls and Cimarron, Kansas) within 2 miles of the WEP. The score for this variable was 0.33.

7.5 Species Ranking Index

The Cimarron WEP has a species ranking index of 0.68 (7.50/11), based on the likelihood of encounter for the 11 species whose ranges overlap with the WEP (Table 3).

Table 3. Ranked scoring system used to develop species risk index for bat species found in southwest Kansas.

Common Name	Score (*P*)	Justification
hoary bat	1.25	Migratory tree bat. Commonly documented mortality at wind facilities (Johnson et al. 2004, Kunz 2007, Arnett et al. 2008).
eastern red bat	1.25	Migratory tree bat. Commonly documented mortality at wind facilities (Johnson et al. 2004, Kunz 2007, Arnett et al. 2008).
silver-haired bat	1.25	Migratory tree bat. Commonly documented mortality at wind facilities (Johnson et al. 2004, Kunz 2007, Arnett et al. 2008).
Mexican free-tailed bat	1.00	Common species statewide. Documented mortality at a nearby wind farm in Oklahoma (Piorkowski 2006; Arnett et al. 2008).
big brown bat	0.75	Local breeder but low levels of mortality documented (Arnett et al. 2008).
eastern pipistrelle	0.50	Highest mortality of locally-breeding species at wind facilities (Arnett et al. 2008); however uncommon in Kansas and WEP is located on the margin of the know distribution range of this species.
Townsend's big-eared bat	0.50	Range overlap with WEP. No documented fatalities at wind facilities.

Table 3. Ranked scoring system used to develop species risk index for bat species found in southwest Kansas.

Common Name	Score (*P*)	Justification
cave myotis	0.25	Uncommon species in Kansas and WEP is located on the margin of the known distribution range of this species. No documented fatalities at wind facilities.
pallid bat	0.25	WEP located on the margin of the known distribution range of this species and it forages almost exclusively on the ground. No documented fatalities at wind facilities.
western small-footed myotis	0.25	Uncommon species in Kansas. No documented fatalities at wind facilities.
northern myotis	0.25	WEP located on the margin of the know distribution range of this species. No documented fatalities at wind facilities.
Total	**7.50**	

7.6 Species Landscape Index

There are 10,921 acres of FAM located within the 78,162-acre Cimarron WEP. There are 19,739 acres of FAM located within the 111,291 acre 3-mile buffer surrounding the Cimarron WEP. Based on these parameters the habitat index (*HI*) is calculated to be 0.79. Because there are 11 species of bats potentially occurring within the WEP, the species landscape index (*SL*) is calculated to be 8.69.

7.7 Assessment Summary

The likelihood index score for the Cimarron WEP is 11.70, indicating a moderate likelihood of bat occurrence (Table 4). There are three main factors contributing to this assessment. One, suitable habitat for bats is present at the Cimarron WEP but only accounts for a small proportion of the project area. However, it is important to recognize that the Arkansas River (and its associated FAM) does occur within the buffer and may represent an important attractant for locally breeding and migratory bats. Two, several species for which there are high documented levels of mortality at wind farms have ranges that overlap with the WEP; this is balanced by the limited suitable foraging habitat within the WEP that may provide a marginal attractiveness of the WEP for migrating bats. Three, the Cimarron WEP falls within a bat migratory pathway; bats that are moving through the region and not stopping to forage on the WEP are also at risk of colliding with turbines.

Table 4. Summary statistics for each variable used in the analysis.

Element	Score
Acres of FAM within WEP	2.00
Number of natural areas within 2 miles of WEP	0
Perennial streams present	0
Number of residential communities	0.33
Species ranking index	0.68
Species landscape index	8.69
Total Likelihood Index	**11.70**

