# Application to the South Dakota Public Utilities Commission for a Permit for the Keystone Pipeline Under the Energy Conversion and Transmission Facility Act

April 2007

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# List of Figure Exhibits



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| 20:10:22:04 | General format of application for permit | |
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| 20:10:22:39 | Testimony and exhibits | 7.2, All Exhibits |
| 20:10:22:40 | Application for party status | No information requested by rule. |

# Acronyms and Abbreviations

| | |
|---|---|
| amsl | above mean sea level |
| APE | area of potential effect |
| API | American Petroleum Institute |
| ASME | American Society of Mechanical Engineers |
| BMP | Best Management Practice |
| bpd | barrels per day |
| CAPP | Canadian Association of Petroleum Producers |
| CFR | Code of Federal Regulations |
| CL | centerline |
| CMR Plan | Construction Mitigation and Reclamation Plan |
| CWA | Clean Water Act |
| dBA | decibels on an A-weighted scale |
| DEQ | Department of Environmental Quality |
| DOS | Department of State |
| EIA | U.S. Energy Information Administration |
| EIS | Environmental Impact Statement |
| ERP | Emergency Response Plan |
| ESA | Endangered Species Act |
| GIS | Geographic Information System |
| GPA | Game Production Area |
| HCA | High Consequence Area |
| HDD | horizontal directional drill |
| IMP | integrity management program |
| kV | kilovolt |

| | |
|---|---|
| MLV | mainline valve |
| MP | milepost |
| NAGPRA | Native American Grave Protection and Repatriation Act |
| NEPA | National Environmental Policy Act |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Park Service |
| NRC | National Response Center |
| NRHP | National Register of Historic Places |
| NSA | Noise Sensitive Area |
| NWI | National Wetland Inventory |
| NWPA | National Wildlife Production Area |
| OPS | Office of Pipeline Safety |
| PADD II | Petroleum Administration for Defense District II |
| $PM_{10}$ | particulate matter with an aerodynamic diameter of 10 microns or less |
| PUC | Public Utilities Commission |
| ROW | right-of-way |
| SCADA | Supervisory Control and Data Acquisition |
| SD DENR | South Dakota Department of Environment and Natural Resources |
| SDGFD | South Dakota Game and Fish Department |
| SDNHP | South Dakota Natural Heritage Programs |
| SHPO | State Historic Preservation Officer |
| SPCC | Spill Prevention, Control, and Countermeasure |
| SWPPP | Storm Water Pollution Prevention Plan |
| TSS | total suspended solids |
| U.S. | United States |
| USACE | U.S. Army Corps of Engineers |

| | |
|---|---|
| USDOT | U.S. Department of Transportation |
| USEPA | U.S. Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| WCSB | Western Canadian Sedimentary Basin |
| WPA | Waterfowl Production Area |
| WSRA | Wild and Scenic Rivers Act |

# 1.0 Introduction

TransCanada Keystone Pipeline, LP (Keystone) hereby submits its application to the South Dakota Public Utilities Commission (PUC) for a permit under the South Dakota Energy Conversion and Transmission Facilities Act, with respect to the proposed Keystone Pipeline Project. Referenced tables and numbered exhibits (Exhibit 1, Exhibit 2, etc.) are included within the text of this document; lettered exhibits (Exhibit A, Exhibit B, etc.) are provided as attachments on the DVD.

## 1.1 Project Purpose

The purpose of the Keystone Pipeline Project is to transport incremental crude oil production from the Western Canadian Sedimentary Basin (WCSB) to meet growing demand by refineries and markets in the United States (U.S.). The demand for the facility is addressed in detail in Chapter 3.0 of this document.

## 1.2 Project Overview and General Site Description

Keystone proposes to construct and operate a crude oil pipeline and related facilities from Hardisty, Alberta, Canada, to Patoka, Illinois. The project, known as the Keystone Pipeline Project, initially will have the nominal capacity to deliver 435,000 barrels per day (bpd) of crude oil from an oil supply hub near Hardisty to existing terminals in Wood River and Patoka, Illinois (Keystone Mainline). If market conditions warrant expansion in the future, additional pumping capacity will be added to increase the average throughput to 591,000 bpd. The length of the proposed Keystone Mainline facility in the U.S. is approximately 1,078 miles, from the North Dakota - Canada border to Patoka. Based on shipper interest, Keystone also will construct an extension in the U.S. to deliver crude oil to Cushing, Oklahoma. The Cushing Extension would consist of an additional 294 miles. **Exhibit 1** depicts the entire pipeline route.

The pipeline will enter South Dakota at the North Dakota/South Dakota border in Marshall County, and extend in a southerly direction, exiting the state at the South Dakota/Nebraska border in Yankton County. The length of the pipeline in South Dakota will be approximately 220 miles and it will cross through the counties of Marshall, Day, Clark, Beadle, Kingsbury, Miner, Hanson, McCook, Hutchinson and Yankton.

## 1.3 Estimated Cost

The total estimated cost of equipment and installation of the Keystone Pipeline Project in South Dakota is approximately $302.2 million.

## 1.4 Time Schedule

Keystone proposes to commence construction of the Keystone Pipeline Project in South Dakota in April 2008 and to complete construction in November 2009. Construction will require three spreads in South Dakota, proceeding in a north to south direction. A drawing illustrating the three spreads in South Dakota is provided in **Exhibit 2**. Keystone proposes to place its pipeline in service in November 2009. This timing is consistent with the requirements of the shippers making the contractual commitments that underlie the pipeline project.

