TC 1C

EXHIBIT C

4 JAN 2007

Environmental Permitting Coordination for the Keystone Pipeline Project

Coordination Summary – Biological Resources

Supplemental State Agency and USFWS Consultation

This biological consultation package includes documentation of consultation with state agencies and the USFWS regarding the Keystone Mainline and Cushing Extension following the September 15, 2006, filing with the Department of State (DOS). These correspondence summaries include species specific survey information, and continued consultation with the state and federal agencies regarding coordination of the 2007 biological surveys for the Project.

On October 16, 2006, ENSR sent study plans for the massasauga, western fox snake, and Kirtland's snake to the Missouri Department of Conservation (MDC) and Illinois Department of Natural Resources (IDNR) for concurrence and approval to move forward with the habitat surveys for these species. The study plans included detailed, state specific survey protocols for the habitat assessment surveys. Concurrence from both the MDC and IDNR was received, and surveys were initiated in November 2006.

On October 31, 2006, ENSR received a consultation letter from the Kansas Department of Wildlife and Parks (KDWP) regarding sensitive species and habitats along the Cushing Extension of the Keystone Project. ENSR will use this sensitive species information to plan species specific surveys along the Cushing Extension beginning in the spring of 2007.

On November 14, 2006, ENSR sent a detailed study plan to the Marion Illinois FWS Field Office. ENSR requested concurrence with the proposed Indiana bat surveys method specific to the state of Illinois. ENSR received comments back from Joyce Collins (IL FWS) regarding the study plan, and the plan was accepted and signed on November 16, 2006. Habitat surveys were initiated shortly after receiving confirmation of the study plan.

On December 19, 2006, ENSR distributed copies of the 2006 biological survey reports to the appropriate state wildlife and USFWS representatives for their review and comments. ENSR requested that each species expert review the corresponding report and provide ENSR with comments as soon as possible in order for ENSR to promptly address any concerns.

On January 4, 2006, ENSR sent emails to each state wildlife agency representative working on the Project, requesting that ENSR meet with them in early February, in person, to review the proposed surveys plans for 2007. An email was also sent to John Cochnar requesting a meeting with the FWS in early February.

Based on the consultation with state agencies and the USFWS throughout the remainder of 2006, ENSR was able to further refine the proposed biological surveys and survey requirements for each species that may potentially be affected by the proposed Project. Continuing consultation will take place to follow up with survey results and other agency concerns that may surface as the project moves forward.

CONFIDENTIAL

Contents Revised 1/19/07

BIOLOGICAL RESOURCES – AGENCY CONSULTATION
Supplemental Filing January 2007

- Letter, October 16, 2006 – BHE Environmental to MDC (Snake habitat study plan REX)
- Letter, October 16, 2006 – BHE Environmental to MDC (Snake habitat study plan Keystone)
- Report from BHE Environmental listing email/voice mail exchanges re: snake surveys
- E-mail, August 15, 2006 – MDC to ENSR (Bird Surveys)

- **ILLINOIS**

  - E-mail, not dated – ENSR to IDNR (Meeting announcement for 2/6/2007)
  - Letter, December 20, 2006 – Mike Ward to ENSR (Bird Surveys CL WMA)
  - E-mail, December 6, 2006 – Mike Ward to ENSR (Bird surveys)
  - E-mail, November 22, 2006 – Chris Phillips to ENSR (re: deferral to M. Ward)
  - E-mail, November 22, 2006 – ENSR to Chris Phillips (re: chorus frog absence)
  - E-mail, November 21, 2006 – ENSR to Mike Ward (INHS) (Request for information on sensitive bird species in Illinois and delivery of project maps and shapefiles)
  - Contact Form, November 21, 2006 – ENSR discussion with John Tucker re: chorus frog.
  - E-mail, November 21, 2006 – J. Tucker to ENSR (opinion of Chorus frog absence)
  - E-mail, November 21, 2006 – ENSR to J. Tucker (Information on Chorus frog)
  - E-mail, November 20, 2006 – John Tucker to ENSR (re: Chorus frog survey bid)
  - E-mail, November 20, 2006 – Diane Tecic to ENSR (reply to request for bird info)
  - Contact Form, November 20, 2006 – ENSR to INHP (Johnson) (re: bird species of concern)
  - Contact Form, November 20, 2006 – ENSR to INHP (Tecic) (re: bird species of concern)
  - Letter, October 16, 2006 – BHE Environmental to IDNR (Snake habitat study plan)
  - Project Contacts Report from BHE Environmental, September 25 – October 4, 2006
  - E-mail, August 14, 2006 – ENSR to Illinois Natural Historical Society (Rare bird survey bids)

- **OKLAHOMA**

  - E-mail, not dated – ENSR to IDNR (Meeting announcement for 2/6/2007)
  - Contact form, November 22, 2006 – ENSR to ODWC (phone call project update and mapping)
  - E-mail, October 26, 2006 –ENSR to ODOT (Project shapefiles)
  - Letter, October 16, 2006 – ENSR to ODWC (request for information)

- **U.S. FISH AND WILDLIFE SERVICE**

  - E-mail, not dated – ENSR to FWS (Meeting announcement for 2/5/2007
  - E-mail, December 22, 2006 – From FWS (Cochnar) to ENSR (Eagle survey locations)
  - Letter, December 19, 2006 – ENSR to FWS (Tabor) (Survey Reports Presented)
  - Letter, December 19, 2006 – ENSR to FWS (Hansen) (Survey Reports Presented)
  - Letter, December 19, 2006 – ENSR to SD FWS (Gates) (Survey Reports Presented)
  - Letter, December 19, 2006 – ENSR to FWS (Cochnar) (Survey Reports Presented)
  - Letter, December 19, 2006 – ENSR to FWS (Bessken) (Survey Reports Presented)
  - E-mail, December 18, 2006 – From ENSR to FWS (Eagle survey locations)
  - E-mail, November 16, 2006 – From FWS to BHE (Concurrence on study plan)
  - E-mail, November 14, 2006 – From BHE to FWS (J. Collins) (re: request for study plan concurrence)
  - Letter, November 7, 2006 – From BHE to USFWS Missouri (re: Indian Bat Surveys)
  - Contact form, November 6, 2006 – ENSR to John Cochnar (re: update on MBTA)
  - E-mail, September 5, 2006 –BHE bat occurrences notification to C. Johnson

CONFIDENTIAL

Stribley, Sara

Subject:	Keystone ENSR - Meeting with the SDGFP
Location:	Pierre, South Dakota
Start:	Fri 2/2/2007 9:00 AM
End:	Fri 2/2/2007 11:00 AM
Recurrence:	(none)
Meeting Status:	Meeting organizer
Required Attendees:	Doug.Backlund@state.sd.us

Hi Doug,
ENSR would like to meet with you in early February to review the biological surveys that are planned for the Keystone Pipeline Project in 2007 and 2008 in South Dakota. Would the following meeting date and time work for you?

Date: Friday, February 2, 2007
Time: 9:00 am
Location: Pierre, SD- SDGFP Office

ENSR is planning on sending you a package by next week containing all of the information regarding the upcoming biological surveys for the Project in South Dakota. We are hoping to use the information contained in this package as the template for discussions at the February meeting. Please feel free to invite other SDGFP representatives if needed. Please let me know at your earliest convenience if you would or would not be able to attend this meeting.
Thanks and Happy New Year,
Sara

Sara Stribley
ENSR | AECOM
1601 Prospect Parkway
Fort Collins, Colorado 80525
970-493-8878 ext 168
sstribley@ensr.aecom.com

CONFIDENTIAL

December 19, 2006

Doug Backlund
South Dakota Department of Game, Fish, and Parks
Foss Building
523 East Capitol
Pierre, SD 57501-3182

Dear Mr. Backlund:

At this time, ENSR Corporation (ENSR) is providing you with survey reports detailing information collected along the Keystone Pipeline Project during the fall of 2006 in South Dakota for the following federally threatened or endangered species: Topeka shiner (*Notropis Topeka*), winged mapleleaf (*Quadrula fragosa*), scaleshell mussel (*Leptodea leptodon*), Dakota skipper (*Hesperia dacotae*), and western prairie fringed orchid (*Platanthera praeclara*).

Project Description

TransCanada is planning to construct and operate an approximately 1,845-mile-long interstate crude oil transmission system from an oil supply hub near Hardisty, Alberta, Canada to destinations in the Midwestern United States (U.S). The proposed Project would consist of approximately 1,078 miles of new pipeline constructed from the U.S.-Canada border in Cavalier County, North Dakota, to terminals and refineries in Wood River (Madison County) and Patoka (Marion County), Illinois. This pipeline is referred to as the Keystone Mainline. Approximately 283 miles of the Keystone Mainline would parallel the proposed Rockies Express Pipeline - West (REX-West) Project in Kansas and Missouri. In addition, TransCanada proposes to construct a 292-mile pipeline extension (Cushing Extension) that would extend from the Keystone Mainline south from the Nebraska/Kansas border to Cushing, Oklahoma. TransCanada proposes to begin construction of the Keystone Mainline in early 2008, with the system in-service by the end of 2009. Work on the Cushing Extension will begin in late 2009 or early 2010, with a Cushing Extension in-service date of 2010.The project also will require the construction of pump stations, valves, meters, and other ancillary facilities. The hydraulic characteristics of the pipeline will determine pump station and valve locations. Electrical powerlines and facility upgrades will be required in some locations to provide power for the new pump stations, though these facilities will be constructed by local utility companies, not Keystone.

Biological Survey Reports

Attached for your review are three separate reports summarizing the Topeka shiner habitat surveys, unionid surveys, and native grassland surveys that were conducted in South Dakota during the fall of 2006 for the Keystone Pipeline Project.

Topeka shiner surveys were conducted from September 14 through 17, 2006, in **Clark, Beadle, Kingsbury, Miner, Hansen, McCook, Hutchinson**, and **Yankton** counties. Field surveys for the winged mapleleaf, scaleshell mussel, and other unionids were conducted at the proposed James River crossing of the Project in Yankton County on September 9 and 16, 2006. Surveys were conducted at stream crossings identified as potential habitat for each species through consultation with the South Dakota Game, Fish, and Parks Department (SDGFP), South Dakota Natural Heritage Program (SDNHP), and U.S. Fish and Wildlife Service (USFWS).

Native grassland surveys were conducted to identify suitable habitat for the Dakota skipper (*Hesperia dacotae*) and western prairie fringed orchid (*Platanthera praeclara*) from September 11 through 16, 2006, in **Marshall, Day, Clark, Kingsbury, Miner, McCook, Hutchinson**, and **Yankton** counties. Surveys were conducted in counties identified as having potential habitat for these two species through consultation with the SDGFP, SDNHP, and USFWS.

Based on your review of the survey findings, we are asking for your input and recommendations on further survey efforts for the Topeka shiner, winged mapleleaf, scaleshell mussel, Dakota skipper, and western prairie fringed orchid that would be required by the SDGFP. We have provided a "Comments and Recommendations" form to aid in your assessment of the report findings. Please return this form to ENSR at your earliest convenience in order for us to promptly address any concerns.

ENSR will be following up with you in early January to discuss the reports in more detail and to consult on any further surveys that would be required for these species. Copies of these reports also have been sent to John Cochnar (Nebraska USFWS – Project Lead). Additional copies of the reports are enclosed for distribution to other state game and fish representatives. If you have any questions regarding the enclosed materials, you may also contact me at (970) 493-8878 ext. 181 or by email at cjohnson@ensr.aecom.com.

Sincerely,

Charles Johnson
Senior Wildlife Biologist

CJ/sc

Enc. A Field Survey of Suitable Habitat for the Topeka Shiner (*Notropis topeka*) for the Keystone Pipeline Project in South Dakota (x2)

A Field Survey for the Winged Mapleleaf (*Quadrula fagosa*), and Scaleshell Mussel (*Leptodea leptodon*) for the Keystone Pipeline Project at the James River Crossing in South Dakota (x2)

A Field Survey of the Keystone Pipeline Project Construction Corridor in North and South Dakota for Dakota Skipper (*Hesperia dacotae*) Habitat, Western Prairie Fringed Orchid (*Platanthera praeclara*) Habitat, and for Native Grassland (x2)

Surveyor Qualifications

Keystone Pipeline Project Survey Report (Topeka Shiner)
Comment and Recommendation Form

Sect. #	Para. #	Specific Comments

Recommendations

Name _____ Title _____ Date _____

Keystone Pipeline Project Survey Report (Unionids)
Comment and Recommendation Form

Sect. #	Para. #	Specific Comments

Recommendations

Name _____ Title _____ Date _____

Keystone Pipeline Project Survey Report (Native Grassland)
Comment and Recommendation Form

Sect. #	Para. #	Specific Comments

Recommendations

Name _____ Title _____ Date _____

Overview – Keystone Pipeline Project Biological Survey Reports

Biological Surveys and Reports

Construction and operation of the Keystone Pipeline Project (Keystone) may affect habitats and populations of species protected under the federal Endangered Species Act (ESA) and by individual State legislation. During 2006, Keystone initiated contact with the U.S. Fish and Wildlife Service (USFWS), and state natural heritage programs and wildlife agencies to identify species and habitats of concern. After receiving lists of species and habitats, Keystone developed field survey protocols, target survey areas, and survey schedules. These protocols were submitted to the USFWS and state agencies for review. No agencies objected to the proposed protocols; agency comments received on the protocols were incorporated. Agency coordination documentation and survey protocols were filed by Keystone with the Department of State (DOS) on September 15, 2006. Further Agency coordination that has taken place since the September filing date is included in this January 2007 supplemental filing to the DOS.

Biological field surveys along the proposed Mainline pipeline right-of-way were initiated in late summer and fall of 2006 (the "as filed" route). These surveys were conducted along the pipeline route alignment that was filed with the DOS on September 15, 2006. Additional field surveys will be conducted in 2007 where necessary to determine species occurrence in the appropriate season, to survey pipeline reroutes, pump stations, pipe storage yards, and contractor yards, as well as pipeline segments where access was not previously available. Field surveys also will be conducted along the Cushing Extension and its pump station sites, pipe storage yards, and contractor yards during 2007.

The biological survey reports included in this filing will be used for: 1) preparation of a Biological Assessment as part of the USFWS Section 7 consultation; 2) documentation for the Environmental Impact Statement (EIS); and 3) preparation of state agency permit applications.

The reports filed herein include the results of all field work completed in 2006. These reports will provide field data for the majority of the listed and sensitive species that were identified for survey by the USFWS and state agencies. The information contained in these reports should provide sufficient documentation to initiate preparation of the Draft EIS.

Keystone will file additional biological survey reports in 2007 for the Cushing Extension, as well as Mainline reroutes, and ancillary facilities.

Biological Survey Progress

The attached table outlines Keystone's process for the collection and submission of biological data.

Keystone Pipeline Project – Biological Survey Report Completion Plan – January 2007

Survey Objective	Survey Status	September 2006 DOS Filing	November 2006 DOS Filing	January 2007 DOS Filing	Future DOS Filing Dates	Supplemental Reports
Rare Plants (Western fringed orchid, Eastern fringed orchid, small white ladies slipper orchid, Decurrent false aster, running buffalo clover, prairie spiderwort, royal catchfly, spring ladies tresses)	Survey completion status: Western prairie fringed orchid: Habitat surveys - 90% Occurrence surveys - 0% Other rare plants: Habitat surveys - 0% Occurrence Surveys - 0% 2007 spring /summer – Occurrence surveys (Mainline and Cushing Extension).	Agency consultation records and species lists. Preliminary survey areas.	Documentation of potential suitable orchid habitats in North and South Dakota, and Nebraska (including photographs and habitat suitability for Western Fringed Orchid is provided in the Native Prairie Survey Report discussed below).	Agency consultation records.	August 2007 • Summary of surveys completed; occurrence data.	
Wetlands and Waters of the U.S.	2006 – spring/fall-Delineation surveys. Survey completion status as of October 13, 2006: ND – 95% SD - 83% NE - 100% KS - 98% MO – 83% ILL - 89% Overall – 85% 2007 – Spring supplemental surveys (Mainline, Cushing Extension).	Consultation records with USACE. Preliminary survey areas.	Summary of survey progress. List of wetland crossings by type, and distances crossed.		April 2007 • Cushing Extension wetland crossing list. September 2007 • 404 Applications filed with USACE Districts.	

Keystone Pipeline Project – Biological Survey Report Completion Plan – January 2007

Survey Objective	Survey Status	September 2006 DOS Filing	November 2006 DOS Filing	January 2007 DOS Filing	Future DOS Filing Dates	Supplemental Reports
Native Prairie	Survey completion status: SD, ND -90% (Mainline) NE (Mainline) KS, OK – 0% (Cushing) Fall 2006 – Preliminary Spring 2007 – Supplemental surveys (Mainline, Cushing Extension).	Agency consultation records and species lists. Preliminary survey areas.	Habitat assessment for ND and SD	Agency consultation records.	May 2007 • Mainline - Supplemental surveys with site descriptions (reroutes). April or May 2007 • Cushing Extension habitat descriptions.	
Mussels (James River, Cottonwood River, Doyle Creek)	Survey completion status – SD (James River) - 100% KS (Cottonwood River, Doyle Creek) – 0% 2007 late summer/fall – habitat/occurrence surveys completed along Cushing Extension.	Agency consultation records and species lists. Preliminary survey areas.	Survey methods and results, habitat descriptions. No listed mussels were found.	Agency consultation records.	If needed, a revised SD report will be submitted 30 days after DOS filing. Fall 2007 • KS (Cushing) survey reports based on spring/summer field reconnaissance.	
Dakota Skipper butterfly	Survey completion status: Habitat – 90% Occurrence – 0% Summer 2007 (Occurrence Surveys -Mainline in ND and SD).	Agency consultation records Preliminary survey areas.	Documentation of potential suitable habitats in North and South Dakota (including photographs and habitat suitability for Dakota Skipper is provided in the Native Prairie Survey Report discussed above).	Agency consultation records.	July 2007 • Occurrence surveys with site descriptions.	

Keystone Pipeline Project – Biological Survey Report Completion Plan – January 2007

Survey Objective	Survey Status	September 2006 DOS Filing	November 2006 DOS Filing	January 2007 DOS Filing	Future DOS Filing Dates	Supplemental Reports
Topeka Shiner	Survey completion status: Habitat surveys SD, KS, MO – 94% (Mainline) KS – 0% (Cushing) Occurrence surveys KS, MO – 94% (Mainline) SD (Mainline) KS – 0% (Cushing) Spring 2007 Mainline and Cushing occurrence surveys – SD, KS	Agency consultation records. Preliminary survey areas.	Survey methods and results, habitat descriptions.	Updated KS/MO Topeka shiner survey report. Agency consultation records.	July 2007 • Survey Reports based on spring/summer field reconnaissance in SD and KS (Mainline and Cushing).	
Fish (Arkansas River shiner, Arkansas darter, silver chub, speckled chub, Neosho madtom)	Survey completion status: Habitat surveys: KS (Cushing) – 0% Occurrence surveys: KS (Cushing) – 0% Spring 2007 habitat and occurrence surveys – KS (Cushing)	No information filed.	No information filed.	Agency consultation records.	Fall 2007 • Survey reports based on spring/summer field reconnaissance in KS (Cushing).	
Reptiles and Amphibians (Massasauga, Kirtland's snake, Western fox snake)	Survey completion status: Habitat surveys MO - 100% of accessible sites IL – 0% Occurrence Surveys MO, IL – 0%	Agency consultation records. Preliminary survey areas and protocols.	No information filed.	Habitat survey reports based on surveys completed in fall/winter 2006. Report letters detailing further survey work to be completed.	May 2007 • Habitat survey reports based on spring 2007 field reconnaissance and updated agency consultation records.	