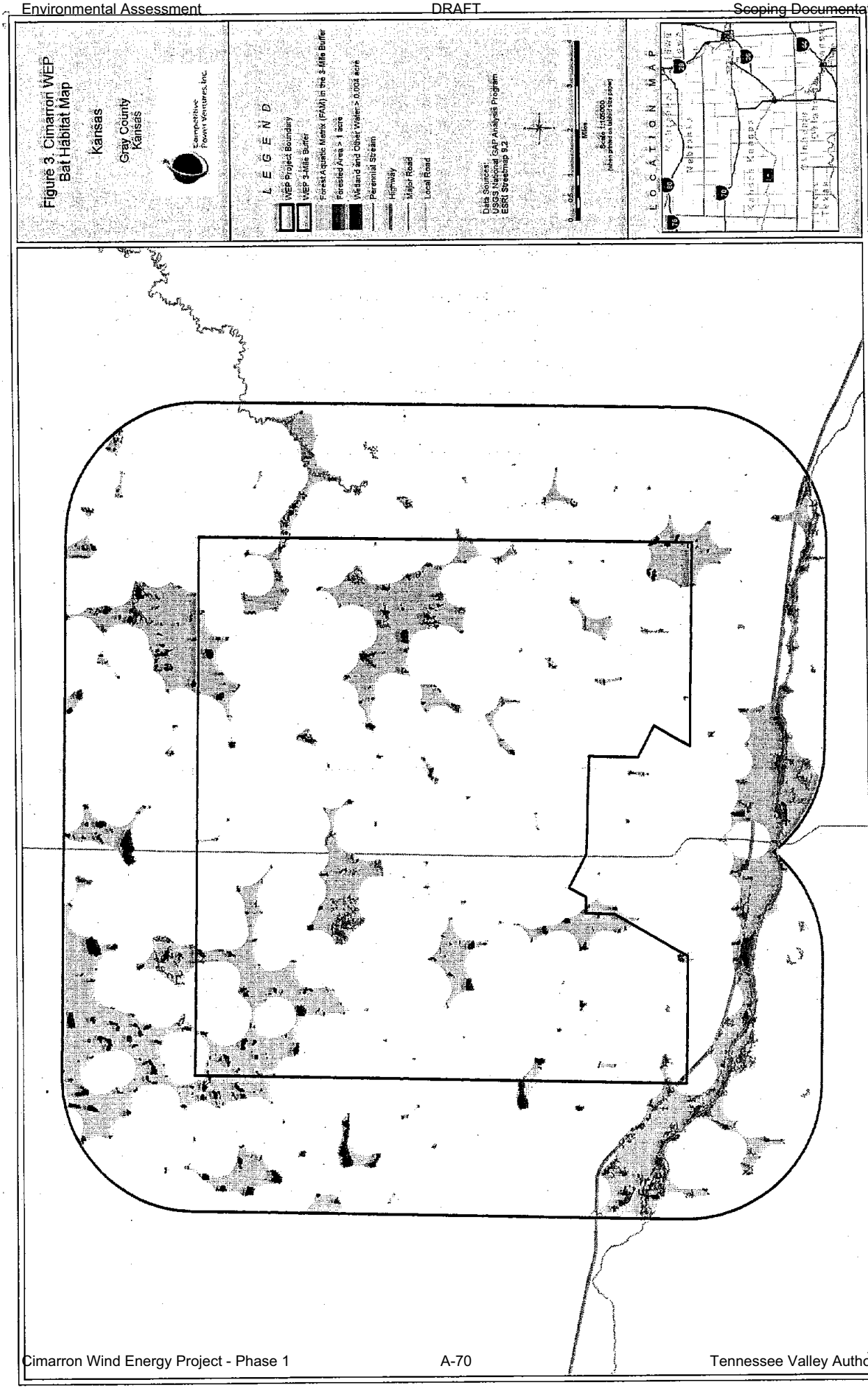
Figure 3. Cimarron WEP
Bat Habitat Map
Kansas
Gray County
Kansas
Competitive Power Ventures, Inc.
LEGEND
WEP Project Boundary
WEP 3-Mile Buffer
Forest/Aquatic Matrix (FAM) in the 3-Mile Buffer
Forested Area > 1 acre
Wetland and other Water > 0.004 acre
Perennial Stream
Highway
Major Road
Local Road
Data Sources:
USGS National GAP Analysis Program
ESRI Streetmap 9.2
Miles
LOCATION MAP

7.8 Site Visit

The majority of the wetlands from the GAP data were found to be present and they were more than half full of water. The best foraging habitats were observed just south of where county roads H and 16 intersect and south of the intersection of roads H and 15. This area has two large playa wetlands. The least desirable habitats were found around the Cimarron Dairy (intersection of roads G and 20). This area has a high amount of human disturbance from activities at the dairy and most of the wetlands in the vicinity are being used for cattle. The intermittent streams that run through the WEP were mostly dry and most were obscured or partially obscured by overgrown vegetation. This site visit supports TtEC's conclusion that the overall likelihood of occurrence of bats at the WEP is moderate.

8.0 RECOMMENDATIONS

The precise mechanisms that determine risk of bat mortality at wind farms remain unclear (RESOLVE 2004, Kunz et al. 2007). However, several guidance documents outlining bat-specific recommendations discuss the importance of preserving existing roosting and foraging habitats, minimizing the use of pesticides, maintaining interagency and stakeholder coordination, and continuing public education programs (Mitchell-Jones 2004, Tuttle 2004). These guidance documents vary but share common themes. Two of these themes are relevant to the Cimarron WEP in Kansas.

- **Preserve FAM Habitat**

  Locating turbines, access roads, substations, and interconnects within FAM habitats may constitute a direct loss of bat foraging and roost habitat. Minimize, to the extent practical, direct impacts to FAM habitat to retain roost and foraging habitats for bats.

- **Preserve Roost Habitat/Snag Retention**

  Agricultural practices and development activities pose a risk to the remaining forested areas in prairie habitats that bat may use for summer roosting. Minimize, to the extent practical, direct impacts to these forested areas by avoiding tree removal during construction. Snags – dead trees in the early to middle stages of decay – provide suitable habitat for tree-roosting bats and should also be retained to maximum extent possible.

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TRIBAL HISTORIC PRESERVATION OFFICE

Date: August 30, 2010 **File: 1011-280KS-10**

RE: Tennessee Valley Authority (TVA), Cimarron Wind Energy Project, Gray County, Kansas

Patricia Bernard Ezzell
Native American Liaison And Historian
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902-1499

Dear Ms. Ezzell,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed project listed as Tennessee Valley Authority (TVA), Cimarron Wind Energy Project, Gray County, Kansas. **The Osage Nation requests a copy of the planned cultural resource reconnaissance survey.**

In accordance with the National Historic Preservation Act, (NHPA) [16 U.S.C. 470 §§ 470-470w-6] 1966, undertakings subject to the review process are referred to in S101 (d)(6)(A), which clarifies that historic properties may have religious and cultural significance to Indian tribes. Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U.S.C. 4321 and 4331-35 and 40 CFR 1501.7(a) of 1969).

The Osage Nation has a vital interest in protecting its historic and ancestral cultural resources. **The Osage Nation anticipates reviewing and commenting on the planned cultural resource reconnaissance survey for the proposed Tennessee Valley Authority (TVA), Cimarron Wind Energy Project, Gray County, Kansas.**

Should you have any questions or need any additional information please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

James Munkres
Archaeologist I

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376