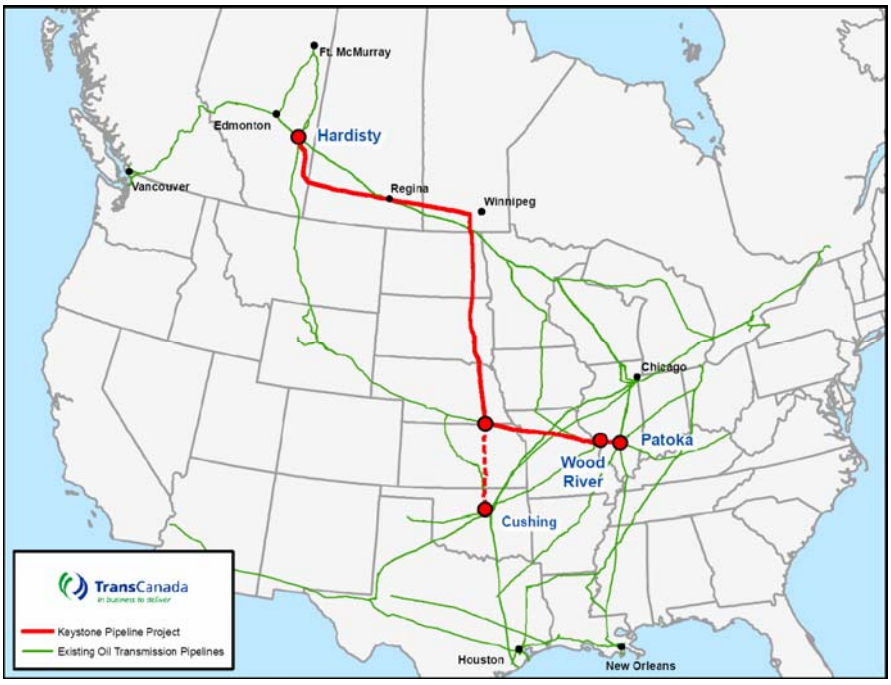
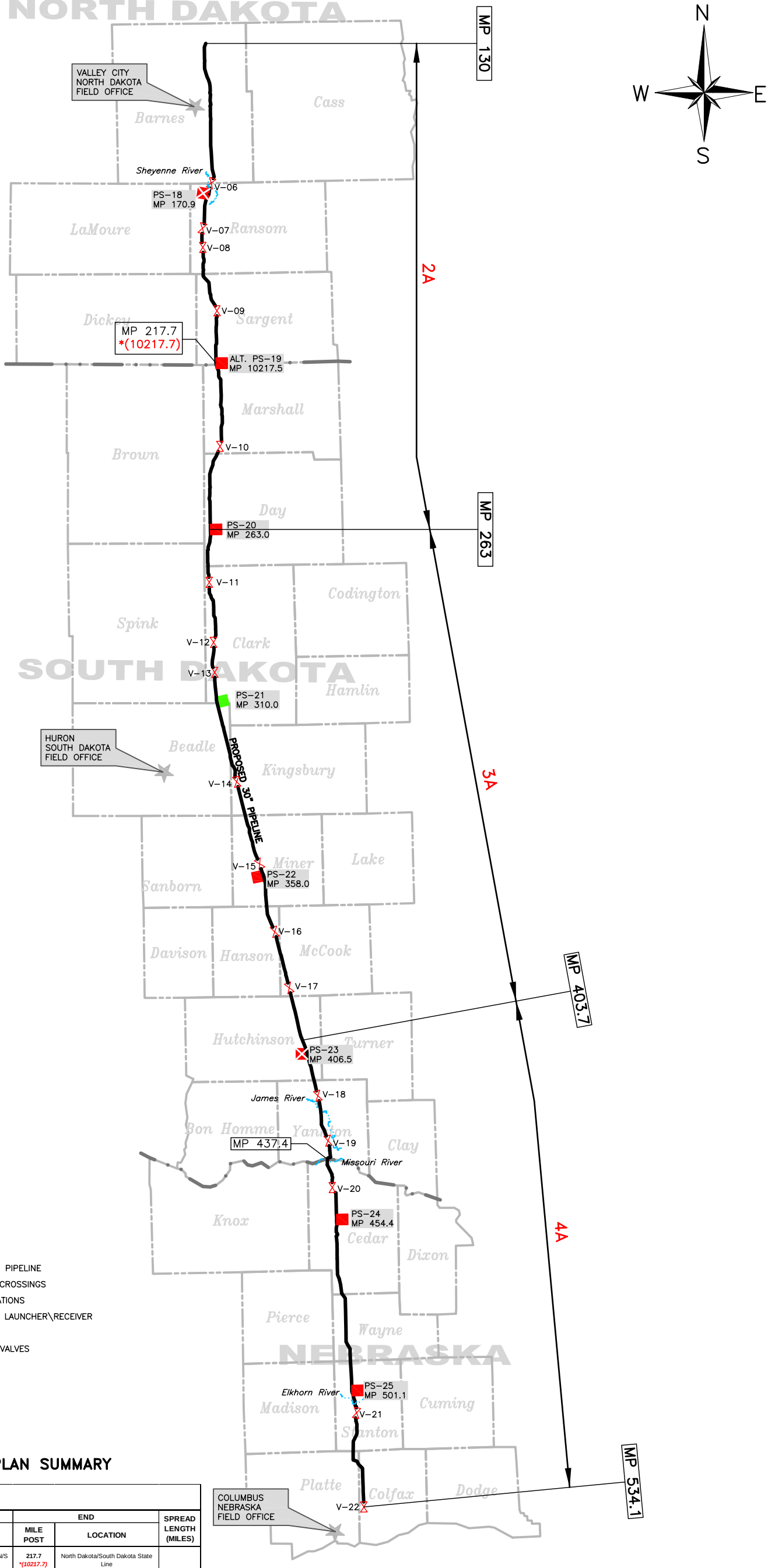



**Exhibit 1 Pipeline Route**




## LEGEND:

- PROPOSED KEYSTONE PIPELINE
- MAJOR WATER BODY CROSSINGS
- PROPOSED PUMP STATIONS
- PUMP STATIONS WITH LAUNCHER\RECEIVER
- FILL STATIONS
- PROPOSED MAINLINE VALVES
- DENSITOMETERS
- TERMINALS
- FIELD OFFICES