Keystone Pipeline Project – Biological Survey Report Completion Plan – January 2007

Survey Objective	Survey Status	September 2006 DOS Filing	November 2006 DOS Filing	January 2007 DOS Filing	Future DOS Filing Dates	Supplemental Reports
	Spring 2007 – Complete habitat surveys – MO, IL. Spring/summer 2007 – Potential occurrence surveys.			Agency consultation records.	August 2007 Snake survey reports, if agencies require occurrence surveys.	
Least tern and piping plover	No 2006 surveys were conducted. Occurrence surveys – 2007 (Mainline and Cushing Extension).	Agency consultation records. Preliminary survey areas.	Documentation of potential suitable habitats.	No information filed.	August 2007 • Results of 2007 surveys (Mainline and Cushing)	
Raptor Nests (including bald eagle)	Spring 2006 – • Preliminary survey 2006 Survey completion status – 70% Spring 2007 – • Conduct Mainline and Cushing Extension raptor surveys within construction ROW (nesting and winter roosting surveys for bald eagles will occur 1.0 mile from either side of the construction ROW along major river crossings). • Potential preconstruction surveys – 2008 (Mainline and Cushing Extension).	Agency consultation records.	List of raptor nests and locations encountered during spring 2006 helicopter surveys.	Agency consultation records.	March 2007 • Results of 2007 aerial raptor/bald eagle surveys (Mainline and Cushing Extension). Spring 2008 • Results of preconstruction aerial surveys.	If needed, a revised report will be submitted 30 days after DOS filing.

Keystone Pipeline Project – Biological Survey Report Completion Plan – January 2007

Survey Objective	Survey Status	September 2006 DOS Filing	November 2006 DOS Filing	January 2007 DOS Filing	Future DOS Filing Dates	Supplemental Reports
Greater Prairie Chicken	Winter 2007 – Phone surveys with landowners to determine potential presence. Completion status – 50%. Spring 2007 – breeding surveys, depending on phone survey results.	Agency consultation records. Preliminary survey areas and protocols.	No information filed.	Agency consultation records.	March 2007 • Results of phone surveys with landowners in MO and agency coordination regarding further survey requirements. August 2007 • Results of breeding surveys, if conducted	If needed, a revised report will be submitted 30 days after DOS filing.
King rail	Spring 2007 MO - Surveys may be conducted in large complex wetlands.	Agency consultation records Preliminary survey areas and protocols.	No information filed.	Agency consultation records.	April 2007 • Further agency coordination regarding survey requirements, survey protocols, and habitat assessment report, based on wetland delineations. August 2007 Habitat survey report, if surveys are necessary based on wetland habitat assessment.	

Keystone Pipeline Project – Biological Survey Report Completion Plan – January 2007

Survey Objective	Survey Status	September 2006 DOS Filing	November 2006 DOS Filing	January 2007 DOS Filing	Future DOS Filing Dates	Supplemental Reports
Barn owl	To date, no structures will be destroyed during construction, therefore; no surveys planned. However, 2008 preconstruction surveys in MO, IL would be conducted if structures (old barns or homes) would be affected by construction activities.	Agency consultation records Preliminary survey areas and protocols.	No information filed.	Agency consultation records.	Spring 2008 • Report filed only if habitat is present.	
Bats (Indiana bat, gray bat)	Survey completion status: Fall 2006 habitat surveys: MO - 84% of accessible sites, IL – 100% of accessible sites Completions status - 84% Spring 2007 – Complete habitat surveys Spring/summer 2007 – Potential mist net surveys – MO, IL.	Agency consultation records Preliminary survey areas and protocols.	No information filed.	Habitat survey reports (MO, IL) based on surveys completed in fall/winter 2006. Report letters detailing further survey work to be completed.	March 2007 • Habitat survey reports based on spring 2007 field reconnaissance and updated agency consultation records. Fall 2007 • Mist net/occurrence survey reports – MO, IL.	If needed, a revised report will be submitted 30 days after DOS filing.
River otter	2007 – Occurrence surveys in NE, IL	Agency consultation records	No information filed.	No information filed	August 2007 • Results of surveys conducted in NE and IL.	

[1]Migratory birds – Keystone will discuss options for complying with the Migratory Bird Treat Act (MBTA) with the USFWS. Future surveys will depend on the outcome of these discussions.

Keystone Pipeline Project: Level I and II Cultural Resource Investigations in Eastern South Dakota

Prepared for:
ENSR Corporation
Fort Collins, Colorado

Principal Investigator:
Amy Bleier

Authors:
Amy Bleier and Ed Stine
Metcalf Archaeological Consultants, Inc.
Bismarck, North Dakota

and

James H. Mayer and Michael McFaul
LaRamie Soils Service, Inc.
LaRamie, Wyoming

December 2006

Abstract

TransCanada Keystone Pipeline, LP intends to construct and operate a new crude oil pipeline originating in Alberta, Canada and terminating in the Midwestern United States. In South Dakota, the proposed route of the pipeline includes Brown, Marshall, Day, Clark, Beadle, Kingsbury, Miner, Hanson, McCook, Hutchinson, and Yankton counties. For the undertaking, the lead Federal agency is the Department of State and the lead state agency is the South Dakota State Historic Preservation Office.

ENSR Corporation, a subcontractor of TransCanada Keystone Pipeline, LP, contracted Metcalf Archaeological Consultants, Inc. to conduct cultural resource investigations of the proposed pipeline route within South Dakota. The length of the pipeline in South Dakota is approximately 218.9 miles. Levels I and II cultural investigations were completed during 2006. The Level I literature and record search was two miles wide centered on the proposed centerline. A reconnaissance vehicular survey covered 100% of the proposed pipeline route. Finally, the Level II cultural resource pedestrian inventory included a 23% sample of the proposed pipeline route, 300 feet wide centered on the proposed centerline. A total of 49.35 miles, or approximately 1,794.6 acres, comprise the Level II inventory. In addition to the pedestrian survey, 26 shovel test probes were excavated at locations with potential for buried cultural deposits.

Cultural resources recorded during the Level II inventory include three archaeological sites, three historic sites, two structures (architectural sites), two historic/architectural sites, and two archaeological isolated finds. In addition, five previously recorded historic railroad sites were updated.

Two prehistoric rock cairn sites (39DA71 and 39YK77) are recommended as eligible for the National Register of Historic Places. Site 39YK79, a prehistoric cultural material scatter, appears to be eligible for the National Register of Historic Places but systematic subsurface testing is recommended in order to make an accurate determination. TransCanada Keystone Pipeline, LP plans to avoid all three archaeological sites by rerouting the pipeline. Survey of these reroutes is scheduled for spring 2007. The historic sites (39CK50, 39HT133, and 39YK78), architectural sites (DA-000-00951 and KB-000-00462), and historic/architectural site (39DA70 with DA-000-00950), as evaluated within the 300 foot wide survey corridor, are non-contributing elements to the perceived larger farmstead sites and do not meet the criteria of eligibility for the National Register of Historic Places. The portions of the sites outside of the 300 foot wide survey corridor remain unevaluated for the National Register of Historic Places. One historic/architectural site (39HT134 with HT-002-00001 and HT-002-00002) extends beyond the confines of the 300 foot wide survey corridor and remains unevaluated for the National Register of Historic Places. Due

to the presence of Euro-American infant burials, avoidance of site 39HT134 is recommended and will be avoided by rerouting the proposed pipeline. With the exception of 39HT134, avoidance is not recommended for the historic and architectural sites because they are non-contributing elements to the overall sites. Moreover, pipeline construction plans include avoidance of structures. The isolated finds are recommended not eligible for the National Register of Historic Places. The five historic railroad sites will be avoided by boring the pipeline underneath the sites.

Provided that sites 39DA71, 39YK77, 39YK79, and 39HT134 are avoided by TransCanada Keystone Pipeline, LP, a finding of *no historic properties affected* is recommended for the proposed undertaking as described herein, mapped and surveyed.

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Chapter 1: Comprehensive Introduction

Introduction

TransCanada Keystone Pipeline, LP (TransCanada) intends to construct and operate a new pipeline (Mainline) approximately 1,845 miles long, originating in Hardisty, Alberta, Canada and terminating in Patoka, Illinois, United States (Figure 1). The crude oil pipeline will run through eastern South Dakota, from the North Dakota/Brown County border approximately 218.9 miles south to the Yankton County/Nebraska border. The proposed pipeline runs through Brown, Marshall, Day, Clark, Beadle, Kingsbury, Miner, Hanson, McCook, Hutchinson, and Yankton counties in South Dakota (Figure 2). The survey corridor is 300 feet wide centered on the proposed pipeline centerline. From this point forward, the 300 foot wide survey corridor will be referred to as the project corridor. For the proposed undertaking, the Department of State is the lead Federal agency and the South Dakota State Historic Preservation Office (SDSHPO) is the lead state agency.

This report documents cultural resource investigations conducted by Metcalf Archaeological Consultants, Inc. (MAC) in 2006 along the proposed TransCanada Keystone Pipeline route in South Dakota. Chapter 1 is an introduction to the project, including the project description and locations. Chapter 2 (project setting) and Chapter 3 (cultural chronology) provide context for the cultural resource investigations discussed here. The Level I record and literature search is reviewed in Chapter 4. The Level II inventories are discussed in Chapter 5. Chapter 6 provides the results of the Level II inventories. Chapter 7 is a summary of the project with recommendations for the treatment of cultural resources along the proposed pipeline route, including an unanticipated discovery plan.

Several appendices supplement information contained in the report. Appendix 1 is a copy of the project Research Design. Note, three changes have occurred since the Research Design was submitted to the South Dakota State Historic Preservation Office (SDSHPO). First, the width of the construction corridor was 125 feet wide and now is 110 feet wide. Second, regarding Native American consultation, the Department of State has determined that it will conduct Nation to Nation consultation with Native American Tribes. Third, the Research Design erroneously stated that MAC would be conducting a Level III inventory. In fact, MAC conducted Levels I and II inventories and a reconnaissance survey. Appendix 2 is the geoarchaeological analysis produced by LaRamie Soils Service, Inc. (LSS). A final version with complete results and monitoring recommendations will be provided in a forthcoming addendum report. Appendix 3 contains a set of project maps depicting the 2006 Level II investigations. The complete record search for all work conducted in 2006 is listed in Appendix 4. Curriculum vitae of appropriate personnel comprise Appendix 5. Appendix 6 contains copies of the site forms submitted to the SDSHPO. Finally, Appendix 7 provides a copy of the Native American consultation letter prepared by MAC and list of the Tribes to which it was sent. It should be noted that we were requested to initiate the invitation to consult early in the project history, at a time when there was some confusion about who would be responsible for consultation.

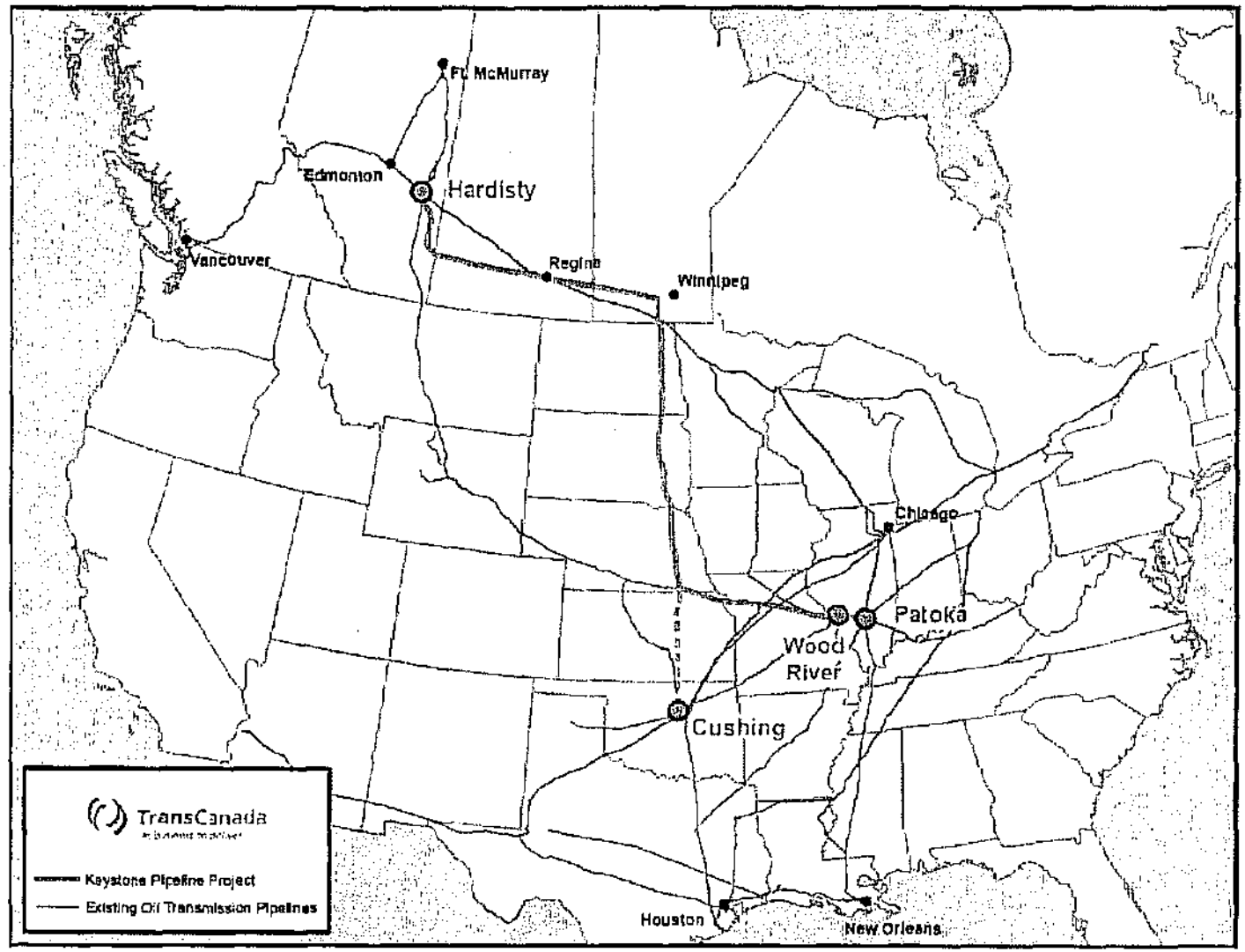

Figure 1. TransCanada Keystone Pipeline Project overview map (Courtesy of ENSR Corporation).

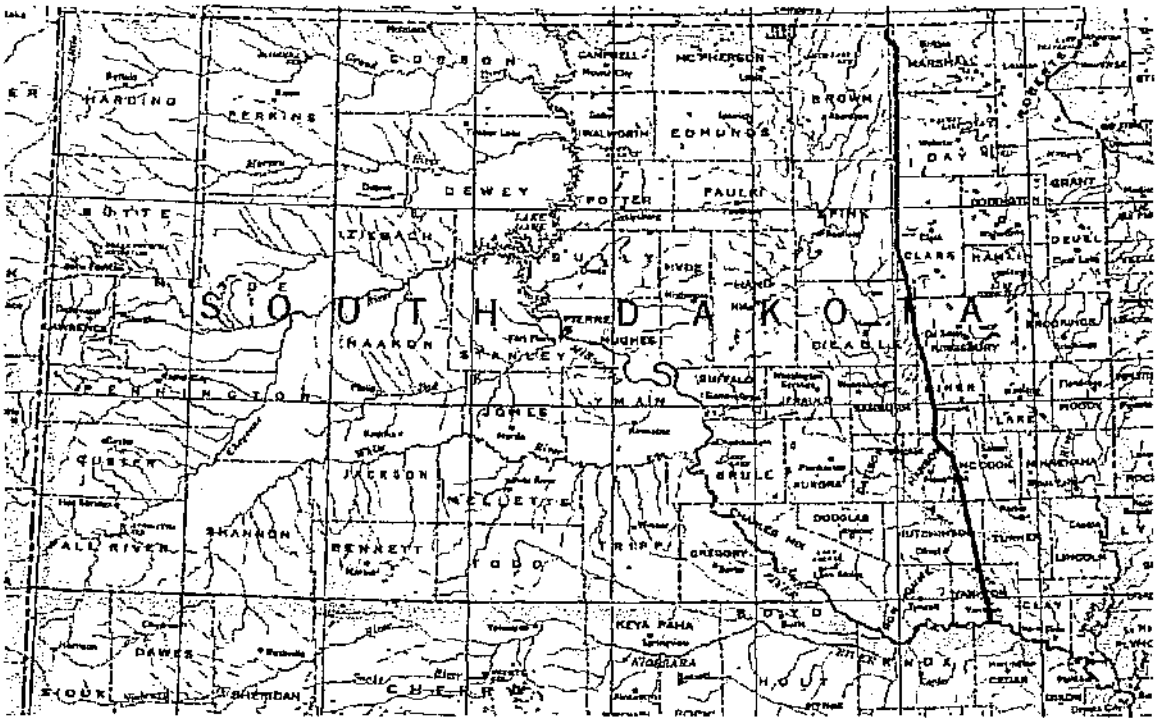

Figure 2. Map displaying the general location of the proposed pipeline route within South Dakota based on Leppard's (1939) state map.

Project Description

Metcalf Archaeological Consultants, Inc. was contracted by ENSR Corporation (ENSR) to conduct several levels of cultural resource investigations within South Dakota. (ENSR has been subcontracted by TransCanada to manage the biological and cultural surveys for the Keystone Pipeline project.) First, a Level I record search of 100% of the proposed pipeline route in South Dakota was conducted in January 2006. The Level I project area was two miles wide centered on the proposed pipeline centerline. The results of the record search were plotted on USGS 7.5' quadrangle maps and discussed with SDSHPO archaeologists. A research design was proposed, in consultation with the SDSHPO, and based on the results of the record search, areas were selected for the Level II intensive pedestrian survey. The research design, approved by the SDSHPO, is presented in Appendix 1.

The reconnaissance level investigation was conducted by Michael McFaul, Principal Geoarchaeologist of LSS, subcontracted by MAC to provide geoarchaeological analysis for the Keystone Pipeline Project. The reconnaissance survey provided a characterization of the geomorphological landscape and identified additional areas of interest for the Level II survey. The reconnaissance investigation included 100% coverage of the project corridor by vehicle.