## CONSTRUCTION SPREAD PLAN SUMMARY

**MAINLINE**

| STATE | CONSTRUCTION PERIOD | SPREAD NO. | START | | END | | SPREAD LENGTH (MILES) |
|---|---|---|---|---|---|---|---|
| | | | MILE POST | LOCATION | MILE POST | LOCATION | |
| North Dakota | May 1 - November 30 2008 | 2A | #REF! | West side of 121st Ave SE, a N/S Road | 217.7 *(10217.7) | North Dakota/South Dakota State Line | 133.0 |
| South Dakota | | | 217.7 *(10217.7) | North Dakota/South Dakota State Line | 263.0 | County Road 22 at PS 20 | |
| South Dakota | May 1 - November 30 2008 | 3A | 263.0 | County Road 22 at PS 20 | 403.7 | East Side of 435th Ave. | 140.7 |
| South Dakota | May 1 - November 30 2008 | 4A | 403.7 | East Side of 435th Ave. | 437.4 | South Dakota/Nebraska State Line | 130.4 |
| Nebraska | | | 437.1 | South Dakota/Nebraska State Line | 534.1 | South side of County Road J Valve 18 | |
| Grand Total Mainline | | | | | | | 404.1 |

*Mile Post as noted in Route Maps

15 0 15 30

(MILES)

Exhibit 2

**PRELIMINARY**


TROW ENGINEERING CONSULTANTS INC.
1300 METROPOLITAN BLVD., SUITE 200
TALLAHASSEE, FL., USA 32308
PHONE: (850) 385-5441


| NO. | REVISION | DATE | APPR. |
|---|---|---|---|
| 0 | ISSUED FOR SOUTH DAKOTA PUC | 04.23.2007 | SS |

| SCALE | DATE | DRAWN | APPROVED | | |
|---|---|---|---|---|---|
| AS NOTED | April 23, 2007 | ALS | SS | | BG |

TransCanada
In business to deliver

KEYSTONE PIPELINE PROJECT

SOUTH DAKOTA PUC APPLICATION MAP

| TROW PROJ. NO. | DRAWING | SHEET |
|---|---|---|
| 50388E | K-46-8003-400 | 1 OF 1 |

## 1.5 Project Participants

The permit applicant is TransCanada Keystone Pipeline, LP. There are no other applicants or participants in the project at this time.

## 1.6 Individual Authorized to Receive Communications

The individuals authorized to receive communications regarding this application are:

Mr. Dean Cowling, Director – Operations & Engineering
Keystone Pipeline Project, TransCanada
450-1st Street S.W.
Calgary, Alberta, Canada T2P 5H1
Ph: (403) 920-6504
Fax: (403) 920-2325

Mr. Brett Koenecke
May, Adam, Gerdes and Thompson, LLP
Box 160
Pierre, SD 57501
Ph: (605) 224-8803
Fax: (605) 224-6289

## 1.7 Ownership and Management

It is anticipated that the pipeline will be wholly owned, managed and operated by TransCanada Keystone Pipeline, LP. The project manager for the Keystone Pipeline Project is:

Mr. Dean Cowling, Director – Operations & Engineering
Keystone Pipeline Project, TransCanada
450-1st Street S.W.
Calgary, Alberta, Canada T2P 5H1
Ph: (403) 920-6504
Fax: (403) 920-2325

## 1.8 Other Required Permits and Approvals

In addition to the permit under the Energy Conversion and Transmission Facility Act, the applicant has identified additional federal and South Dakota permits and regulatory approvals that will be required for construction and operation of the proposed Keystone pipeline in South Dakota. In order to construct pipeline facilities across the international border, Keystone is required to obtain a Presidential Permit from the U.S. Department of State (DOS). As required by the National Environmental Policy Act (NEPA), the proposed pipeline facilities will be the subject of an Environmental Impact Statement (EIS), which is currently being prepared by the DOS with the assistance of other cooperating agencies. It is anticipated that the Draft EIS for the Keystone Project will be issued by the DOS in mid-summer 2007. In support of its Presidential Permit application, Keystone submitted studies and other environmental information to the DOS.

In addition to the facility siting permit, the principal additional federal and South Dakota permits and approvals required or potentially required by the Keystone Project are listed in **Table 1**.

**Table 1 Additional Permits/Approvals Potentially Required**

| Agency | Permit or Consultation/Authority | Agency Action |
|---|---|---|
| **FEDERAL** | | |
| U.S. Department of State (DOS) | Presidential Permit, Executive Order 11423 of August 16, 1968 (33 Fed. Reg. 11741) and Executive Order 13337 of April 30, 2004 (69 Fed. Reg. 25229) | Approve cross-border facilities. DOS is lead federal agency under NEPA for the completion of the EIS, which is underway. |
| U.S. Army Corps of Engineers (USACE) – Omaha District | Section 404, Clean Water Act (CWA) | Section 404 permits for the placement of dredge or fill material in waters of the U.S., including wetlands. |
| | Section 10 Permit (Rivers and Harbors Act of 1899) | Section 10 permits for pipeline crossings of navigable waters. |
| Federal Highway Administration | Encroachment Permit | Permits for the crossing of federally funded highways. |
| Office of Pipeline Safety (OPS) | 49 Code of Federal Regulations (CFR) Part 195 | Review and approval of Integrity Management Plan for High Consequence Areas (HCAs). |
| | 49 CFR Part 194 | Review and approval of Emergency Response Plan (ERP). |
| U.S. Environmental Protection Agency (USEPA), Region VIII | Section 401, CWA, Water Quality Certification | Water use and crossing permits for non-jurisdictional waters. Implemented through SD DENR's Water Quality Certification Program. |
| | Section 402, CWA, National Pollutant Discharge Elimination System (NPDES) | Review and issue NPDES permit for the discharge of hydrostatic test water. Implemented through SD DENR's water discharge permitting program. |
| U.S. Fish and Wildlife Service (USFWS) | Section 7 of the Endangered Species Act (ESA) | Provide an opinion on project effects to listed threatened and endangered species. |
| **SOUTH DAKOTA** | | |
| Department of Environment and Natural Resources, Surface Water Quality Program | Section 401, CWA, Water Quality Certification | Permit for stream and wetland crossings/ consultation for CWA Section 404 process. |

**Table 1 Additional Permits/Approvals Potentially Required**

| Agency | Permit or Consultation/Authority | Agency Action |
|---|---|---|
| | NPDES Temporary Discharge Permit (General Permit for Temporary Discharges and a Temporary Water Use Permit) | Permit regulating hydrostatic test water discharge, and construction dewatering to waters of the state. |
| Department of Transportation | Encroachment Permits | Permits for encroachment on state highways. |
| County Road Departments | Encroachment Permits<br>Crossing Permits | Permits for encroachment on or crossing of county roads. |
| County Planning and Zoning Departments | Conditional Use Permits<br>Building Permits (as required) | Approval of plans and specifications, permits to construct. |

# 2.0 Project Description

## 2.1 Nature of Proposed Project

### 2.1.1 Facility Description Overview

Approximately 220 miles of the pipeline will be constructed in South Dakota, beginning in Marshall County and ending in Yankton County. Detailed route maps are presented in **Exhibit A**.

In addition to the pipeline, Keystone will construct aboveground facilities in South Dakota including pump stations, mainline valves (MLVs), and densitometers. Power lines required to provide power to pump stations, remotely activated valves, and densitometers will be permitted and constructed by local utility providers, not by Keystone.

### 2.1.2 Future Expansion and Other Industrial Facilities

If future market conditions warrant, the only additional infrastructure necessary in South Dakota to increase Keystone's throughput of crude oil from 435,000 bpd to 591,000 bpd will be the addition of one to three additional electric pumps within the footprint of the proposed pump stations located in South Dakota.

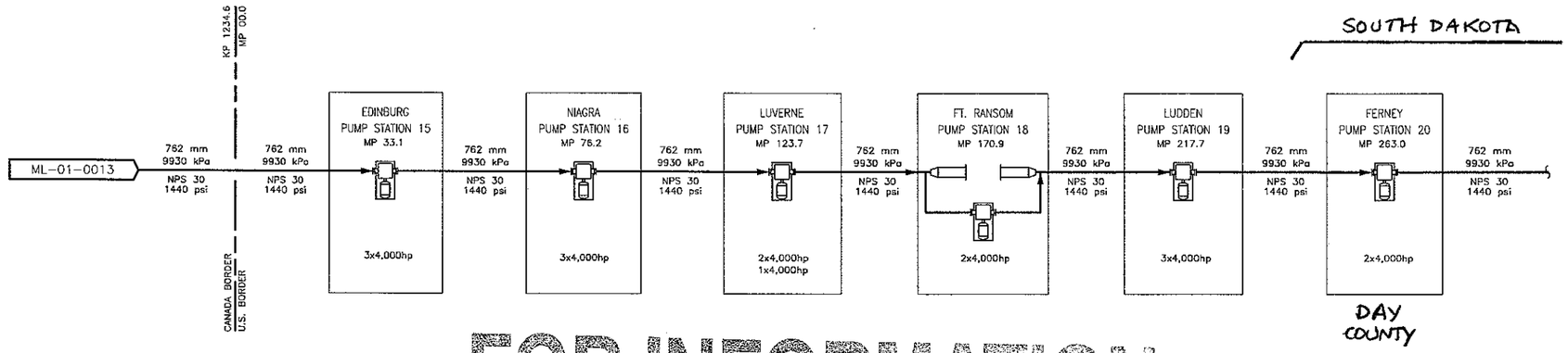
## 2.2 Engineering Design

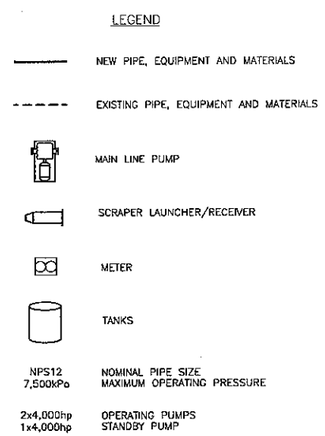
The proposed facilities will be designed, constructed, tested, and operated in accordance with all applicable requirements including the U.S. Department of Transportation (USDOT) regulations at 49 CFR Part 195, Transportation of Hazardous Liquids by Pipeline, American Society of Mechanical Engineers (ASME) Standard B31.4, and other applicable federal and state regulations. These regulations are intended to ensure adequate protection for the public and to prevent crude oil pipeline accidents and failures. Among other design standards, Part 195 specifies pipeline material and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion.

### 2.2.1 Pipeline

**Exhibit 3** is a process flow diagram for the first 600 miles of the pipeline route in the U.S. The length of the pipeline in South Dakota will be approximately 220 miles (from Milepost [MP] 217.7 to MP 437.4). No lateral lines will be constructed in South Dakota. The pipeline will have batching capabilities and will be able to transport products ranging from light crude oil to heavy crude oil. The pipeline will be constructed of high-strength steel pipe (American Petroleum Institute [API] 5L). The pipeline will have a 30-inch nominal pipe size diameter using grade X-70 steel pipe or grade X-80 steel pipe. An external coating (fusion bonded epoxy) will be applied to the pipeline and all buried facilities to protect against corrosion. Cathodic protection will be provided by impressed current. All pipe will be manufactured, constructed, and operated in accordance with applicable local, state, and federal regulations.

The initial design flow rate will be 435,000 bpd. If market conditions warrant, the maximum design flow rate may be increased to 591,000 bpd. The maximum allowable operating pressure of the pipeline will be 1,440 pounds per square inch, gauge.