The third level of investigation was the Level II intensive pedestrian inventory of selected

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Contents
Supplemental Filing, January 24, 2007
CUSHING EXTENSION

REX SURVEYS

Overview – Keystone Pipeline Project Cultural Resource Surveys and Reports

Cultural Resource Surveys and Reports

Construction and operation of the Keystone Pipeline Project (Keystone) may affect cultural resources protected under the National Historic Preservation Act (NHPA), and by individual State legislation. During 2006, Keystone initiated contact with the State Historic Preservation Officer (SHPO) in each state to identify known cultural resource sites, and to develop survey plans. Keystone submitted records searches and research designs to each state for review and approval. Agency coordination documentation and survey protocols were filed by Keystone with the Department of State (DOS) on September 15, 2006.

Cultural resource field surveys along the proposed Mainline pipeline right-of-way were initiated in the spring and summer of 2006, and were completed in the fall of 2006. These surveys were conducted along the pipeline route alignment that was filed with the DOS on September 15, 2006. Additional field surveys will be conducted during the spring and summer of 2007 to survey pipeline reroutes, pump stations, certain pipe storage yards and contractor yards, access roads, and pipeline segments where access was not previously available. Field surveys will be conducted along the Cushing Extension and on pump station sites, pipe storage yards and contractor yards associated with the extension in early 2007.

Keystone reached an agreement with Kinder Morgan to purchase the cultural resources survey reports for the proposed Rockies Express Pipeline (REX) segment that will be located parallel to the Keystone pipeline route in Nebraska, Kansas, and Missouri. The Rockies Express reports and concurrence letters received from the SHPO in each state were included in the November 17, 2006, supplemental filing.

Keystone initiated discussions with the Nebraska, Kansas, and Missouri SHPOs to define a process for incorporating the REX survey results into the Keystone project. Keystone prepared maps of its proposed construction surface disturbance footprint in relation to the REX cultural resources survey corridor. These maps documented the portion of the REX survey corridor that includes the proposed Keystone surface disturbance. The SHPOs reviewed this submittal and provided concurrence letters for the portion of the Keystone Project located within the REX survey corridor. The concurrence letters are included in this supplemental filing.

Keystone will document proposed surface disturbance located outside the REX survey corridor and will conduct field surveys in these areas. The results will be submitted to the SHPOs in a separate Keystone report, as agreed to by the SHPOs.

Included in this filing are six binders:

- Binder 1: North Dakota Cultural Resources Report.
- Binder 2: South Dakota Cultural Resources Report.
- Binder 3: Nebraska Cultural Resources Report.
- Binder 4: Kansas Cushing Research Design/SHPO concurrence letter; Keystone/REX Co-locate transmittals and SHPO concurrence.
- Binder 5: Missouri Interim Cultural Resources/Site Testing Report.
- Binder 6: Illinois Cultural Resources Report, Site Testing Report, and Corps of Engineers Letter Report.

These reports contain results of the pedestrian survey along the Mainline pipeline right-of-way in North/South Dakota, Nebraska, Missouri, and Illinois. Site testing to determine National Register eligibility was conducted in North Dakota, Missouri, and Illinois. The results of site testing in Missouri and Illinois can be found in the testing reports included in this filing; results of testing in North Dakota will be included in the March filing. All potentially eligible sites in South Dakota and Nebraska were avoided by reroutes; therefore, no site testing was conducted in these states. Also included in this filing is the revised Kansas Cushing research design, Keystone/REX co-location transmittals, including maps, and SHPO

concurrence. All of the information contained in this filing will be reviewed by the SHPOs and the DOS and will provide documentation for the Environmental Impact Statement.

As stated previously, Keystone will file cultural resource survey reports in early 2007 for the Cushing Extension, as well as Mainline reroutes, ancillary facilities, and any additional site testing (if required).

Table 1 outlines the process for the collection and submission of cultural resource data.

The cultural resource reports filed herewith identify a number of sites in each state that have either not been evaluated for eligibility for listing on the National Register of Historic Places (NRHP) or have been determined potentially NRHP-eligible, based on preliminary field investigations and testing. The cultural resource reports for each state recommend that a finding of no impact is appropriate, if Keystone agrees to avoid the unevaluated or potentially eligible sites. Keystone commits to avoid each of the sites in question. Table 2 lists the sites, along with the type of site and the avoidance measures that Keystone commits to undertake to avoid each of those sites.

Table 1 - Keystone Pipeline Project – Cultural Resources Field Surveys and Report Completion Plan – January 2007

State	Survey Status	September 2006 DOS Filing	November 2006 DOS Filing	January 2007 DOS Filing	Supplemental Reports
North Dakota	Field Survey Completion Status as of January 2007: • Pedestrian Survey – 88% • Site Testing – 100% Spring 2007 – follow up surveys as needed for reroutes and ancillary sites.	Cultural resources record search; Survey protocols and survey areas.	Keystone Cultural Resources Status Report (pedestrian survey results and site forms, site testing methodology).	Compilation of 2006 surveys (pedestrian and geomorphological surveys).	March 2007 Site testing report. May or June 2007 Reports will include survey results for any pipeline reroutes and ancillary facilities, and site testing (if required).
South Dakota	Completion Status as of January 2007: • Pedestrian Survey – 86% • Site Testing – no sites Spring 2007 –follow up surveys as needed for reroutes and ancillary sites.	Cultural resources record search; Survey protocols and survey areas.	Keystone Cultural Resources Status Report (pedestrian survey results and site forms, site testing methodology).	Compilation of 2006 surveys (pedestrian and geomorphological surveys).	May or June 2007 Reports will include survey results for any pipeline reroutes and ancillary facilities, and site testing (if required).

Table 1 - Keystone Pipeline Project – Cultural Resources Field Surveys and Report Completion Plan – January 2007

State	Survey Status	September 2006 DOS Filing	November 2006 DOS Filing	January 2007 DOS Filing	Supplemental Reports
Nebraska	Mainline Completion Status as of January 2007: • Pedestrian Survey – 97% • Site Testing – no sites Spring 2007 – Mainline follow up surveys; Cushing Extension.	Cultural resources record search; Survey protocols and survey areas.	Keystone Cultural Resources Status Report (pedestrian survey results and site forms). Rockies Express (REX) Cultural Surveys in NE (pedestrian survey results and SHPO concurrence for segments where REX and Keystone are co-located).	Compilation of 2006 surveys (pedestrian and geomorphological surveys). Map documentation of Keystone proposed construction ROW overlap with REX cultural resource survey areas and SHPO concurrence.	March 2007 Mainline field survey status report for any areas outside REX survey areas. Cushing Extension field surveys – status report. May or June 2007 Reports will include Mainline survey results for pipeline reroutes and ancillary facilities, and site testing (if required). Cushing Extension – Pedestrian survey results; site testing (if required).

Table 1 - Keystone Pipeline Project – Cultural Resources Field Surveys and Report Completion Plan – January 2007

State	Survey Status	September 2006 DOS Filing	November 2006 DOS Filing	January 2007 DOS Filing	Supplemental Reports
Kansas	Field Survey Completion Status as of January 2007: • Mainline Pedestrian Survey – 99% • Mainline Site Testing – 0% • Cushing Extension – 0% 2007 Spring – Mainline Follow up surveys; Cushing Extension.	Cultural resources record search; Survey protocols and survey areas.	REX Cultural Surveys in KS (pedestrian survey results and SHPO concurrence for segments where REX and Keystone are co-located).	Map documentation of Keystone proposed construction ROW overlap with REX cultural resource survey areas and SHPO concurrence. Cushing Extension Revised research design (maps included) and SHPO concurrence.	March 2007 Mainline field survey status report for any areas outside REX survey area. Cushing Extension field surveys – status report. May or June 2007 Reports will include Mainline survey results for pipeline reroutes and ancillary facilities, and site testing (if required). Cushing Extension – Pedestrian survey results; site testing (if required).
Missouri	Field Survey Completion Status as of January 2007: • Mainline Pedestrian Survey – 85% • Mainline Site Testing – 44%	Cultural resources record search; Survey protocols and survey areas.	Keystone Cultural Resources Status Report (pedestrian and geomorphological survey results and site forms)	Compilation of 2006 surveys (pedestrian and geomorphological surveys and site testing). Map documentation	May or June 2007 Reports will include Mainline survey results for pipeline reroutes and ancillary facilities, and site testing (if

Table 1 - Keystone Pipeline Project – Cultural Resources Field Surveys and Report Completion Plan – January 2007

State	Survey Status	September 2006 DOS Filing	November 2006 DOS Filing	January 2007 DOS Filing	Supplemental Reports
	Spring 2007 – Follow up surveys for reroutes and ancillary sites.		REX Cultural Surveys in MO (pedestrian survey results and SHPO concurrence for segments where REX and Keystone are co-located.	of Keystone proposed construction ROW overlap with REX cultural resource survey areas and SHPO concurrence.	required).
Illinois	Field Survey Completion Status as of January 2007: • Pedestrian Survey – 89% • Site Testing –33% Spring 2007 – Follow up surveys for reroutes and ancillary sites.	Cultural resources record search; Survey protocols and survey areas.	Keystone Cultural Resources Status Report (pedestrian survey results and site forms).	Compilation of 2006 surveys (pedestrian and geomorphological surveys, and site testing).	May or June 2007 Mainline survey results for pipeline reroutes and ancillary facilities, and site testing (if required).
Oklahoma	Spring 2007 Pedestrian and geomorphological surveys; site testing, if required.	Cultural resources record search; Survey protocols and survey areas.	No information filed.	No information filed.	March 2007 Cushing Extension field surveys – status report. May or June 2007 Cushing Extension survey results for pipeline reroutes, ancillary facilities; site testing, if required.

Table 2. Potentially Eligible Cultural Resource Sites and Reroute/Avoidance Status

	MP	Site Number	Site Type	Mitigation
North Dakota	March CL – MP 163.4	32BA170	Unevaluated Prehistoric lithic scatter	Rerouted to avoid site Reroute to be surveyed in 2007
	March CL – MP 20.6	32PB202	Unevaluated Prehistoric lithic scatter	Rerouted to avoid site Reroute to be surveyed in 2007
South Dakota	March CL – MP 265.3	39DA71	Archaeological rock cairn	Rerouted to avoid site Reroute to be surveyed in 2007
	March CL – MP 416.8	39YYK77	Archaeological rock cairn	Rerouted to avoid site Reroute to be surveyed in 2007
	March CL – MP 418.0	39YK79	Prehistoric artifact scatter	Rerouted to avoid site Reroute to be surveyed in 2007
Nebraska	June CL – MP 452.9	25CD21	Prehistoric field camp	Rerouted to avoid site
	March CL – MP 542.1	25CX7	Historic cabin	Rerouted to avoid site
	June CL – MP 570.0	25SW53	Prehistoric field camp	Rerouted to avoid site
	June CL – MP 568.0	25SW54	Prehistoric field camp	Rerouted to avoid site
	June CL – MP 696.6	25SA79	Farmstead	Rerouted to avoid site
Missouri	March CL – MP 999.3	JM – 20 23SC1054	Prehistoric field camp	Reroute pending. Subject to completion of testing
	September CL – MP 984.8	ARG-MO-26	Prehistoric field camp	Rerouted to avoid site Reroute to be surveyed in 2007
Illinois	March CL – MP 1064.9	JM-3	Prehistoric field camp (tested eligible)	Reduced construction ROW to avoid site
	March CL – MP 1051.2	JM-13	Prehistoric field camp	Rerouted to avoid site Reroute to be surveyed in 2007
	March CL – MP 1067.6	11FY20/RBM-1/ARG-2	Prehistoric field camp	Keystone evaluating the use of HDD to pass under the site

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Keystone Pipeline Project – Mainline Pipeline Route Alternatives

January 2007
Document No.: 10623-004

Contents

List of Appendices

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List of Figures

1.0 Introduction

The Keystone Project filed an updated pipeline centerline in its November 17, 2006 Supplemental Filing, which incorporated changes in the as-filed mainline pipeline alignment since April 2006 when the Environmental Report was first filed. Subsequent to November 2006, three additional route alternatives (4 to 55 miles in length) were developed by the Project to respond to environmental, land use, and project operational issues. For each route alternative, an alternative pump station location would also be required. These route alternatives consist of the following:

- Hecla Sandhills Route Alternative (55 miles in North and South Dakota; also involving Pump Station 19)
- Chain of Rocks Route Alternative (11 miles in Missouri; also involving Pump Station 36)
- Wood River Route Alternative (4 miles in Missouri and Illinois; also involving Pump Station 37)

Keystone has examined the environmental and project operational effects of each of these route and pump station alternatives, and recommends that the Department of State (DOS) adopt these alternatives as a component of an Agency Preferred Alternative for the Environmental Impact Statement. The comparative analysis below provides the basis for this recommendation.

2.0 Alternative Routes and Pump Station Locations

The following sections describe the three mainline route alternatives, the rationale for developing each alternative, and a comparative tabulation and analysis of the potential natural and human resource characteristics of the alternatives. The pipeline route centerline and associated pump station locations that were filed with the DOS in its November 17, 2006, filing are referred to as the "as-filed" facilities. The route alternatives are designated by a geographical name (e.g., Hecla Sandhills Route Alternative) and the alternative pump stations by the current numbering system for individual pump stations (e.g., Alternative Pump Station 19).

The majority of the data used in this analysis are from published sources and high resolution aerial photography. During the summer of 2006, wetland, cultural resources, and biological surveys were conducted on portions of the as-filed mainline pipeline route that correspond to the pipeline route alternatives. No field work has been conducted on the route alternatives described here, with the exception of the Wood River Alternative Route and Alternative Pump Station 37 site. Field work will be completed on the alternatives in spring and summer 2007.

Line lists of landowners crossed by alternative routes, and landowners within 0.5 mile of the alternative pump station locations are contained in Appendix A.

3.0 Hecla Sandhills Route Alternative and Alternative Location for Pump Station 19

3.1 Introduction

The 55-mile Hecla Sandhills Route alternative is located in Sargent County, North Dakota, and Marshall and Day counties, South Dakota. The Hecla Sandhills Route Alternative deviates from the as-filed alignment at approximately Milepost 192.3 in Sargent County, North Dakota, and rejoins the as-filed route at approximately Milepost 247.5

The Hecla Route Alternative and the corresponding as-filed route segment are illustrated on **Figure 1.**

The route alternative is illustrated at a scale of 1:6,000 on aerial photo base sheets in the Route Alternatives Map Book that accompanies this filing under the Tab "Hecla". The alternative route alignment is also illustrated on a 1:100,000 scale topographic in the Tab "Hecla". The alternative Pump Station 19 is illustrated on Sheet 018 in the Alternatives Map Book.

The as-filed route segment is illustrated on the 1:6,000 scale Mainline Route Sheets 0138 through Sheet 0177 in Appendix A to the November 17, 2006, Supplemental Filing. The as-filed Pump Station 19 location is illustrated on sheet 0155 in Appendix A to the November 17, 2006, Supplemental Filing.

3.2 Rationale for Considering the Alternative

The following factors influenced the consideration of this route alternative:

1) The as-filed route would cross USFWS wetland and grassland easements. Concerns were raised about revegetating and stabilizing native grasslands on dune and sandy substrates.

2) The as-filed route would cross shallow aquifers that are used for domestic and agricultural uses, and would cross an extensive area of wetlands within an area of very sandy substrates (stabilized dunes). Concerns were expressed by landowners, local officials, and the U.S. Fish and Wildlife Service (USFWS) about the risk of groundwater contamination from any pipeline leaks and spills, and the potential for movement of contaminants into the sandy and gravelly substrates that contain shallow aquifers.

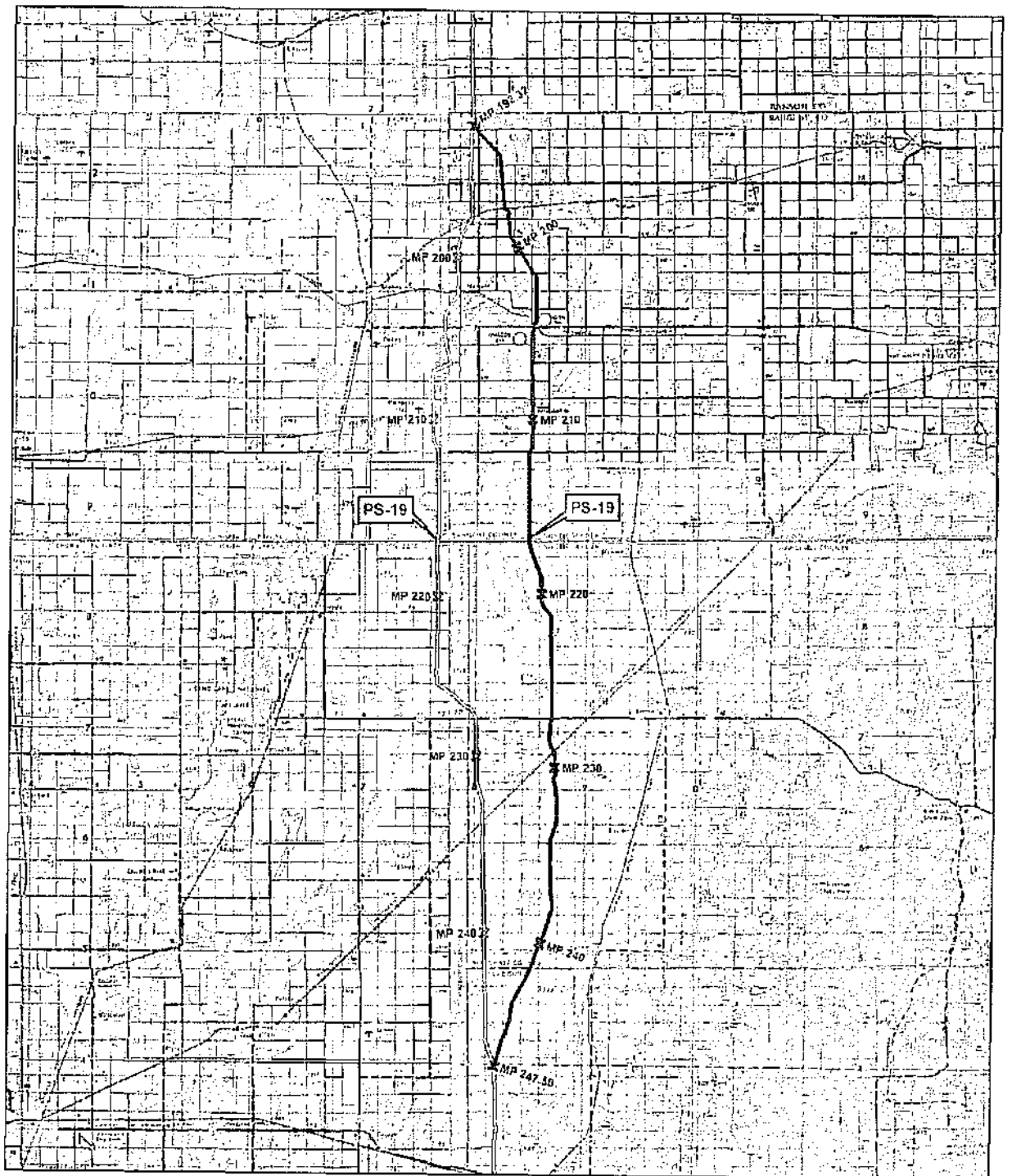
3) The pump station site associated with this alternative requires a shorter power line.