FOR INFORMATION

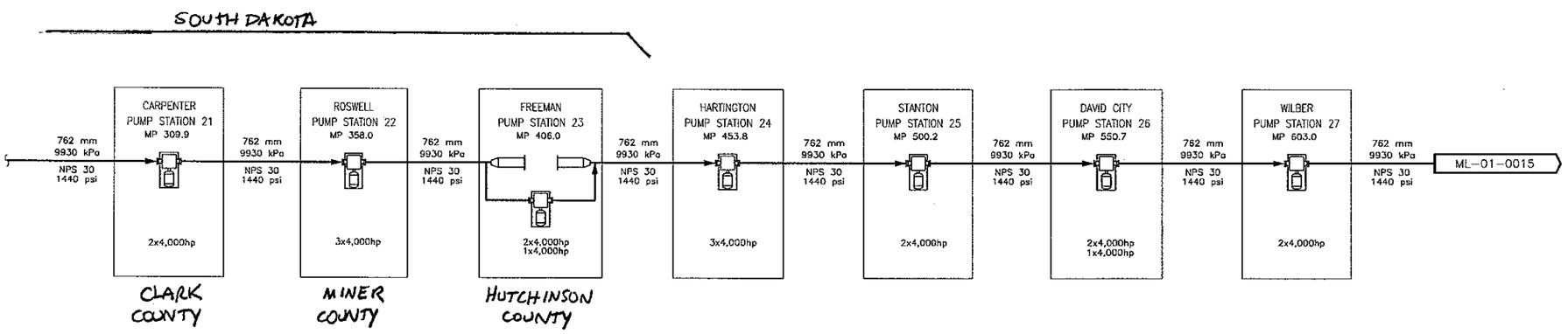



Exhibit 3

SNC·LAVALIN Inc.
608 Oxford Tower
10235 – 101 Street
Edmonton, Alberta, Canada T5J 3G1

REFERENCE DRAWINGS

| DRAWING No | TITLE |
|---|---|
| X | |

REVISION

| REV No | DATE | DESCRIPTION |
|---|---|---|
| PA | 2006 APR 05 | ISSUED FOR PRELIMINARY REVIEW |
| PB | 2006 JUN 02 | ISSUED FOR REVIEW |
| PC | 2006 JUN 10 | ISSUED FOR REVIEW |
| PD | 2006 NOV 27 | ISSUED FOR REVIEW |
| PE | 2007 FEB 16 | ISSUED FOR DBM |
| PF | 2007 APR 16 | ISSUED FOR REVIEW |

APPROVAL

| PROJECT CODE | DRAFTER | DRAFTING CHECKER | DESIGNER | DESIGN CHECKER | PROJECT MANAGER | COMPANY |
|---|---|---|---|---|---|---|
| | SS | | MA | JO | JO | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | YZ | JS | JS | JO | | |

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada
Keystone Pipeline GP Ltd.

KEYSTONE PIPELINE

FIA # | CHAINAGE: | DISCIPLINE #

KEYSTONE PIPELINE
MECHANICAL FLOW SCHEMATIC
CANADA AND UNITED STATES SITES

SCALE NTS | DRAWING No 1399-01-ML-01-014 | REV PF

SLI#017617-2101-49D1-0003

TC_A1_BR.DWG 5642541

### 2.2.2 Pump Stations

The four pump stations in South Dakota (Pump Stations 20, 21, 22, and 23) will be located in Day, Beadle, Miner, and Hutchinson counties. (Locations are indicated on the route maps provided in **Exhibit A**.) For the initial 435,000 bpd nominal capacity, each station will consist of two or three pumps driven by electric motors, an electrical building, electrical substation, a small maintenance building, and parking area for station personnel. Keystone will purchase electric power for its pump stations from local power providers. An additional one to two pumps will be added at each pump station if the pipeline's flow rate is increased to 591,000 bpd.

Pump stations will utilize electric power for all pumps, lights, and heating in the buildings. Pump stations will be fully automated for unmanned operation. Remote start/stop, set point controls, unit monitoring equipment, and station information will be installed at each location. The pipe entering and exiting the pump station sites will be located below grade; however, some of the piping within the pump station yard (after entering and prior to exiting the pump station facilities) will be aboveground. **Exhibit 4** shows a typical pump station layout.

There also may be a small gasoline powered emergency generator at each pump station, which will be housed in a small enclosure. The generator will supply electrical power if the local utility power supply is disrupted. The generator's primary purpose will be to maintain communications between the pump station and the pipeline control center, provide lighting and to provide power for minor facility procedures. Estimated operating hours for the generator are less than 20 hours per year. Emergency generators that utilize a petroleum product for fuel are exempt from air permitting requirements in South Dakota.