3.3 Pipeline Route Analysis

Table 1 provides a comparative summary of natural and human resources relevant to the Hecla Sandhillls Route alternative and the corresponding portion of the as-filed route.

3.3.1 Natural Resources

As compared to the as-filed route, the alternative route would cross 11 fewer miles of palustrine emergent wetlands. The as-filed route would cross approximately 1.0 mile of USFWS grassland easements versus none for the alternative; the as-filed route would cross approximately 4 miles of wetland easements versus 1 mile for the alternative **(Figure 2).** The as-filed route crosses approximately 3 more miles of high quality native prairie, which could support populations of



Legend
As-Filed Route
Hecla Sandhills Alternative Route

Keystone Pipeline Project

- Figure 1 -
Hecla Sandhills Route and Pump Station Alternatives

0 5 10 Miles

1:500,000

N

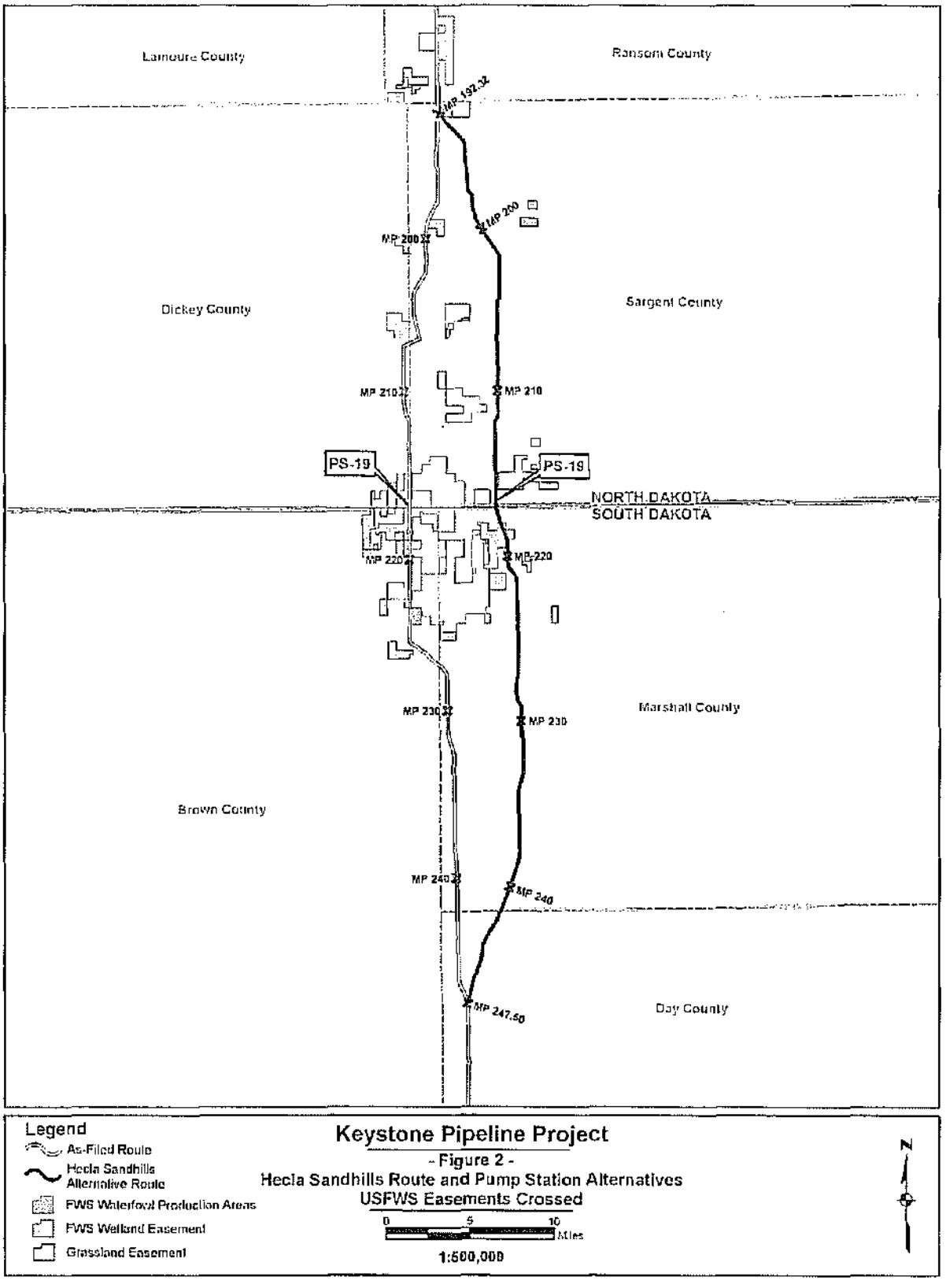

Lamoure County
Ransom County
MP 192.32
MP 200
MP 200
Dickey County
Sargent County
MP 210
MP 210
PS-19
PS-19
NORTH DAKOTA
SOUTH DAKOTA
MP 220
MP 220
MP 230
MP 230
Marshall County
Brown County
MP 240
MP 240
MP 247.50
Day County
Legend
As-Filed Route
Hecla Sandhills Alternative Route
FWS Waterfowl Production Areas
FWS Wetland Easement
Grassland Easement
Keystone Pipeline Project
- Figure 2 -
Hecla Sandhills Route and Pump Station Alternatives
USFWS Easements Crossed
0
5
10
Miles
1:500,000
N

Table 1 Resource Factors – Hecla Sandhills Alternative Pipeline Crossings

	Units	As-filed Route	Alternative Route
Length	Mi.	55.1	55.2
Length By County	Mi.		
Sargent County, ND	Mi.	14.4	24.5
Dickey County, ND	Mi.	10.1	
Brown County, SD	Mi.	10.2	
Marshall County, SD	Mi.	14.9	24.7
Day County, SD	Mi.	5.5	6.0
Ownership			
Private	Mi.	54.6	54.1
State	Mi.	0.5	1.1
Federal	Mi.	0.0	0.0
Mineral Resources			
Mineral Extraction Sites		Potential sand and gravel in Day County	Potential sand and gravel in Day County
Soils			
Sandy (surface)	Mi.	21.6	11.2
Shallow to bedrock	Mi.	<0.1	0.0
Stony/rocky	Mi.	0.0	0.0
Prime farmland	Mi.	26.2	29.4
Water Resources/Wetlands			
Perennial streams	No.	0	0
Impaired waterbodies	No.	0	0
Public water supplies within 1 mile of centerline	No.	1	1
Shallow water supply aquifers (North Dakota)	Mi.	20.4 (12.7 high yield)	5.2 (high yield)
Land Cover			
Wetlands			
Palustrine emergent	Mi.	13.1	2.3
Shrub scrub	Mi.	1.0	0.1
Palustrine forested	Mi.	0.0	0.0
Open Water	Mi.	0.1	0.0
Grassland/pastureland	Mi.	6.9	14.2
Woodlands	Mi.	0.0	0.2
Annual Cropland	Mi.	33.6	37.5
Residential/Commercial	Mi.	0.2	0.1
ROW (road, railroad)	Mi.	0.2	0.8
Utility Crossings			
Railroad crossings	No.	3	3
Road crossings (major paved highways)	No.	4	4

Table 1 Resource Factors – Hecla Sandhills Alternative Pipeline Crossings

	Units	As-filed Route	Alternative Route
Sensitive Wildlife Habitats and Species			
Sensitive Habitats – Native Prairie	Mi.	3.9	1.1
Sensitive Plants (by species)		More potential habitat – Western Prairie Fringed Orchid	Less potential habitat – Western Prairie Fringed Orchid
Sensitive Animals (by species)		More potential habitat – Dakota Skipper	Less potential habitat – Dakota Skipper
Sensitive Aquatic systems (by name)	No.	0	0
Land Use			
Potential Residences/Residential Areas within 500 feet	No.	21	5
Public Assembly locations (e.g., schools, churches) within 500 feet	No.	0	1
Designated recreation areas (state, federal, local) – by name	Mi.	0.0	0.0
Special Management Area (USFWS grassland easements on private land)	Mi.	1.0	0
Special Management Area (USFWS wetland easements on private land)	Mi.	4.2	1

western prairie fringed orchid and the Dakota skipper butterfly. Based on these factors, the alternative route would result in less surface disturbance within sensitive habitats (wetlands and native prairie) than the as-filed route.

As compared to the as-filed route, the alternative route would cross approximately 5 fewer miles of sandy and gravelly soils, and approximately 15 fewer miles of mapped shallow water supply aquifers in North Dakota (**Figure 3**). As a consequence, there would be proportionally less potential (based on mileage) for crude oil releases to directly affect underlying shallow aquifers along the alternative route, and potentially lower potential risk of downward spread of a spill or leak into highly permeable soils.

3.3.2 Human Resources

As compared to the as-filed route, the alternative route would cross approximately 3 more miles of prime farmland. Keystone would apply agricultural mitigation procedures outlined in its *Construction Mitigation and Reclamation Plan*. The number of utility crossings (roads, railroads) is the same between alternatives. The alternative route would pass within 500 feet of 16 fewer residences or residential areas (based on photointerpretation) as compared to the as-filed route.

3.4 Pump Station 19 Location Analysis

Table 2 provides a comparative summary of natural and human resource that may be affected by pump station.

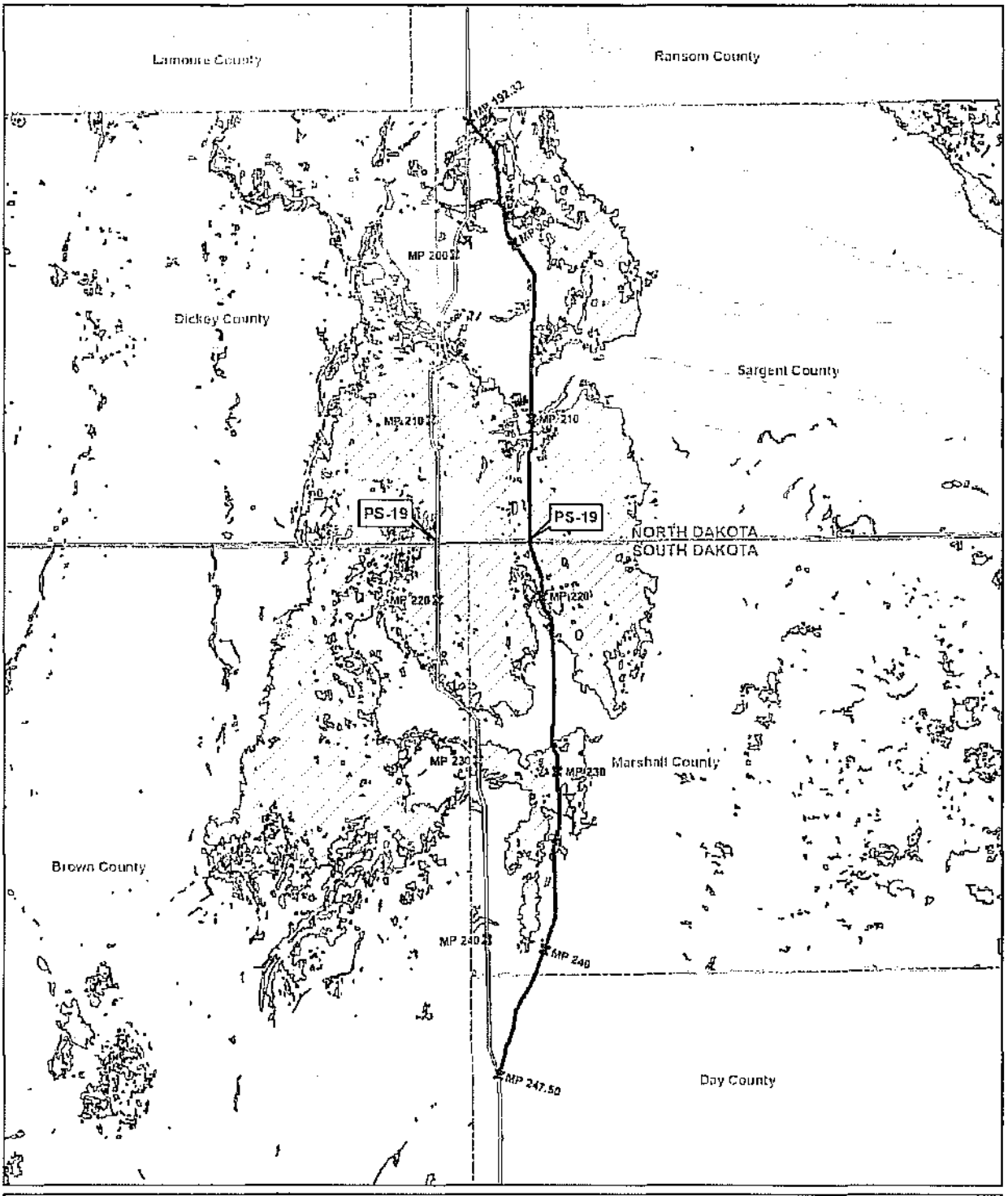

Lamoure County
Ransom County
Dickey County
Sargent County
Marshall County
Brown County
Day County
NORTH DAKOTA
SOUTH DAKOTA
PS-19
PS-19
MP 192.32
MP 200
MP 210
MP 210
MP 220
MP 220
MP 230
MP 230
MP 240
MP 247.50
Legend
As-Filed Route
Hecla Sandhills Alternative Route
ND Aquifers - Yields 50 to 500 gpm
ND Aquifers - Yields >500 gpm
Sandy Substrate Soils
(Data not available for Day County, SD)
Keystone Pipeline Project
- Figure 3 -
Hecla Sandhills Route and Pump Station Alternatives
Aquifers and Sandy Substrate Soils
0
5
10
Miles
1:500,000
N

Table 2 Hecla Sandhills Alternative Resource Factors – Pump Stations

	Units	As-filed Station Site	Alternative Station Site
Area	acres	5	5
Length of Powerline Required	miles	26.7	21.7
Ownership			
Private	Yes/no	Yes	Yes
State	Yes/no	No	No
Federal	Yes/no	No	No
Mineral Resources			
Mineral Extraction Sites	Yes/no	No	No
Soils Constraints (sandy, shallow, rocky, wet)	Yes/no	No	No
Water Resources/Wetlands			
Perennial streams within 500 feet	Yes/no	No	No
Impaired waterbodies within 500 feet	Yes/no	No	No
Public water supplies within 1 mile of centerline	Yes/no	No	No
Shallow water supply aquifers	Yes/no	Yes	No
Wetlands	Yes/no	No	No
Land Cover			
Annual Cropland	Acres	5	5
Sensitive Wildlife Habitats and Species			
Sensitive Habitats – Native Prairie	Yes/no	No	No
Sensitive Plant Habitat (by species)	Yes/no	No	No
Sensitive Animal Habitat (by species)	Yes/no	No	No
Sensitive Aquatic systems (by name)	Yes/no	No	No
Land Use			
Residences/Residential Areas within 1 mile	Number	3	0
Public Assembly locations (e.g., schools, churches) within 1 mile	Number	0	0
Designated recreation areas (state, federal, local) – by name	Yes/no	No	No
Special Management Areas (wildlife management areas, State Conservation Reserve, USFWS wetland and grassland easements)	Yes/no	No	No

3.5 Natural Resources

The primary difference between the as-filed site and the alternative pump station site is that the alternative location would not overlie a mapped shallow aquifer. There would be 5 less miles of powerline required by the alternative as compared to the as-filed pump station.

3.5.1 Human Resources

The primary difference between the alternative pump station sites would be the shifting of local property tax benefits. The alternative pump station location would be located in Sargent County, while the as-filed route location would be in Dickey County, North Dakota.

3.6 Recommendations

Construction of the Hecla Sandhills Alternative pipeline segment would result in substantially less miles of palustrine (meadow) wetlands, high quality native prairie, and shallow aquifers crossed as compared to the as-filed route. The alternative route would cross no USFWS grassland easements, and would cross 3 less miles of USFWS wetland easements. The alternative pipeline route would largely address spill risk concerns related to the shallow aquifers and revegetation concerns raised by landowners, local elected officials, and the USFWS. The alternative pump station would require 5 less miles of electrical service powerline. Based on these factors, Keystone recommends that the Department of State include the Hecla Sandhills Alternative Route and Alternative Pump Station 19 site in its Agency Preferred Alternative in the Environmental Impact Statement.

4.0 Chain of Rocks Alternative and Alternative Pump Station 36

4.1 Introduction

The 11-mile Chain of Rocks Alternative Route is located in Lincoln and Saint Charles counties, Missouri. The Chain of Rocks route alternative deviates from the as-filed route at Milepost 976.5, and rejoins the as-filed route at Milepost 987.5.

The Chain of Rocks Route Alternative and the corresponding as-filed route segment are illustrated on **Figure 4.**

The route alternative is illustrated at a scale of 1:6,000 on aerial photo base sheets in the Route Alternatives Map Book that accompanies this filing under the Tab "Chain of Rocks". The alternative route alignment is also illustrated on a 1:100,000 scale topographic in the Tab "Chain of Rocks". The alternative Pump Station 36 is illustrated on Sheet 003 in the Alternatives Map Book.

The as-filed route segment is illustrated on the 1:6,000 scale Mainline Route Sheets 0699 through Sheet 0707 in Appendix A to the November 17, 2006, Supplemental Filing. The as-filed Pump Station 36 location is illustrated on sheet 0705 in Appendix A to the November 17, 2006, Supplemental Filing.

4.2 Rationale for Considering the Alternative

The following factors influenced the consideration of a route alternative:

1. The as-filed pipeline alignment is located parallel to the existing Platte pipeline that was constructed approximately 50 years ago. Residences and residential developments have been constructed adjacent to the existing pipeline since then. In particular, the existing pipeline passes within 500 feet of an existing mobile home park that contains 150 to 200 individual mobile home units. Even if residences and outbuildings are avoided, lawns and pastures on smaller acreages would be crossed.

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Legend
As-Filed Route
Chain of Rocks Alternative Route

Keystone Pipeline Project

- Figure 4 -
Chain of Rocks Route and Pump Station Alternatives

0 1 2 Miles
1:100,000

2. The Keystone Project is in discussions with an electric utility to purchase land for pump station 36 adjacent to an existing power line which requires the pipeline to be routed to this location. This utility is planning to install a substation to improve service to other utility customers in the area and increase capacity. The substation for the pump station 36 will be an extension of the utility substation and no additional power lines to the Keystone pump station are required. Locating pump station 36 adjacent to existing utility infrastructure will improve reliability of service to Keystone and other utility customers in the area.

3. The alternative pipeline alignment provides a better location for crossing the Cuivre River as compared to the as-filed route because it avoids congestion associated with the existing Platte Pipeline and an adjacent county road bridge. The alternative route also would avoid two large archaeological sites crossed by the as-filed route near the Cuivre River.

4.3 Pipeline Route Analysis

Table 3 provides a comparative summary of natural and human resources that would be crossed, or be affected by pipeline construction and operation.

Table 3 Resource Factors – Chain of Rocks Alternative Pipeline Crossings

	Units	As-filed Route	Alternative Route
Length	Mi.	10.4	11.4
Length By County			
Lincoln County	Mi.	4.3	5.4
Saint Charles County	Mi.	6.1	6
Ownership			
Private	Mi.	10.4	11.4
Mineral Resources			
Mineral Extraction Sites		No	No
Soils			
Sandy	Mi.	0.0	0.0
Shallow to bedrock	Mi.	7.9	8.3
Stony/rocky	Mi.	0.3	0.3
Prime farmland	Mi.	4.6	5.6
Water Resources/Wetlands			
Perennial streams	No.	2	2
Impaired waterbodies	No.	1	1
Public water supplies within 1 mile of centerline	No.	3	1
Shallow water supply aquifers		Alluvial aquifer – Cuivre River floodplain	Alluvial aquifer – Cuivre River floodplain
Wetlands			
Palustrine emergent	Mi.	0.1	0.2
Shrub scrub	Mi.	<0.1	0.7
Palustrine forested	Mi.	1.0	0.2
Open water	Mi.	0.1	0.1
Land Cover			
Grassland/pastureland	Mi.	0.0	1.5
Woodlands	Mi.	0.4	1.2
Annual Cropland	Mi.	8.4	7.3
Residential/Commercial	Mi.	0.3	0.0
ROW (road, railroad)	Mi.	0.1	0.2

Table 3 Resource Factors – Chain of Rocks Alternative Pipeline Crossings

	Units	As-filed Route	Alternative Route
Railroad crossings	No.	0	0
Road crossings	No.	1	1
Levee crossings	No.	0	0
Sensitive Wildlife Habitats and Species			
Sensitive Habitats – Native Prairie	Mi.	0.0	0.0
Sensitive Plants (by species)	Mi.	0.2 False Aster, Buffalo	0.3 False Aster, Buffalo Clover
Sensitive Animals (by species)	Mi.	0.4 Indiana Bat 0.2 King Rail 0.2 Northern Harrier 0.2 Massasauga/W. Fox Snake	0.4 Indiana Bat 0.2 King Rail 0.2 Northern Harrier 0.2 Massasauga/W. Fox Snake
Sensitive Aquatic systems (by name)	No.	Fish/Mussel at Cuivre River	Fish/Mussel at Cuivre River
Land Use			
Potential Residences/Residential Areas within 500 feet	No.	86	32
Public Assembly locations (e.g., schools, churches) within 500 feet.	No.	1	0
Designated recreation areas (state, federal, local) – by name	Mi.	0.0	0.0
Special Management Areas (wildlife management areas, State Conservation Reserve, USFWS wetland and grassland easements)	Mi.	0.0	0.0

4.3.1 Natural Resources

The primary differences between the routes are the length of floodplains crossed, and proximity to waterbodies. The as-filed route would cross approximately 0.3 mile of the Cuivre River floodplain versus 1.2 miles by the alternative. The as-filed route would pass within 0.1 mile of the Horseshoe Lake, with a buffer of woodlands between the pipeline route and the lake; the alternative route would cross a short segment (200 feet) of Horseshoe Lake. The alternative route would cross approximately 0.7 mile of shrub-scrub wetlands versus less than 0.1 mile for the as-filed route; the alternative route would cross 0.2 mile of palustrine forested wetland versus 1.0 mile for the as-filed route, so that reductions in the land cover of woody wetland species would be slightly higher for the as-filed route as compared to the alternative. The alternative route passes within 1 mile of two fewer public water supplies than the as-filed route.

4.3.2 Human Resources

The primary difference between the two routes is the larger number of residences within 500 feet of the as-filed route versus the alternative (86 versus 32, respectively). This larger number is primarily

because of the mobile home park. Another difference is the length parallel to existing utilities. The as-filed route is parallel to an existing pipeline for 10.5 miles; the alternative is parallel to a railroad bed for 1.8 miles and a highway for 3.6 miles, or approximately 50 percent of its length.

4.4 Pump Station Location Analysis

Table 4 provides a comparative summary of natural and human resource that may be affected by the Pump Station 36 locations.

Table 4 Resource Factors – Chain of Rocks Pump Station Alternatives

	Units	As-filed Station Site	Alternative Station Site
Area	acres	5	5
Length of Power line Required	miles	0	0
Ownership			
Private	Yes/no	Yes	Yes
State	Yes/no	No	No
Federal	Yes/no	No	No
Mineral Resources			
Mineral Extraction Sites	Yes/no	No	No
Soils Constraints		No	No
Water Resources/Wetlands			
Perennial streams within 500 feet	Yes/no	Yes	No
Impaired waterbodies within 500 feet	Yes/no	No	No
Public water supplies within 1 mile of centerline	Yes/no	No	No
Shallow water supply aquifers	Yes/no	No	No
Wetlands		No	No
Land Cover			
Annual Cropland	Acres	5	5
Sensitive Wildlife Habitats and Species			
Sensitive Habitats – Native Prairie	Yes/no	No	No
Sensitive Plant Habitat (by species)	Yes/no	No	No
Sensitive Animal Habitat (by species)	Yes/no	No	No
Sensitive Aquatic systems (by name)	Yes/no	No	No
Land Use			
Potential Residences/Residential Areas within 1 mile	Number	10	20
Public Assembly locations (e.g., schools, churches) within 1 mile	Number	0	0
Designated recreation areas (state, federal, local) – by name	Yes/no	No	No
Special Management Areas (wildlife management areas, State Conservation Reserve, USFWS wetland and grassland easements)	Yes/no	No	No

4.4.1 Natural Resources

The alternative location would be located in an upland area approximately 0.2 mile away from a small Cuivre River tributary (Campbell Branch). The as-filed pump station location would be located approximately 0.2 mile from a large wetland complex (Horseshoe Lake) on the Cuivre River floodplain.

4.4.2 Human Resources

The primary difference between the alternative pump station sites is the larger number of residences within 0.5 mile of the alternative route site. The as-filed route site is located adjacent to an existing highway, the alternative site is located next to a less traveled county road. The as-filed station site would be located to existing transmission line; the alternative pump station would be located adjacent to an electrical substation. Based on this proximity to electrical utilities, no additional powerline would be required to operate these stations.

4.5 Recommendations

The alternative route would affect less forested wetlands and would provide a better location for crossing the Cuivre River. Co-location of the pump station with a utility substation provides an opportunity for clustering industrial facilities within a rural and residential landscape, and improving the service reliability to the Keystone pump station. In addition, the alternative route would reduce the number of potential residences in close proximity to the pipeline. On balance, the reduction in land use issues associated with the as-filed route, and the opportunity for co-location with the utility substation favor the selection of the alternative route and pump station. Keystone recommends that the Department of State include the Chain of Rocks Alternative Route and Alternative Pump Station 36 site in its Agency Preferred Alternative in the Environmental Impact Statement.

5.0 Wood River Pipeline Route Alternative and Alternative Pump Station 37

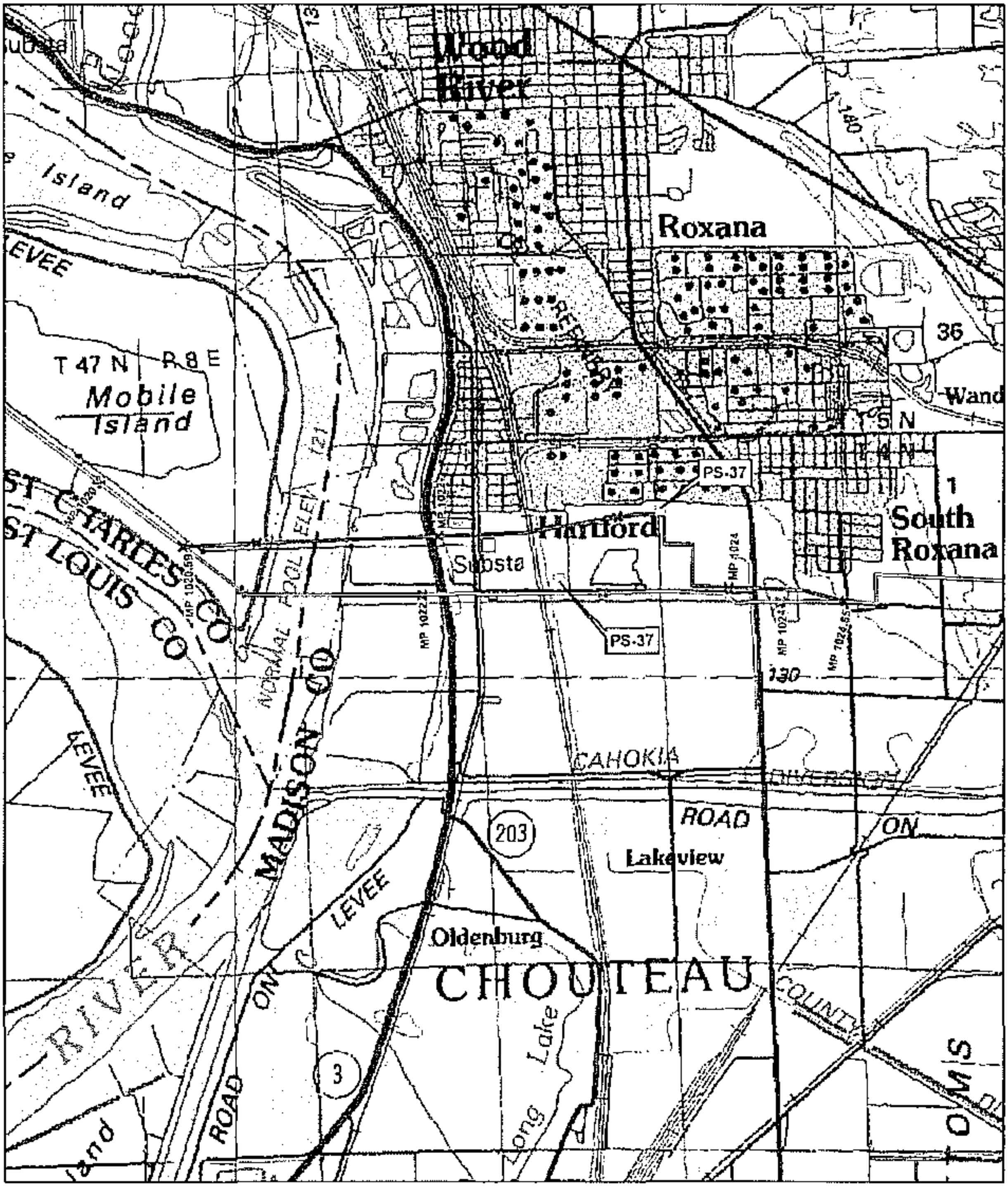
5.1 Introduction

The 4-mile Wood River Alternative Route is located in Saint Charles County, Missouri and Madison County, Illinois. The Wood River route alternative deviates from the as-filed route at Milepost 1020.6, and rejoins the as-filed route at Milepost 1024.4.

The Wood River Route Alternative and the corresponding as-filed route segment are illustrated on **Figure 5.**

The route alternative is illustrated at a scale of 1:6,000 on aerial photo base sheets in the Route Alternatives Map Book that accompanies this filing under the Tab "Wood River". The alternative route alignment is also illustrated on a 1:100,000 scale topographic in the Tab "Wood River". The alternative Pump Station 37 is illustrated on Sheet 003 in the Alternatives Map Book.

The as-filed route segment is illustrated on the 1:6,000 scale Mainline Route Sheets 0730 through Sheet 0733 in Appendix A to the November 17, 2006, Supplemental Filing. The as-filed Pump Station 37 location and 0.8 mile pipeline lateral is illustrated on sheet 0732 in Appendix A to the November 17, 2006, Supplemental Filing.



Legend

As-Filed Route

Wood River Alternative Route

Keystone Pipeline Project

- Figure 5 -

Wood River Route and Pump Station Alternatives

0 0.5 1 Miles

1:50,000

N

5.2 Rationale for Considering the Alternative

The following factors influenced the consideration of a route alternative:

1) During route refinement activities, an opportunity to site Pump Station 37 adjacent to the Wood River refinery was identified. The route alternative represents the adjustment necessary to site the station at that location.

2) This relocation would allow the pullback for horizontal directional drills of the Mississippi River and levees on the east side of the river to stay within the Keystone Project right-of-way (ROW), which would eliminate additional surface disturbance outside the construction ROW.

3) Construction of the alternative would eliminate the need to construct a 0.8 mile lateral from the as-filed pump station to the terminus at the refinery.

5.3 Pipeline Route Analysis

Table 5 provides a comparative summary of natural and human resources that would be crossed, or be affected by pipeline construction and operation.

Table 5 Resource Factors – Wood River Alternative Pipeline Crossings

	Units	As-filed Mainline Route and Pump Station lateral pipeline	Alternative Route
Length	Mi.	4.9	4.1
Length By County			
St Charles County	Mi.	0.8	0.8
Madison County	Mi.	4.1	3.3
Ownership			
Private	Mi.	3.6	3.6
State	Mi.	1.3	0.5
Federal	Mi.	0.0	0.0
Mineral Resources			
Mineral Extraction Sites		Potential stone, sand, gravel, clay, and coal in Madison County	Potential stone, sand, gravel, clay, and coal in Madison County
Soils Constraints			
Prime farmland	Mi.	4.6	3.5
Water Resources/Wetlands			
Perennial streams	No.	1	1
Impaired waterbodies	No.	1	1
Public water supplies within 1 mile of centerline	No.	0	3
Shallow water supply aquifers		Potential in Madison County	Potential in Madison County
Wetlands			
Palustrine emergent	Mi.	0.2	0.3
Shrub scrub	Mi.	0.0	0.1
Palustrine	Mi.	0.0	0.4

Table 5 Resource Factors – Wood River Alternative Pipeline Crossings

	Units	As-filed Mainline Route and Pump Station lateral pipeline	Alternative Route
forested			
Open water	Mi	0.5	0.4
Land Cover			
Grassland/pastureland	Mi.	0.0	0.8
Woodlands	Mi.	0.0	0.0
Annual Cropland	Mi.	3.6	1.5
Residential/Commercial	Mi.	0.5	0.4
ROW (road, railroad)	Mi.	0.1	0.2
Railroad crossings	No.	2	2
Road crossings	No.	2	2
Levee crossings	No.	2	2
Sensitive Wildlife Habitats and Species			
Sensitive Habitats – Native Prairie	Mi.	0.0	0.0
Sensitive Plants (by species)		Eastern Fringed Orchid, Royal Catchfly, Prairie spiderwort	Eastern Fringed Orchid, Royal Catchfly, Prairie spiderwort
Sensitive Animals (by species)		Massasauga/Kirtlands's snake, Indiana bat	Massasauga/Kirtlands's snake, Indiana bat
Sensitive Aquatic systems (by name)	No.	Directional drill of Mississippi River	Directional drill of Mississippi River
Land Use			
Potential Residences/Residential Areas within 500 feet	No.	20	33
Public Assembly locations (e.g., schools, churches) within 500 feet.	No.	0	0
Designated recreation areas (state, federal, local) – by name	Mi.	Confluence State Park 1.3	Confluence State Park 0.5
Special Management Areas (wildlife management areas, State Conservation Reserve, USFWS wetland and grassland easements)	Mi.	0.0	0.0

5.3.1 Natural Resources

There are few differences in potential effects on sensitive resources between the two alternatives. The primary differences between the routes is that the alternative route would involve less distance within a state park at the confluence of the Missouri and Mississippi Rivers. The alternative is 0.8 mile shorter in total, representing an overall reduction in the footprint of the project. Both routes would cross previously disturbed or farmed land on the east side of the Mississippi River.

5.3.2 Human Resources

The alternative route would be located closer to an existing residential development on the west side of the Wood River Refinery. Therefore there would be a larger number of residences within 500 feet of the alternative pipeline route. Levee and utility crossings would be the same for both routes. The as-filed route would cross more farmland because of construction of the pump station lateral pipeline. Since the alternative route crosses less state park land, this location could reduce public access and use disruptions to the state park.

5.4 Pump Station Analysis

Table 6 provides a comparative summary of natural and human resource that may be affected by pump station.

Table 6 Resource Factors – Wood River Pump Station Alternatives

	Units	As-filed Station Site	Alternative Station Site
Area	acres	5	5
Length of Powerline Required (345 kV)	miles	0	0.5
Ownership			
Private	Yes/no	Yes	Yes
State	Yes/no	No	No
Federal	Yes/no	No	No
Mineral Resources			
Mineral Extraction Sites	Yes/no	No	No
Soils			
Prime farmland	Acres	5	2.9
Water Resources/Wetlands			
Perennial streams within 500 feet	Yes/no	No	No
Impaired waterbodies within 500 feet	Yes/no	No	No
Public water supplies within 1 mile of centerline	Yes/no	No	No
Shallow water supply aquifers	Yes/no	No	No
Wetlands			
Palustrine emergent	Yes/no	No	Yes
Land Cover			
Annual Cropland	Acres	5	5
Sensitive Wildlife Habitats and Species			
Sensitive Habitats – Native Prairie	Yes/no	No	No
Sensitive Plant Habitat (by species)	Yes/no	No	No
Sensitive Animal Habitat (by species)	Yes/no	No	No
Sensitive Aquatic systems (by name)	Yes/no	No	No

Table 6 Resource Factors – Wood River Pump Station Alternatives

	Units	As-filed Station Site	Alternative Station Site
Land Use			
Residences/Residential Areas within 1 mile	Number	486	1045
Public Assembly locations (e.g., schools, churches) within 1 mile	Number	Unknown	Unknown
Designated recreation areas (state, federal, local) – by name	Yes/no	No	No
Special Management Areas (wildlife management areas, State Conservation Reserve, USFWS wetland and grassland easements)		No	No

5.4.1 Natural Resources

Both sites are located on cropland in and near an industrial facility. Based on wetlands surveys, the as-filed pump station would not be located in a wetland; however a portion of the alternative pump station site may be located on a farmed wetland (subject to completion of field surveys). It is likely that the alternative pump station could be located outside wetlands while fulfilling the operational purpose of being located close to the delivery point for refinery storage.

5.4.2 Human Resources

Both sites are located on cropland in and near an industrial facility. Neither site location would be accessible to the public. The 0.5 mile of power line needed for the alternative pump station location would traverse the existing refinery.