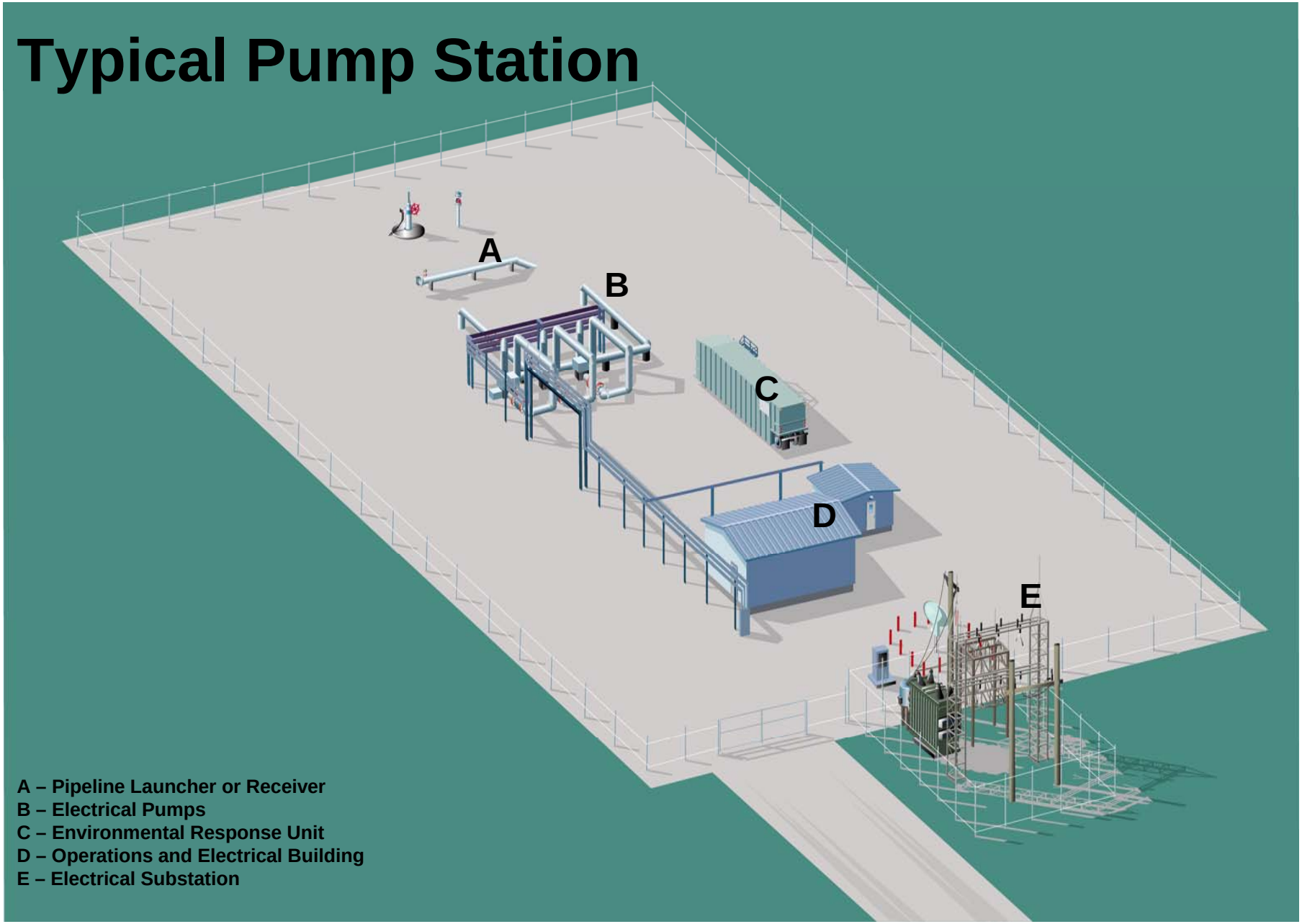
### 2.2.3 Mainline Valves

Keystone plans to construct 15 MLVs along the pipeline in South Dakota. The approximate locations for these valves are shown in the route mapping presented in **Exhibit A**. MLVs will be installed at each pump station and along the right-of-way (ROW). MLV intervals will have an average spacing interval of approximately every 15 miles. When not located at a pump station, MLVs will be sectionalizing block valves constructed within a fenced 50 feet-wide by 50 feet-long site located within the pipeline construction ROW and centered on the 50 feet-wide permanently maintained ROW. The spacing intervals between the MLVs along the ROW are based upon the location of the pump stations, waterbodies greater than 100 feet in width, HCAs, densely populated areas, and other topographic and environmental considerations. Remotely activated valves are located at pump stations, upstream of major river crossings, and upstream of sensitive waterbodies. In the unlikely event of a system upset, these valves can be quickly activated to isolate sections of the pipeline in the event of an emergency to minimize environmental impacts in the unlikely event of a system upset.

### 2.2.4 Land Requirements

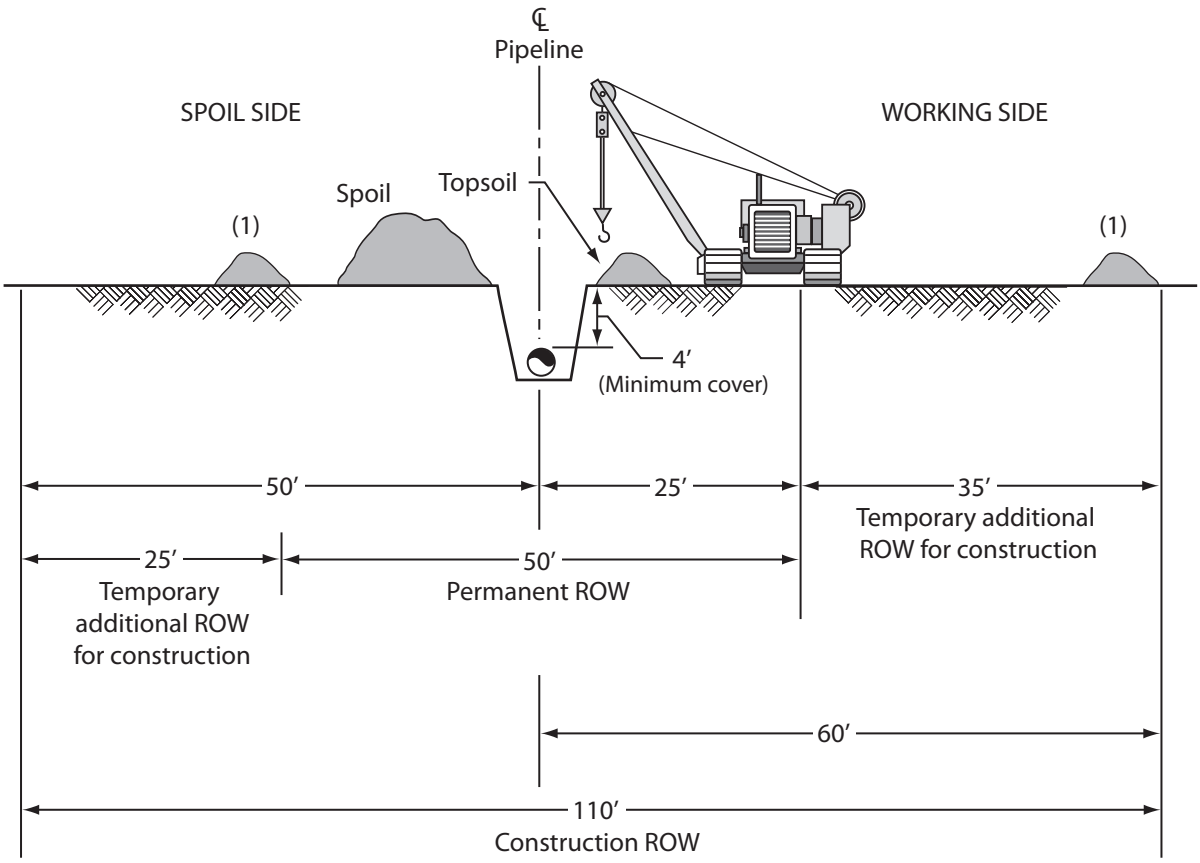
Keystone will construct the Keystone Pipeline using 30-inch-diameter pipe within a 110-foot-wide corridor, consisting of both a temporary 60-foot-wide construction ROW and a 50-foot permanent ROW. Additional temporary work space will be required for stream, road and railroad crossings, hilly terrain, etc. **Exhibit 5** illustrates the typical construction ROW and equipment work locations in most areas. Keystone will reduce the construction ROW width to 85 feet in certain wetlands to minimize impacts.