The alternative pump station location is located closer to a larger number of residences within 1 mile. However, this pump station would represent a small addition to an existing refinery complex. Accordingly, the incremental effect of this station on those residences would be very minor compared to the refinery as a whole.

5.5 Recommendations

The primary benefits provided by the alternative pipeline route and pump station are lower overall surface disturbance (better alignments for horizontal directional drill pullbacks, and elimination of the need for a lateral pipeline), and co-location of the alternative Pump Station 37 with existing refinery facilities that would provide higher operational efficiency as well as higher security. Keystone recommends that the Department of State include the Wood River Alternative Route and Alternative Pump Station 37 site in its Agency Preferred Alternative in the Environmental Impact Statement.

Appendix A

Landowners List

(List maintained as confidential material)

Cushing Extension Environmental Report Tables

Keystone filed an updated Environmental Report in its November 17, 2006, Supplemental Filing with the Department of State. In that filing, Keystone noted a pending change in pipeline alignment and that change was filed with the Department of State on December 15, 2006. Consequently, some environmental and human resource information has been updated for the Cushing Extension. These updates are provided here as revised Environmental Report tables (table numbers correlate with those filed November 17, 2006). Changes from previously submitted information are indicated by highlighting.

List of Cushing Tables
Supplemental Filing, January 24, 2007

Table 1.1-1 Ownership of Land Crossed by Keystone (miles)[1]

	Federal	Tribal	State	Private[2]	Total
KEYSTONE MAINLINE					
North Dakota	0.0	0.0	0.8	216.1	216.9
South Dakota	0.0	0.0	0.5	218.4	218.9
Nebraska	0.0	0.0	0.0	213.7	213.7
Kansas	0.0	0.0	0.0	98.8	98.8
Missouri	0.1	0.0	1.9	271.1	273.1
Illinois	3.0	0.0	0.0	53.5	56.5
Keystone Mainline subtotal	*3.1*	*0.0*	*3.2*	*1,071.6*	*1,077.9*
CUSHING EXTENSION					
Nebraska	0.0	0.0	0.0	2.4	2.4
Kansas	3.6	0.0	0.0	206.6	210.1
Oklahoma[3]	0.0	0.0	3.6	77.3	81.0
Cushing Extension Subtotal[3]	3.6	*0.0*	*3.6*	286.3	*293.5*
Keystone Pipeline Project Total	**6.7**	**0.0**	**6.8**	**1,357.9**	**1,371.4**

[1]Slight discrepancies in total values due to rounding.

[2]Includes privately owned lands with a federal or state easement.

[3]No tribal lands crossed in Oklahoma with the revised alignment as described in Section 2.4.1.4.

Table 2.1-1 Miles of Pipeline per State

	North Dakota	South Dakota	Nebraska	Kansas	Missouri	Illinois	Oklahoma	TOTAL
KEYSTONE MAINLINE								
(miles)	216.9	218.9	213.7	98.8	273.1	56.5	0.0	1,078.0
CUSHING EXTENSION								
(miles)	0.0	0.0	2.4	210.1	0.0	0.0	81	293.5
PROJECT TOTAL	**216.9**	**218.9**	**216.1**	**308.9**	**273.1**	**56.5**	**81**	**1,371.4**

Table 2-1-2 Land Requirements

Facility	Land Affected During Construction[1] (acres)	Land Affected During Operation[2] (acres)
Keystone Mainline Subtotal[5]	16,648	6,595
CUSHING EXTENSION		
NEBRASKA		
Pipeline ROW	32	15
Lateral ROWs	0	0
Additional Temporary Workspace Areas	4	0
Pipe and Contractor Yards	15	0
Pump Stations/Delivery Facilities[3]	0	0
Nebraska Subtotal[4]	51	15
KANSAS		
Pipeline ROW	2,802	1,273
Lateral ROWs	0	0
Additional Temporary Workspace Areas	158	0
Pipe and Contractor Yards	295	0
Pump Stations/Delivery Facilities[3]	4	4
Kansas Subtotal[4]	*3,259*	*1,278*
OKLAHOMA		
Pipeline ROW	1,079	496
Lateral ROWs	11	6
Additional Temporary Workspace Areas	77	0
Pipe and Contractor Yards	105	0
Pump Stations/Delivery Facilities[3]	4	4
Oklahoma Subtotal[4]	*1,276*	*506*
Cushing Extension Subtotal[4]	4,586	1,798
PROJECT TOTAL[4]	**21,234**	**8,393**

[1] Disturbance is based on a total of 110-foot-wide construction ROW for 30- and 36-inch pipe and a 95-foot-wide construction ROW for 24-inch pipe, except in certain wetlands, shelterbelts, and other forested areas, residential areas, and commercial/industrial areas where a 85-foot-wide construction ROW will be used, or in areas requiring extra width for workspace necessitated by site conditions. Disturbance also includes pipe storage and contractor yards.

[2] Operation acreage was estimated based on a 50-foot-wide permanently maintained ROW in all areas. All pigging facilities will be located within either pump stations or delivery facility sites. Mainline valves and densitometers will be constructed within the construction ROW and operated within a 50-foot x 50-foot area or 50-foot x 66-foot area, respectively, centered on the permanently maintained 50-foot-wide ROW. Other mainline valves will be located within the area associated with a pump station. Consequently, the acres of disturbance for these aboveground facilities are captured within the Pipeline ROW and Pump Station/Delivery Facilities categories within the table.

[3] The Wood River delivery facility will be constructed outside of the existing pipeline operational tank facilities. The delivery facility in Patoka will be located within the terminal. Delivery facilities along the Cushing Extension at Ponca City and Cushing will be located within existing tank storage terminals. Additional temporary workspace areas include temporary disturbance for the construction of pump stations and/or delivery facilities.

[4] Discrepancies in total acreages are due to rounding.

Table 2.1-6 Areas with Buildings Located Within 25 Feet of Construction ROW

	Counties	Milepost	Structures
CUSHING EXTENSION			
Nebraska	N/A	N/A	None
Kansas	Marion	124.6	single
	Butler	156.4	development
	Butler	162.0	single
	Cowley	180.3	single
	Cowley	208.3	several
Oklahoma	Kay	233.2	development
	Noble	241.9	several
	Noble	246.7	single
	Noble	258.7	single
	Payne	269.7	several
	Payne	270.5	single
	Payne	274.5	development
	Payne	279.4	single
	Payne	289.6	single
	Payne	291.7	single

Table 2.3-1 Comparison of the Keystone Pipeline System with Two Other System Alternatives

	Keystone Pipeline Project	Enbridge Projects and Spearhead-Cushing Expansion	Hypothetical Kinder Morgan Express-Platte Pipeline System Expansion and Cushing Extension
Delivery Points	Midwestern, U.S. and Cushing, Oklahoma	Midwestern, U.S. and Cushing, Oklahoma	Midwestern, U.S. and Cushing, Oklahoma
Miles of Pipe to Midwestern markets (Canada and U.S.)	1,078	955	1,282
Additional Miles of Pipe to Cushing	294	655	294
Total Miles	1,372	1,610	1,576
Project Cost (U.S. portion only)	$2.0 billion	$3.3 billion	$2.1 billion
Project Status	• Regulatory application submitted – April 2006 • Secured contracts for 340,000 bpd	• Southern Access-approved • Southern Access Extension – proposed • Alberta Clipper-proposed • Spearhead Loop – not proposed	Not Proposed
In-Service Date	November 2009	Unknown	N/A

Table 2.4-3 Route Alternative Comparisons

Route	Mileage
Western Alternative A	1,414
Western Alternative B	1372
Eastern Alternative	1,373

Table 2.4-4 **Phase 2 Route Alternatives – Length, Utility Co-location, and Crossing Comparisons**

Phase II Route Alternatives																
		Co-location Percentage				Waterbody Crossings		Road Crossings				Land Use Crossings				
Route Option	Length (miles)	Railroad (%)	Powerline (%)	Road (%)	Pipeline (%)	minor	major	minor	major	Rail Crossings	Utility Crossings	National/ State Parks	National Forest Lands	Conservation Areas	Wildlife Areas	Indian/Military Reserves
Western A	1414	1.2	0.6	11.7	14.1	1600	96	1729	21	131	109	1	0	0	1	0
Western B	1372	1.3	0.7	8.1	9.9	1474	81	1635	18	122	102	1	0	0	1	0
Eastern	1373	2.8	0.6	4.3	7.9	1560	73	1710	20	137	85	0	0	0	1	0

Notes: Waterbody Crossing Classifactions: Minor < 100ft > Major width. Road Crossing Classifactions:

Minor = unpaved and paved local streets and two lane highways, Major = four lane highways and interstates

This crossing list was completed in greater detail than the assessment table illustrated in the respective routing report

Table 3.4-1 Summary of Sensitive Soils Along the Proposed Pipeline Route

State/County	Total Miles[1]	Highly Erodible[2]	Prime Farmland[3]	Hydric[4]	Compaction Prone[5]	Stony – Rocky[6]	Shallow Bedrock[7]	Droughty[8]
KEYSTONE MAINLINE								
North Dakota	216.9	18.7	115.1	28.4	14.4	3.1	29.5	0.0
South Dakota	218.9	11.6	99.8	26.8	27.7	1.5	0.0	0.0
Nebraska	213.7	43.8	134.8	8.9	10.9	0.5	4.0	0.0
Kansas	98.8	23.6	46.3	2.0	8.6	0.2	29.6	0.0
Missouri	273.1	48.9	145.9	51.8	140.3	16.5	80.2	0.0
Illinois	56.5	4.5	40.8	16.3	35.2	0.1	0.1	0.0
Keystone Mainline Subtotal[9]	**1,077.9**	**151.1**	**582.7**	**134.2**	**237.1**	**21.9**	**143.4**	**0.0**
CUSHING EXTENSION								
Nebraska	2.4	1.1	1.4	0.0	0.0	0.0	0.0	0.0
Kansas	210.1	13.0	157.2	1.4	10.9	9.8	38.1	0.0
Oklahoma	81.0	4.4	53.5	<0.1	0.3	8.0	10.9	0.0
Cushing Extension Subtotal[9]	**293.5**	**18.5**	**212.1**	**1.4**	**11.2**	**17.8**	**49.0**	**0.0**
Project Total	**1,371.4**	**169.6**	**794.8**	**135.6**	**248.3**	**39.7**	**192.4**	**0.0**

[1]Mileage does not account for areas or disturbance associated with metering or pump stations, transmission lines, laterals, or pipe storage/contractor yards. Individual soils may occur in more than one characteristic class.

[2]Includes all soils listed as highly erodible.

[3]Includes land listed by the NRCS (2005) as potential prime farmland if adequate protection from flooding and adequate drainage are provided.

[4]As designated by the NRCS (2005).

[5]Includes soils that have clay loam or finer textures in somewhat poor, poor, and very poor drainage classes.

[6]Includes soils that have either: 1) a cobbly, stony, bouldery, gravelly, or shaly modifier to the textural class, or 2) have >five percent (weight basis) of stones larger than three inches in the surface layer.

[7]Includes soils that have bedrock within 60 inches of the soil surface.

[8]Includes coarse-textured soils (sandy loams and coarser) that are moderately well to excessively drained.

[9]Discrepencies in mileage are due to rounding.

Table 3.4-2 Average Slope Class Along the Proposed Pipeline Route

State/County	Total Miles[1]	Slope Class[2] (percent)				
		0-5	>5-8	>8-15	>15-30	>30
		Miles				
KEYSTONE MAINLINE						
North Dakota	216.9	170.9	43.5	2.5	0.0	0.0
South Dakota	218.9	189.9	17.9	11.1	0.0	0.0
Nebraska	213.7	119.7	42.2	51.8	0.0	0.0
Kansas	98.8	31.7	58.2	8.9	0.0	0.0
Missouri	273.1	133.5	17.8	104.9	16.9	0.0
Illinois	56.5	34.0	2.9	19.6	0.0	0.0
Keystone Mainline Subtotal[3]	**1,077.9**	**679.7**	**182.5**	**198.8**	**16.9**	**0.0**
CUSHING EXTENSION						
Nebraska	2.4	0.2	2.2	0.0	0.0	0.0
Kansas	210.1	162.0	47.8	0.0	0.0	0.0
Oklahoma	81.0	75.0	5.5	0.0	0.0	0.0
Cushing Extension Subtotal[3]	**293.5**	**238.0**	**55.5**	**0.0**	**0.0**	**0.0**
Project Total	**1371.4**	**917.7**	**238.0**	**198.8**	**16.9**	**0.0**

Note: Depth to bedrock listed in the STATSGO database is greater than 24 inches for the entire Keystone Project.

[1]Mileage does not account for disturbance associated with metering or pump stations, transmission lines, laterals, or pipe storage/contractor yards.

[2]Slopes are grouped by the averages of the high and low slope ranges provided in the STATSGO database for each map unit identification (MUID) component soil series. For example, Tresano series, 3 to 10 percent slopes, is 20 percent of MUID CO010. Its average slope is six and one-half percent. The representative acreage, calculated by multiplying percent composition by the total MUID acreage, is included in the >five to eight percent slope class.

[3]Discrepencies are due to rounding.

Table 3.5-1 Waterbodies Within 10 Miles Downstream of Proposed Crossings

State	County	Stream Crossing Point	Approximate Milepost	Affected Downstream Reservoir / Fishery / Wildlife Areas	Other Description
CUSHING EXTENSION					
Kansas	Clay	W. Fancy Creek	36.5	Turtle Creek Wildlife Area, Turtle Creek Lake	More than 10 miles downstream, approximately 15 to 20, very large reservoir
	Clay	Lincoln Creek	44, 45.5	Milford Wildlife Area, Milford Lake	Lincoln Creek feeds into the Republican River which leads directly downstream to the Milford Wildlife Area and Milford Lake
	Clay	Republican River	50	Milford Wildlife Area, Milford Lake	Pipeline crossed directly through the Milford Wildlife Area at this crossing. Feeds directly into Milford Wildlife Area and Milford Lake
	Clay	Cane Creek	54	Milford Wildlife Area, Milford Lake	Pipeline crossed directly through the Milford Wildlife Area at this crossing. Feeds directly into Milford Wildlife Area and Milford Lake
	Clay	Trib to Milford Lake	58	Milford Wildlife Area, Milford Lake	
	Clay	Quinnby Creek	61, 62	Milford Wildlife Area, Milford Lake, Milford Lake Project	
	Dickinson	Lyon Creek	98.5, 100, 101.5	Herington Reservoir	Immediately downstream
	Marion	Cottonwood River	117	Marion Lake Reservoir, Marion Lake State Wildlife Area	River crossing is downstream, but passes very closely to lake and WA
	Cowley	Arkansas River	206	Kaw WMA, Kaw Lake	
	Cowley	Spring Creek	206	Kaw WMA, Kaw Lake	Fishing area 3040 directly downstream
Oklahoma	Kay	Cholocco Creek	212, 213	Kaw WMA, Kaw Lake	
	Noble	Trib to Sooner Lake	252	Sooner Lake	

Table 3.5-4 Crossing Locations within 10 Stream-Miles of USEPA Tier 1 or Tier 2 Sediment Sampling Sites

Surface Waterbody Associated with Sampling Site[1]	County	State	Waterbody Crossing Closest to Sampling Site (MP)[2]	USEPA Sediment Quality Category
CUSHING EXTENSION				
Little Blue River	Jefferson	NE	0	Tier 1
Rose Creek	Jefferson	NE	0	Tier 2
Little Blue River	Washington	NE	3	Tier 2
Milford Lake	Geary	KS	67	Tier 2
Smoky Hill River	Dickinson	KS	79	Tier 1
Herington Reservoir	Dickinson	KS	95	Tier 3
Prairie Creek	Sedgwick	KS	152	Tier 3
West Branch Whitewater River	Butler	KS	154	Tier 1
Walnut River	Butler	KS	158	Tier 1
Walnut River	Butler	KS	170	Tier 1
Little Walnut River	Butler	KS	171	Tier 2
Arkansas River	Sumner	KS	192	Tier 3
Arkansas River	Cowley	KS	211	Tier 3
Kaw Lake	Kay	OK	218	Tier 1

[1]Indicates waterbody associated with the sediment sampling location. Waterbody may not be directly impacted by the proposed project.

[2]Indicates the approximate waterbody crossing point that might lead to the USEPA Tier 1 or Tier 2 sampling site. The waterbody, which is crossed by the project, may be a tributary to the waterbody associated with the sampling site. Refer to Appendix F for names and classifications of the crossed waterbodies.

3.5-6 Public Water Supplies within 1 mile of Centerline

State	County	Approximate Milepost Marker (mi)	Distance from Centerline (mi)	Cardinal Direction from Centerline	PWS Name
CUSHING EXTENSION					
Nebraska	Jefferson	N/A	N/A	N/A	NONE
Kansas	Washington	3.75	0.32	east	Hollenberg
	Washington	20.80	0.20	west	Greenleaf Well #7
	Washington	21.06	0.27	east	Greenleaf Well #8
	Washington	21.67	0.70	east	Greenleaf
	Washington	21.70	0.67	east	Standby Well #5
	Washington	21.77	0.71	east	Greenleaf
	Washington	21.78	0.71	east	Greenleaf
	Washington	21.83	0.67	east	Standby Well #6
	Dickinson	73.79	0.37	east	Chapman
	Dickinson	73.80	0.40	east	Chapman
	Dickinson	73.80	0.42	east	Chapman
	Butler	146.13	0.37	west	Potwin
	Butler	146.16	0.38	west	Potwin
	Butler	146.16	0.38	west	Potwin
	Butler	146.20	0.24	west	Potwin
	Butler	146.38	0.02	east	Potwin
	Butler	146.41	0.05	west	Potwin
	Butler	155.27	0.27	west	Towanda
	Butler	155.50	0.78	west	Towanda
	Butler	155.63	0.65	west	Towanda
	Butler	155.78	0.02	west	Towanda
	Butler	155.78	0.02	west	Towanda
	Butler	155.90	0.05	west	Towanda
	Butler	155.90	0.05	west	Towanda
	Cowley	194.81	0.04	west	Winifield
Oklahoma	Payne	290.17	0.04	west	Lincoln Co RW & Sewer Dist

Table 3.5-8 Miles of Wetlands Crossed by the Keystone Pipeline Project

State	Wetland Types Crossed (miles)				
	Palustrine Emergent	Palustrine Forested	Riverine/ Open Water/	Palustrine Scrub Shrub	TOTALS
NWI Codes	PEM	PFO	ROW	PSS	
KEYSTONE MAINLINE					
ND	16.7	0.4	0.6	1.0	18.7
SD	18.6	0.0	0.7	0.3	19.6
NE	2.0	0.4	1.3	0.1	3.8
KS	0.5	0.4	1.3	0.0	2.2
MO	1.9	3.3	4.1	0.3	9.6
IL	0.9	0.8	1.1	0.6	3.4
Keystone Mainline Total	**40.6**	**5.3**	**9.1**	**2.3**	**57.3**
CUSHING EXTENSION[1]					
NE	0.0	0.0	0.0	0.0	0.0
KS	2.6	3.5	0.6	0.0	6.7
OK	2.9	1.4	0.4	0.0	4.6
Cushing Extension Subtotal	**5.5**	**4.9**	**1.0**	**0.0**	**11.4**
PROJECT TOTAL	**46.1**	**10.2**	**10.1**	**2.3**	**68.7**

[1]Preliminary identification of wetlands and waters of the U.S. was based on the review of aerial photographs.

Table 3.6-2 Miles of Vegetative Communities Crossed by the Keystone Pipeline ROW

State	Vegetative Communities Crossed (miles)								TOTAL
	Urban or Built-up land	Cropland	Grassland/ Rangeland	Upland Forest Land	Riverine/ Open Water	Palustrine Forested Wetlands	Palustrine Emergent/ Scrub-Shrub	ROW	
KEYSTONE MAINLINE									
ND	0.2	167.6	26.3	3.0	0.6	0.4	17.7	1.1	216.9
SD	1.2	158.6	37.7	0.2	0.7	0.0	18.9	1.6	218.9
NE	0.3	181.0	24.8	2.1	1.3	0.4	2.1	1.7	213.7
KS	0.1	70.5	18.5	7.5	1.3	0.4	0.5	0.0	98.8
MO	2.9	148.3	72.5	35.9	4.1	3.3	2.2	3.9	273.1
IL	0.8	44.4	1.7	4.7	1.1	0.8	1.5	1.6	56.5
Subtotal	**5.5**	**70.4**	**181.5**	**53.4**	**9.1**	**5.3**	**42.9**	**9.8**	**1,077.9**
CUSHING EXTENSION									
NE	0.0	0.8	1.2	0.3	0.0	0.0	0.0	0.0	2.4
KS	0.2	130.8	63.8	6.5	0.6	3.5	2.6	2.1	210.1
OK	1.1	30.7	40.4	1.7	0.4	1.3	3.6	1.8	80.9
Subtotal	**1.3**	**162.3**	**105.4**	**8.5**	**1.0**	**4.8**	**6.2**	**3.9**	**293.5**
PROJECT TOTAL	**6.8**	**932.7**	**286.9**	**61.9**	**10.1**	**10.1**	**49.1**	**13.7**	**1371.4**

Table 3.8-1 Surface Ownership Crossed by the Proposed Project

	Miles Crossed	% of Total Length
Keystone Mainline Subtotal	**1,077.9**	**78.7**
CUSHING EXTENSION		
Nebraska		
Federal	0.0	0.0
State	0.0	0.0
Private	2.4	100.0
NE Subtotal	2.4	100.0
Kansas		
Federal	3.6	1.7
State	0.0	0.0
Private	206.6	98.3
KS Subtotal	210.1	100.0
Oklahoma		
Federal	0.0	0.0
State	3.6	4.5
Private	77.3	95.5
OK Subtotal	81.0	100.0
Cushing Extension Subtotal	**293.5**	**21.4**
PROJECT TOTAL	**1,371.4**	**100.0**

Table 3.8-2 Land Uses Crossed by the Proposed Project

	Keystone Mainline (miles)						Cushing Extension (miles)		
	ND	SD	NE	KS	MO	IL	NE	KS	OK
Developed	1.3	2.8	2.0	0.1	6.8	2.3	0.0	2.3	2.9
Agriculture/Cropland	167.6	158.6	181.0	70.5	148.3	44.4	0.8	130.8	30.7
Grassland/Rangeland	26.3	37.7	24.8	18.5	72.5	1.7	1.2	63.8	40.3
Forest Land	3.0	0.2	2.1	7.5	35.9	4.7	0.4	6.5	1.7
Water	0.6	0.7	1.3	1.3	4.1	1.1	0.0	0.6	0.4
Wetlands	18.1	18.9	2.5	0.9	5.5	2.3	0.0	6.1	5.0
Total	**216.9**	**218.9**	**213.7**	**98.8**	**273.1**	**56.5**	**2.4**	**210.1**	**81.0**

Table 3.8-3 Potential Residences and Public Assembly Places near the Proposed Project

	Potential Residences or Residential Areas (within 500 feet)[1]	Public Assembly Places (within 500 feet)[1]
KEYSTONE MAINLINE		
North Dakota	61	2
South Dakota	69	1
Nebraska	112	3
Kansas	87	0
Missouri	579	3
Illinois	77	1
Keystone Mainline Subtotal	985	10
CUSHING EXTENSION		
Nebraska	1	0
Kansas	124	1
Oklahoma	86	0
Cushing Extension Subtotal	211	1
PROJECT TOTAL	**1,196**	**12**

[1]To be confirmed with field surveys within 500 feet of the proposed centerline.

Table 4.2-1 Acreage Summary, Soil Characteristics of Concern

State/ County	Total Acres[1]	Highly Erodible Water[2]	Prime Farmland[3]	Hydric[4]	Compaction Prone[5]	Stony – Rocky[6]	Shallow Bedrock[7]	Droughty[8]
KEYSTONE MAINLINE								
North Dakota	3,343	270	1,607	392	198	39	45	0
South Dakota	3,099	167	6	383	398	21	4	0
Nebraska	3,027	625	1,906	126	154	7	30	0
Kansas	1,402	351	642	16	105	3	22	0
Missouri	3,936	728	2,069	803	2,054	260	271	0
Illinois	736	57	537	218	454	1	5	0
Keystone Mainline Subtotal[9]	15,243	2,198	8,237	1,938	3,363	533	373	0
CUSHING EXTENSION								
Nebraska	35	16	20	0	0	0	0	0
Kansas	2,968	179	2,223	20	153	137	533	0
Oklahoma	1,155	64	781	<1	5	113	154	0
Cushing Extension Subtotal[9]	4,158	260	3,024	20	159	250	687	0
Project Total	19,401	2,459	11,261	1,958	3,522	783	1,060	0

[1]Based on a total of 110-foot-wide ROW for 30- and 36-inch pipe and a 95-foot-wide ROW for 24-inch pipeline during construction, except in certain wetlands and as agreed with landowners, in shelterbelts and other forested areas, and commercial/industrial areas where an 85-foot-wide construction ROW will be used, or in areas requiring extra width for workspace necessitated by site conditions. Acreage does not account for 1,820 acres associated with pipe storage/contractor yards or disturbance associated with transmission lines or access roads. Individual soils may occur in more than one characteristic class.

[2]Includes soils listed as identified by a STATSGO database search.

[3]Includes land listed by the NRCS (1995) as potential prime farmland if adequate protection from flooding and adequate drainage are provided.

[4]As designated by the NRCS (1995).

[5]Includes soils that have clay loam or finer textures in somewhat poor, poor, and very poor drainage classes.

[6]Includes soils that have either: 1) a cobbly, stony, bouldery, gravelly, or shaly modifier to the textural class, or 2) have >five percent (weight basis) of stones larger than three inches in the surface layer.

[7]Includes soils that have bedrock within 60 inches of the soil surface.

[8]Includes coarse-textured soils (sandy loams and coarser) that are moderately well to excessively drained.

[9]Discrepancies in acreage totals are due to rounding.

Table 4.2-2 Acreage Summary of Federal, State, and Private Lands Affected by Construction of the Keystone Project

	Federal	State	Private	Total
KEYSTONE MAINLINE				
North Dakota	0	13	3,340	3,353
South Dakota	0	8	3,491	3,499
Nebraska	0	0	3,262	3,262
Kansas	0	0	1,497	1,497
Missouri	1	27	4,183	4,211
Illinois	37	0	789	826
Keystone Mainline Subtotal	38	48	16,562	16,648
CUSHING EXTENSION				
Nebraska	0	0	51	51
Kansas	52	0	3,207	3,259
Oklahoma	0	53	1,223	1,276
Cushing Extension Subtotal	52	53	4,481	4,586
Project Total	90	101	21,043	21,234

Note: Acreage does not include 1,820 acres of disturbance associated with pipe storage/contractor yards or disturbance associated with transmission lines.

Table 4.2-3 Acres of Land Uses Affected by Construction of the Keystone Project

	Developed	Agriculture/ Cropland	Grassland/ Rangeland	Forest	Water	Wetland/ Riparian	Total
KEYSTONE MAINLINE							
North Dakota	348	2,314	379	45	9	258	3,353
South Dakota	447	2,226	544	4	10	268	3,499
Nebraska	280	2,539	652	34	18	39	3,262
Kansas	97	984	570	113	20	113	1,497
Missouri	398	2,102	1,032	538	62	79	4,211
Illinois	131	567	20	63	14	31	826
Keystone Mainline Subtotal	*1,701*	*10,732*	*2,597*	*797*	*133*	*688*	*16,648*
CUSHING EXTENSION							
Nebraska	15	11	18	6	<1	0	51
Kansas	339	1,830	887	104	9	90	3,259
Oklahoma	147	434	598	28	5	63	1,276
Cushing Extension Subtotal	*501*	*2,275*	*1,503*	*138*	*14*	*153*	*4,586*
Project Total	2,202	13,008	4,100	935	148	841	21,234

Note: Acreage does not include 1,820 acres of disturbance associated with pipe storage/contractor yards or disturbance associated with transmission lines.

Table 6-1 Impact Summary

Resource	Impact Summary
Air Quality	• Fugitive dust will be generated from ROW construction activities and traffic over the construction period regardless of the dust suppression measures applied. All regions crossed by the project are in attainment for particulate matter and no state-mandated dust control permits will be required. • Operational hydrocarbon emissions from 27 pump stations (23 initial [plus one future] on the Keystone Mainline and three on Cushing Extension) spaced 30 to 50 miles apart will be minimal since pumps will be electric and no new crude oil tanks will be required.
Geology, Minerals, and Paleontology	• Construction and operation of the Keystone pipeline system will limit access to underlying minerals (sand and gravel) for the project life. This limitation will be confined to the width of the permanent pipeline ROW that overlies glacial deposits, or approximately 800 miles. • The Keystone pipeline system will be located over approximately 40 miles of underlying coal seams between Wood River and Patoka, Illinois. This coal is currently being mined with underground methods. The Keystone pipeline will be located within an existing pipeline corridor and will not add a new limitation on access to underlying coal. • Any Pleistocene-era mammalian fossils excavated during construction will not be studied or retrieved.
Soils and Agricultural Production	• A small fraction of the excavated soils in areas with highly erodible soils (2,458 acres) will be lost to increased water and wind erosion acting on disturbed soil surfaces until grass and other herbaceous vegetation is restored (three to five years). • Agricultural cropland and rangeland (including hayland) production will be lost from the construction ROW for the season during construction on approximately 21, 234 acres. During the next growing season, production on haylands and pasturelands may be reduced but not completely lost. Long-term productivity will not be impaired.
Water Resources	• Construction across waterbodies will cause local short-term increases in total suspended solids and deposited sediment in 272 perennial streams and rivers. Channel disturbance within the Missouri River (two crossings), Platte River, Chariton River, Cuivre River (two crossings), Mississippi River, Hurricane Creek, and Kaskaskia River will be avoided by using horizontal directional drills to install the pipeline. • Water used for hydrostatic testing of the pipeline will be obtained from surface water resources. The volume for a 50-mile test section of 30-inch pipeline is approximately nine million gallons. Withdrawals rates and volumes will be designed to avoid impacts to aquatic life and downstream water users. Hydrostatic test water will be discharged to the land surface at an approved location. Discharged water may evaporate or infiltrate into the soil or drainage where the water is released. • Pipeline construction will disturb a total of 987 acres of wetlands, river systems and open water. Of this total, approximately 840 acres are wetlands (695 acres palustrine emergent wetlands and 145 acres forested wetlands) and 147 acres are located in river systems and open water. It is estimated that vegetation cover in palustrine emergent wetlands will recover in three to five years; forested wetlands will require 20 to 50 years. No permanent loss of wetlands will occur as a result of this project; however, approximately 61 acres of forested wetland will be permanently converted to herbaceous wetland.
Vegetation	• Pipeline construction will disturb a total of 21,234 acres including 4,101 acres of native and modified grassland and 1,078 acres of upland and forested wetlands. It is estimated that vegetation cover in native and modified grasslands will recover in three to five years, while forests and woodlands will require 20 to 50 years. Trees will not be able to grow on approximately 520 acres of currently forested woodlands during operation to allow aerial

Resource	Impact Summary
	surveillance.
Wildlife	• Approximately 1,773 acres of upland and wetland wildlife habitats will be cleared during pipeline construction and then will recover over short- and long-term time frames (see Wetlands and Vegetation above). • Wildlife displacement from the construction ROW is expected to be short-term. No long-term displacement impacts from increased human activity are expected. • There may be a potential loss of bird eggs and young from pipeline clearing activities or increased human presence if these activities occur during the breeding season along the entire length of the pipeline. • Powerlines (ranging in length from one to 27 miles) will be constructed to serve the pump stations. The powerlines represent a collision hazard for waterfowl and other birds similar to existing electrical distribution lines.
Aquatic Resources	• Short-term (one to 10 day) increases in total suspended solids and sediment deposition downstream from channel excavation at open-cut stream crossings will occur in 272 perennial rivers and streams (see Water Resources above).
Sensitive Species	• There will be a potential reduction in sensitive wildlife and aquatic species habitats as the result of pipeline construction. These habitat changes are described for wildlife and aquatic resources above. • Keystone received the USFWS and state wildlife agency lists of species to be evaluated for project effects. The primary listed species to be considered are those associated with the Missouri River and Mississippi River (e.g., pallid sturgeon, least tern, piping plover, bald eagle), smaller streams and rivers (e.g., Topeka shiner, scaleshell mussel, winged mapleleaf), wetlands and moist prairie (e.g., western prairie fringed orchid, prairie bush clover), and deciduous forests (e.g., Indiana bat). In 2006, Keystone initiated habitat and occurrence surveys for several federally listed and state sensitive species, and will continue these surveys in 2007. • Keystone will coordinate with the USFWS and state wildlife agencies to estimate direct and indirect impacts to federally listed and sensitive species, and to identify pipeline route adjustments, and construction procedures that will avoid, or minimize effects to these species. For example, horizontal directional drills of the Missouri and Mississippi rivers will avoid channel and river bank disturbance. Keystone has adjusted its proposed pipeline route at several locations in North and South Dakota to reduce the length of wetland and native prairie crossings.

Resource	Impact Summary
Land Use (including noise, transportation)	• Approximately 8,393 acres will not be able to be occupied by residential or other structures within the permanent pipeline ROW and pump station sites over the life of the project. Agricultural uses (cropland) will be allowed to continue as before except at the pump station sites. • Approximately 37 acres of land owned by the USACE will be crossed by the pipeline at Carlyle Lake between Wood River and Patoka, Illinois. Approximately 33 acres of land administered by the NPS at the Missouri River crossing at Yankton, South Dakota, will be crossed by a horizontal directional drill under the river. Approximately 17 acres of land will be crossed by the pipeline at Edward "Ted" and Pat Jones-Confluence Point State Park in Missouri. Approximately 52 acres of land owned by the USACE will be crossed at the Milford Wildlife Area in Kansas. Small parcels of state land (generally less than 10 acres of surface disturbance) will be crossed in North Dakota, South Dakota, Missouri, and Oklahoma. The majority of these state lands are used for wildlife management purposes. Keystone will consult with the state and federal managers of these lands to develop site-specific crossing plans to maintain public access and existing land uses. • Construction noise will be heard to nearby (generally one-half mile or less) residences during daytime construction activities over a period of several weeks. • Long-term operational noise from pump stations will be maintained below community noise level thresholds. • Aboveground facilities (pump stations, powerlines, valves, densitometers) will exist for the life of the project. The majority of these facilities will be located in rural areas. Powerlines will be located along county roads and, therefore, will pass within the view of roadside residences. • Short-term obstruction or temporary disruption to local roads will occur during construction. Major highways will be bored. There would be no long-term impacts to transportation.
Cultural Resources	• Keystone developed study plans that were approved by the State Historic Preservation Office in each state crossed by the Keystone project. Keystone then initiated field surveys in 2006 to determine the locations of prehistoric and historic cultural resources that could be affected by surface disturbance caused by pipeline and ancillary facility construction. Cultural resource impacts could include physical disturbance of archaeological sites or architecturally significant structures and features, and introduce visual or audible elements (e.g., pump stations) that would alter the setting of a cultural resource feature. • Impacts to sites that are eligible for the National Register of Historic Places (NRHP) would be mitigated by one or more of the following measures: avoidance through use of pipeline realignments and facility relocations; approved data recovery from sites that cannot be avoided; and use of landscaping or other techniques to minimize or eliminate effects on the historic setting or ambience of standing structures. • Construction activities could adversely affect undiscovered archaeological sites. If previously undocumented sites are discovered within the construction corridor, work that could adversely affect the discovery would cease until consultation with appropriate cultural preservation agencies is completed. If the previously unidentified site is recommended as eligible to the NRHP, impacts will be mitigated through the procedures included in an Unanticipated Discovery Plan. • Treatment of any discovered human remains would be handled in accordance with the guidelines contained in the Native American Grave Protection and Repatriation Act (NAGPRA) or state laws, depending on the age and cultural affiliation of the remains. Construction will not resume in an area where human remains are discovered until an

Resource	Impact Summary
	authorized agency provides a notice to proceed.
Native American Consultation	• The DOS, as the lead federal agency, will consult with tribes that may have a past or current affiliation with the Keystone Pipeline project area and solicit input. These contacts will be maintained throughout the project permitting process.
Socioeconomic Conditions	• In exchange for monetary compensation, Keystone will acquire easements from landowners to place pipeline facilities on private lands. Keystone also will compensate landowners for property damage resulting from construction and make repairs as needed. • In the short term, construction of the pipeline will provide direct employment of up to 2,500 to 3,000 workers distributed across five to six states at once. Pipeline employees will increase retail sales in local areas along the pipeline route. Demands on local infrastructure will include temporary accommodations and, potentially, emergency services. It is anticipated that workers will commute from larger population centers to the pipeline work sites. • In the long term, operations will increase revenues to the states and counties crossed by the pipeline. It is estimated that the project will pay about $30 million dollars in property taxes in the first year of operation.
Public Health and Safety	• The USDOT prescribes pipeline design and operational requirements that limit the risk of accidental crude oil releases (leaks or spills) from pipelines. Over the operational life of the Keystone Pipeline Project there will be a very low likelihood of a crude oil release from the pipeline that could injure people, drinking water supplies, and ecologically sensitive areas. Keystone submitted a preliminary risk assessment for the accidental release of crude oil from the pipeline. The assessment included the likelihood of crude oil releases and potential for environmental affects, depending upon release volumes and locations. Based on refinements of the route, hydraulic models, and additional engineering information, an updated risk assessment will be submitted to the Department of State in the first quarter of 2007.