# Typical Pump Station




**A – Pipeline Launcher or Receiver**
**B – Electrical Pumps**
**C – Environmental Response Unit**
**D – Operations and Electrical Building**
**E – Electrical Substation**

Exhibit 4




(1) Alternate topsoil placement locations

KEYSTONE PIPELINE PROJECT

Exhibit 5
Typical 110′ Construction Right-of-Way (30- or 36-inch Pipeline) with Topsoil Removal Only over Trench Line

Surface disturbance associated with the construction and operation of the Keystone Pipeline Project is summarized in **Table 2**. In South Dakota, approximately 3,521 acres of land will be disturbed during construction. This total includes temporary construction workspace and approximately 1,331 acres that will be retained as permanent ROW. All disturbed acreage will be restored and returned to its previous use after construction, except for approximately 12 acres of permanent ROW, which will not be restored but will serve to provide adequate space for aboveground facilities, including pump stations and valves, for the life of the pipeline.

**Table 2 Summary of Land Requirements in South Dakota Associated with the Keystone Pipeline Project**

| Facility | Land Affected During Construction (acres) | Land Affected During Operation (acres) |
|---|---|---|
| Pipeline ROW | 2,929 | 1,331 |
| Lateral ROWs | 0 | 0 |
| Additional Temporary Workspace Areas | 170 (approximate) | 0 |
| Pipe and Contractor Yards | 400 (approximate) | 0 |
| Pump Stations | 22 | 12 |

Additional temporary workspace will be required at areas requiring special construction techniques (e.g., river, wetland, and road crossings; horizontal directional drill entry and exit points; steep slopes; rocky soils) and construction staging areas.

Off-ROW extra workspace areas will be required during the construction phase of the project to serve as pipe storage yards and contractor yards. Pipe storage and staging yards will be used to stockpile pipe for use during construction of the pipeline. Pipe storage yards are located at approximately 30-mile intervals along the pipeline route and typically are located in proximity to existing railroad siding facilities. Pipe yards typically will occupy approximately 20 to 30 acres. Keystone has identified 12 possible locations for pipe storage yards. These potential pipe storage yard locations are near the following towns and cities: Hecla, Ferney, Doland, Iroquois, Fedora, Bridgewater, Utica, Claremont, Groton, Yale, Emery, and Yankton. It is unlikely that Keystone will use all identified potential sites. Actual sites will be determined following discussions with pipe suppliers and contractors.

Three to five contractor yards will be required and possible locations have been identified near the following towns and cities: Aberdeen, Mitchell, Yankton, Bath, and Huron. Contractor yards will reduce worker transportation requirements during construction and will occupy approximately 15 to 20 acres. To the extent practical, Keystone proposes to use existing commercial/industrial sites or sites that previously have been used for construction. Existing public or private roads will be used to access each yard. Both pipe storage yards and contractor yards will be used on a temporary basis and will be restored upon completion of construction.

### 2.2.5 General Construction Procedures

To manage construction impacts, Keystone will implement Keystone's Construction Mitigation and Reclamation Plan (CMR Plan), which is attached to this application in **Exhibit B**. This plan contains construction and mitigation procedures that will be used throughout the project, with subsections to address specific environmental conditions. Specific mitigation measures from the CMR Plan are described in Chapters 5.0 and 6.0 of this application. These mitigation measures will constitute the basic construction mitigation procedures applicable to all lands disturbed by the Keystone Pipeline Project.

Before starting construction, Keystone will finalize engineering surveys of the ROW centerline and extra workspaces and substantially complete the acquisition of ROW easements and any necessary acquisitions of property in fee. Pipeline construction generally proceeds as a moving assembly line called a "spread." Each Mainline spread will consist of approximately 120 to 140 miles of pipeline. Separate crews will be used for construction of the aboveground facilities.

Standard pipeline construction is composed of specific activities including survey and staking of the ROW, clearing and grading, trenching, pipe stringing, bending, welding, lowering-in, backfilling, hydrostatic testing, and cleanup. Additional details on construction stages can be found in the November 2006 Environmental Report (**Exhibit C**). Construction on individual properties will generally last 8 to 12 weeks.

### 2.2.6 Special Construction Procedures

In addition to standard pipeline construction methods, Keystone will use special construction techniques where warranted by site-specific conditions. These special techniques will be used when constructing across paved roads, highways, railroads, waterbodies, and wetlands. These special techniques are described below.