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
NEBRASKA					
Jefferson	0.3	Unnamed	Intermittent Stream/River		
Jefferson	0.4	Unnamed	Intermittent Stream/River		
Jefferson	0.6	Unnamed	Intermittent Stream/River		
Jefferson	0.8	Unnamed	Intermittent Stream/River		
Jefferson	1.7	Unnamed	Intermittent Stream/River		
Jefferson	1.8	Unnamed	Intermittent Stream/River		
Jefferson	1.9	Unnamed	Intermittent Stream/River		
KANSAS					
Washington	2.8	Unnamed	Intermittent Stream/River		
Washington	3.6	Unnamed	Intermittent Stream/River		
Washington	4.1	Little Blue River	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Primary Contact Recreation Not Open to Public; Secondary Contact Recreation Not Open To Public; Domestic Water Supply; Food Procurement Use;	Supporting

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
				Groundwater Recharge; Industrial Water Supply; Irrigation; Livestock Watering	
Washington	6.8	Joy Creek	Perennial Stream/River		
Washington	9.1	Unnamed	Connector		
Washington	9.6	Mill Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Secondary Contact Recreation Not Open to Public; Food Procurement Use	Supporting
Washington	12.1	Mill Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Secondary Contact Recreation Not Open to Public; Food Procurement Use	Supporting
Washington	13.5	Mill Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Secondary Contact Recreation Not Open to Public; Food Procurement Use	Supporting
Washington	22.6	Coon Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Primary Contact Recreation Not Open to Public; Food Procurement	Supporting
Washington	23.9	Coon Creek	Perennial Stream/River		
Washington	26.2	Unnamed	Connector		
Washington	28.7	Unnamed	Intermittent Stream/River		
Washington	29.7	Unnamed	Intermittent Stream/River		

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Washington	30.3	Unnamed	Intermittent Stream/River		
Washington	30.5	Unnamed	Intermittent Stream/River		
Washington	31.3	Unnamed	Intermittent Stream/River		
Washington	32.1	Unnamed	Intermittent Stream/River		
Clay	33.3	Unnamed	Intermittent Stream/River		
Clay	34.7	Carter Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Secondary Contact Recreation Not Open to Public	Supporting
Clay	34.8	Carter Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Secondary Contact Recreation Not Open to Public	Supporting
Clay	34.8	Carter Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Secondary Contact Recreation Not Open to Public	Supporting
Clay	34.9	Carter Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Secondary Contact Recreation Not Open to Public	Supporting
Clay	35.0	Carter Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Secondary Contact Recreation Not Open to Public	Supporting

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Clay	36.3	West Fancy Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Primary Contact Recreation Not Open to Public; Food Procurement	Supporting
Clay	36.4	Unnamed	Intermittent Stream/River		
Clay	37.9	Unnamed	Intermittent Stream/River		
Clay	39.6	Unnamed	Intermittent Stream/River		
Clay	40.8	Unnamed	Intermittent Stream/River		
Clay	43.8	Unnamed	Intermittent Stream/River		
Clay	43.9	Lincoln Creek	Intermittent Stream/River	General Purpose Waters; Expected Aquatic Life Use; Secondary Contact Recreation Not Open to Public	Supporting
Clay	45.5	Unnamed	Intermittent Stream/River		
Clay	51.2	Republican River	Artificial Path	General Purpose Waters; Special Aquatic Life Use; Primary Contact Recreation Not Open to Public; Domestic Water Supply; Food Procurement Use; Groundwater Recharge; Industrial Water Supply; Irrigation; Livestock Watering	Supporting
Clay	52.5	Unnamed	Intermittent Stream/River		

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Clay	54.0	Cane Creek	Perennial Stream/River		
Clay	54.9	Unnamed	Intermittent Stream/River		
Clay	55.4	Unnamed	Intermittent Stream/River		
Clay	57.8	Unnamed	Intermittent Stream/River		
Clay	58.1	Unnamed	Intermittent Stream/River		
Clay	59.3	Unnamed	Intermittent Stream/River		
Clay	60.1	Unnamed	Intermittent Stream/River		
Clay	60.8	Unnamed	Intermittent Stream/River		
Clay	62.0	Unnamed	Intermittent Stream/River		
Clay	62.7	Unnamed	Intermittent Stream/River		
Dickinson	63.9	Unnamed	Intermittent Stream/River		
Dickinson	64.6	Unnamed	Intermittent Stream/River		

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Dickinson	68.8	Chapman Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Primary Contact Recreation Not Open to Public; Domestic Water Supply; Food Procurement Use; Groundwater Recharge; Industrial Water Supply; Irrigation; Livestock Watering	Supporting
Dickinson	69.5	Unnamed	Intermittent Stream/River		
Dickinson	70.3	Branch of Chapman Creek	Perennial Stream/River		
Dickinson	70.7	Unnamed	Intermittent Stream/River		
Dickinson	71.2	Unnamed	Intermittent Stream/River		
Dickinson	71.9	Unnamed	Intermittent Stream/River		
Dickinson	72.0	Unnamed	Intermittent Stream/River		
Dickinson	72.1	Unnamed	Intermittent Stream/River		

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Dickinson	76.6	Smoky Hill River	Artificial Path	General Purpose Waters; Expected Aquatic Life Use; Primary Contact Recreation Not Open to Public; Domestic Water Supply; Food Procurement Use; Groundwater Recharge; Industrial Water Supply; Irrigation; Livestock Watering	Supporting
Dickinson	78.3	Unnamed	Intermittent Stream/River		
Dickinson	78.6	Unnamed	Intermittent Stream/River		
Dickinson	79.5	Unnamed	Intermittent Stream/River		
Dickinson	80.0	Unnamed	Intermittent Stream/River		
Dickinson	80.1	Unnamed	Intermittent Stream/River		
Dickinson	81.4	Unnamed	Intermittent Stream/River		
Dickinson	83.6	Unnamed	Intermittent Stream/River		
Dickinson	85.1	Unnamed	Perennial Stream/River		
Dickinson	86.2	Unnamed	Intermittent Stream/River		
Dickinson	87.1	Carry Creek	Perennial Stream/River	General Purpose Waters; Special Aquatic Life Use; Food Procurement	Supporting

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Dickinson	87.6	Unnamed	Intermittent Stream/River		
Dickinson	89.6	Unnamed	Intermittent Stream/River		
Dickinson	90.0	Unnamed	Intermittent Stream/River		
Dickinson	91.1	Unnamed	Intermittent Stream/River		
Dickinson	91.7	Unnamed	Intermittent Stream/River		
Dickinson	92.0	West Branch Lyon Creek	Perennial Stream/River	General Purpose Waters; Special Aquatic Life Use; Food Procurement	Supporting
Dickinson	95.2	Unnamed	Intermittent Stream/River		
Dickinson	95.9	Unnamed	Intermittent Stream/River		
Dickinson	96.3	Unnamed	Perennial Stream/River		
Dickinson	97.2	Unnamed	Perennial Stream/River		
Dickinson	98.8	Lyon Creek	Perennial Stream/River		
Marion	100.0	Unnamed	Perennial Stream/River		
Marion	101.4	Unnamed	Intermittent Stream/River		
Marion	101.7	Unnamed	Intermittent Stream/River		

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Marion	103.3	Unnamed	Intermittent Stream/River		
Marion	105.1	Unnamed	Intermittent Stream/River		
Marion	105.2	Unnamed	Intermittent Stream/River		
Marion	106.3	Unnamed	Intermittent Stream/River		
Marion	108.7	Unnamed	Intermittent Stream/River		
Marion	109.4	Unnamed	Intermittent Stream/River		
Marion	111.6	Unnamed	Intermittent Stream/River		
Marion	111.9	Unnamed	Intermittent Stream/River		
Marion	112.7	Unnamed	Intermittent Stream/River		
Marion	114.1	Mud Creek	Perennial Stream/River	General Purpose Waters; Special Aquatic Life Use; Domestic Water Supply; Food Procurement	Supporting
Marion	116.9	Unnamed	Intermittent Stream/River		

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Marion	117.1	Cottonwood River	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Primary Contact Recreation Not Open to Public; Domestic Water Supply; Food Procurement; Groundwater Recharge; Industrial Water Supply; Irrigation; Livestock Watering	Supporting
Marion	118.9	Spring Branch River	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use	Supporting
Marion	119.9	Unnamed	Intermittent Stream/River		
Marion	120.6	Unnamed	Intermittent Stream/River		
Marion	122.6	Unnamed	Intermittent Stream/River		
Marion	123.4	Catlin Creek	Perennial Stream/River	General Purpose Waters; Special Aquatic Life Use; Food Procurement	Supporting
Marion	124.2	Unnamed	Intermittent Stream/River		
Marion	124.3	Unnamed	Intermittent Stream/River		

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Marion	128.2	Unnamed	Intermittent Stream/River		
Marion	129.0	Doyle Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Domestic Water Supply; Food Procurement; Groundwater Recharge; Industrial Water Supply; Irrigation; Livestock Watering	Supporting
Marion	129.1	Unnamed	Intermittent Stream/River		
Marion	129.2	Unnamed	Intermittent Stream/River		
Marion	129.5	Unnamed	Intermittent Stream/River		
Marion	130.2	Unnamed	Intermittent Stream/River		
Marion	130.3	Unnamed	Intermittent Stream/River		
Marion	133.0	Unnamed	Intermittent Stream/River		
Marion	133.1	Unnamed	Intermittent Stream/River		
Marion	133.4	Unnamed	Intermittent Stream/River		

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Marion	134.4	Unnamed	Intermittent Stream/River		
Butler	136.2	Unnamed	Perennial Stream/River		
Butler	136.3	Unnamed	Intermittent Stream/River		
Butler	136.8	Unnamed	Intermittent Stream/River		
Butler	137.4	Unnamed	Intermittent Stream/River		
Butler	139.4	Unnamed	Intermittent Stream/River		
Butler	140.1	May Branch	Perennial Stream/River		
Butler	142.5	East Branch Whitewater River	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Domestic Water Supply; Food Procurement; Groundwater Recharge; Industrial Water Supply; Irrigation; Livestock Watering	Supporting
Butler	145.0	Diamond Creek	Perennial Stream/River	No Data	No Data
Butler	145.6	Brush Creek	Intermittent Stream/River	No Data	No Data
Butler	146.5	Unnamed	Intermittent Stream/River		
Butler	148.7	Fourmile Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Food Procurement	Supporting

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Butler	149.0	Unnamed	Intermittent Stream/River		
Butler	150.9	Rock Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use	Supporting
Butler	151.6	Unnamed	Intermittent Stream/River		
Butler	152.4	Unnamed	Intermittent Stream/River		
Butler	153.3	Unnamed	Intermittent Stream/River		
Butler	155.0	Spring Branch	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use	Supporting
Butler	155.9	Unnamed	Intermittent Stream/River		
Butler	156.0	Unnamed	Intermittent Stream/River		
Butler	158.3	Whitewater River	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Domestic Water Supply; Food Procurement; Groundwater Recharge; Industrial Water Supply; Irrigation; Livestock Watering	Supporting
Butler	159.1	Badger Creek	Intermittent Stream/River	General Purpose Waters; Expected Aquatic Life Use; Domestic Water Supply	Supporting
Butler	160.0	Unnamed	Intermittent Stream/River		

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Butler	160.6	Unnamed	Perennial Stream/River		
Butler	164.1	Dry Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use	Supporting
Butler	165.4	Unnamed	Perennial Stream/River		
Butler	167.6	Unnamed	Perennial Stream/River		
Butler	168.0	Fourmile Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Primary Contact Recreation Not Open To Public; Domestic Water Supply; Food Procurement; Groundwater Recharge; Industrial Water Supply; Irrigation; Livestock Watering	Supporting
Butler	169.6	Unnamed	Intermittent Stream/River		
Butler	170.9	Unnamed	Intermittent Stream/River		
Butler	172.5	Unnamed	Intermittent Stream/River		
Butler	174.8	Eightmile Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Domestic Water Supply; Food Procurement; Groundwater Recharge; Industrial Water Supply; Irrigation; Livestock Watering	Supporting
Butler	175.8	Unnamed	Intermittent Stream/River		

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Butler	176.2	Unnamed	Intermittent Stream/River		
Butler	176.9	Unnamed	Intermittent Stream/River		
Butler	177.5	Unnamed	Intermittent Stream/River		
Butler	178.1	Unnamed	Intermittent Stream/River		
Cowley	178.9	Unnamed	Intermittent Stream/River		
Cowley	180.9	Polecat Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use; Food Procurement	Supporting
Cowley	182.3	Unnamed	Intermittent Stream/River		
Cowley	183.1	Unnamed	Intermittent Stream/River		
Cowley	185.4	Stewart Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use	Supporting
Cowley	185.5	Stewart Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use	Supporting
Cowley	185.6	Stewart Creek	Perennial Stream/River	General Purpose Waters; Expected Aquatic Life Use	Supporting
Cowley	187.0	Unnamed	Intermittent Stream/River		

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Cowley	188.1	Unnamed	Intermittent Stream/River		
Cowley	188.3	Crooked Creek	Intermittent Stream/River	General Purpose Waters; Expected Aquatic Life Use	Supporting
Cowley	188.4	Unnamed	Intermittent Stream/River		
Cowley	190.2	Unnamed	Intermittent Stream/River		
Cowley	191.2	Unnamed	Intermittent Stream/River		
Cowley	191.6	Unnamed	Intermittent Stream/River		
Cowley	195.2	Unnamed	Intermittent Stream/River		
Cowley	196.2	Unnamed	Intermittent Stream/River		
Cowley	196.5	Unnamed	Intermittent Stream/River		
Cowley	198.3	Unnamed	Intermittent Stream/River		
Cowley	200.0	Unnamed	Intermittent Stream/River		
Cowley	201.4	Spring Creek	Intermittent Stream/River	General Purpose Waters; Expected Aquatic Life Use	Supporting

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Cowley	201.8	Unnamed	Intermittent Stream/River		
Cowley	205.3	Unnamed	Intermittent Stream/River		
Cowley	205.7	Arkansas River	Artificial Path	General Purpose Waters; Special Aquatic Life Use; Primary Contact Recreation by Law or Written Permission; Domestic Water Supply; Food Procurement; Groundwater Recharge; Industrial Water Supply; Irrigation; Livestock Watering	Supporting
Cowley	206.2	Spring Creek	Intermittent Stream/River	No Data	
Cowley	207.8	Unnamed	Intermittent Stream/River		
Cowley	208.3	Unnamed	Intermittent Stream/River		
Cowley	209.5	Unnamed	Intermittent Stream/River		
OKLAHOMA					
Kay	212.2	Chilocco Creek	Intermittent Stream/River		
Kay	212.8	Chilocco Creek	Intermittent Stream/River		
Kay	220.0	Unnamed	Intermittent Stream/River		

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Kay	225.0	Bois d'Arc Creek	Perennial Stream/River	Agriculture; WW Aquatic Community; Hydropower; Primary Contact Recreation; Public and Private Water Supply; Fish Consumption; Aesthetics	Fully Supporting; Insufficient Information; Insufficient Information; Not Supporting; Fully Supporting; Not Assessed; Fully Supporting
Kay	230.7	Bois d'Arc Creek	Perennial Stream/River	Agriculture; WW Aquatic Community; Hydropower; Primary Contact Recreation; Public and Private Water Supply; Fish Consumption; Aesthetics	Fully Supporting; Insufficient Information; Insufficient Information; Not Supporting; Fully Supporting; Not Assessed; Fully Supporting
Kay	232.6	Unnamed	Intermittent Stream/River		
Kay	234.1	Bois d'Arc Creek	Perennial Stream/River	Agriculture; WW Aquatic Community; Hydropower; Primary Contact Recreation; Public and Private Water Supply; Fish Consumption; Aesthetics	Fully Supporting; Insufficient Information; Insufficient Information; Not Supporting; Fully Supporting; Not Assessed; Fully Supporting
Kay	234.4	Bois d'Arc Creek	Perennial Stream/River	Agriculture; WW Aquatic Community; Hydropower; Primary Contact Recreation; Public and Private Water Supply; Fish Consumption; Aesthetics	Fully Supporting; Insufficient Information; Insufficient Information; Not Supporting; Fully Supporting; Not Assessed; Fully Supporting
Kay	236.0	Bois d'Arc Creek	Perennial Stream/River	Agriculture; WW Aquatic Community; Hydropower; Primary Contact Recreation; Public and Private Water Supply; Fish Consumption; Aesthetics	Fully Supporting; Insufficient Information; Insufficient Information; Not Supporting; Fully Supporting; Not Assessed; Fully Supporting
Kay	239.0	Cowskin Creek	Intermittent Stream/River	No Data	No Data

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Kay	240.3	Salt Fork Arkansas River	Artificial Path	Aesthetics; Agriculture;WW Aquatic Community; Industrial and Municipal Process and Cooling Water;Primary Contact Recreation; Public and Private water supply; Fish Consumption	Insufficient Data; Fully Supporting/Not Assessed; Not Supporting, Fully Supporting; Not Supporting; Not Assessed; Not Assessed
Kay	240.8	Deadman Creek	Intermittent Stream/River		
Noble	241.6	Unnamed	Intermittent Stream/River		
Noble	248.3	Red Rock Creek	Perennial Stream/River		
Noble	249.1	Unnamed	Intermittent Stream/River		
Noble	250.2	Unnamed	Intermittent Stream/River		
Noble	250.3	Unnamed	Intermittent Stream/River		
Noble	251.6	Long Branch	Intermittent Stream/River		
Noble	260.3	Black Bear Creek	Perennial Stream/River		
Noble	261.6	Unnamed	Intermittent Stream/River		
Noble	262.6	Unnamed	Intermittent Stream/River		

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Noble	264.2	Long Branch	Intermittent Stream/River		
Payne	268.4	Unnamed	Intermittent Stream/River		
Payne	269.2	East Brush Creek	Intermittent Stream/River		
Payne	270.0	Unnamed	Intermittent Stream/River		
Payne	271.1	Little Stillwater Creek	Intermittent Stream/River		
Payne	271.3	Unnamed	Intermittent Stream/River		
Payne	273.0	Unnamed	Intermittent Stream/River		
Payne	274.4	Unnamed	Intermittent Stream/River		
Payne	275.8	Unnamed	Intermittent Stream/River		
Payne	278.0	Unnamed	Intermittent Stream/River		
Payne	279.0	Unnamed	Intermittent Stream/River		
Payne	279.7	Unnamed	Intermittent Stream/River		

APPENDIX F-1 Waterbody Crossings

State / County	Approximate MP	Waterbody Name	Intermittent Perennial, Reservoir, or Lake	State Water Quality Classification	Supports Use Designation
CUSHING EXTENSION					
Payne	283.2	Long Branch	Intermittent Stream/River		
Payne	284.9	Cimarron River	Artificial Path		
Payne	286.5	Unnamed	Intermittent Stream/River		
Payne	287.6	Cabin Creek	Intermittent Stream/River		
Payne	288.9	Cabin Creek	Intermittent Stream/River		
Payne	289.0	Cabin Creek	Intermittent Stream/River		
Payne	289.2	Cabin Creek	Intermittent Stream/River		