#### 2.2.6.1 Road, Highway, and Railroad Crossings

Construction across paved roads, highways, and railroads will be in accordance with the requirements of the road and railroad crossing permits and approvals to be obtained by Keystone. In general, all major paved roads, including highways, all primary gravel roads, and railroads will be crossed by boring beneath the road or railroad. Boring will result in minimal or no disruption to traffic at road, highway, or railroad crossings. Each bored crossing is expected to take 1 to 2 days for most roads and railroads and up to 10 days for long crossings such as interstate or four-lane highways.

Most smaller, unpaved roads and driveways will be crossed using the open-cut method where permitted by local authorities or private owners. The open-cut method will require temporary closure of the road to traffic and establishment of detours. If no reasonable detour is feasible for public roads, at least one lane of traffic will be kept open, except during brief periods when it is necessary to close the road to install the pipeline. Most open-cut road crossings will be completed and the road resurfaced in 1 or 2 days. Keystone will take measures, such as posting signs at open-cut road crossings, to ensure safety and minimize traffic disruptions.

#### 2.2.6.2 Waterbody Crossings

Five perennial streams and rivers and approximately 112 intermittent waterbodies will be crossed during construction of the Keystone Mainline in South Dakota. Perennial waterbodies will be

crossed using one of four techniques: the open-cut wet method (Keystone's preferred method), open-cut flume method, open-cut dam-and-pump method, or Horizontal Directional Drill (HDD) method. When crossing waterbodies, Keystone will adhere to the guidelines outlined in Keystone's CMR Plan (**Exhibit B**). Additional information on waterbody crossings is provided in Section 5.4.1.

#### 2.2.6.3 Wetland Crossings

Data from wetland delineation field surveys, aerial photography, and National Wetland Inventory (NWI) map data were used to identify wetlands crossed by the proposed Keystone Mainline in South Dakota. Approximately 97 acres of wetlands will be disturbed by the construction corridor. Wetlands are classified as palustrine emergent, palustrine forested and palustrine shrub-scrub. All wetland areas that will be affected have been categorized as palustrine emergent (wet meadows) except for 0.3 acre of palustrine forested and 1.5 acres of palustrine shrub-scrub. Pipeline construction across wetlands will be similar to typical conventional upland cross-country construction procedures, with several modifications where necessary to reduce the potential for pipeline construction to affect wetland hydrology and soil structure. Specific protection measures for wetlands are described in Section 5.5.1.1

#### 2.2.6.4 Fences and Grazing

To minimize the impacts to grazing and livestock movement, Keystone will implement protective measures on rangeland. Detail on these protective measures can be found in Section 6.1.2.2 and in the CMR Plan. All work on pasture and farmlands including access and removal of bevel shavings, litter, and garbage will be in accordance with applicable permits. Temporary gates used for access will remain closed at all times. The temporary gates will be replaced with permanent fence.

Keystone will prohibit feeding or harassment of livestock or wildlife, firearms, and pets on the construction ROW. Food and food wastes will be stored and secured.

Once construction is completed, grazing and livestock movement over the permanent ROW may resume. Landowners will be compensated for the temporary loss of land use. Grazing may return to normal after vegetation is re-established.

## 2.3 Operation and Maintenance

Keystone will operate and maintain the project facilities in accordance with the USDOT regulations in 49 CFR Parts 194 and 195 and other applicable federal and state regulations. Operation and maintenance of the pipeline system in most cases will be accomplished by Keystone personnel. Keystone estimates that operation of the pipeline may require a small number of permanent employees for the South Dakota segment of the pipeline. Keystone may utilize contractors to perform other services including ROW maintenance and emergency response.

### 2.3.1 Normal Operations and Routine Maintenance

The pipeline will be inspected periodically from the air and on foot as operating conditions permit but no less frequently than as required by 49 CFR Part 195. These surveillance activities will provide information on possible encroachments and nearby construction activities, erosion, exposed pipe, and other potential concerns that may affect the safety and operation of the pipeline. Evidence of population changes will be monitored and HCAs will be identified as required by federal regulations. HCAs, as defined by 49 CFR Section 195.450, are high population areas (urbanized

area that contains 50,000 or more people and that has a density of at least 1,000 people per square mile), other populated areas (a place that contains a concentrated population), unusually sensitive areas as defined by 49 CFR Section 195.6 (ecosensitive and drinking water source areas), and commercially navigable waterways.

In order to maintain accessibility of the ROW and to accommodate pipeline integrity surveys, woody vegetation along the pipeline ROW periodically will be cleared. The permanent ROW will be maintained free of trees for the life of the project. Within that permanent ROW, a 30-foot-wide corridor, centered on the pipeline, will be maintained solely in a herbaceous condition. Cultivated croplands (such as wheat and corn) will be allowed to grow on the permanent ROW.

During operations, Keystone will monitor the pipeline and conduct pipeline integrity surveys to identify any potential integrity concerns. Keystone will survey the ROW to identify areas where permanent erosion control devices require repair or additional erosion control devices are necessary to prevent future degradation. Operation and maintenance procedures, including record keeping, will be performed in accordance with the USDOT requirements.

Keystone will further monitor the ROW to identify any areas where reclamation has not been successful. Further, reclamation measures will be implemented to rectify any such concerns. Applicable reclamation measures are outlined in the CMR Plan.

Supervisory Control and Data Acquisition (SCADA) facilities will be located at all pump stations and certain MLVs. The pipeline SCADA system will be capable of a number of functions, including:

- MLV position remote indication;
- MLV remote closing and opening control from a control center;
- Remote indication of line pressure and temperature; and
- Remote indication of delivery flow and total flow.

The Keystone pipeline will have a control center manned by an experienced and highly trained crew 24 hours per day for 365 days per year. A backup control center also will be constructed and maintained.

Communications systems will provide up-to-date information from the pump stations and other locations to the control center plus the capability to contact field personnel. A backup communications system will be included within the system design and installation. The control center will have pipeline monitoring systems including a leak detection system that will indicate out-of-normal conditions (see next section, Abnormal Operations) and initiate visual and audible alarms if they detect an operating condition that warrants operator investigation. Serious abnormal situations that are not investigated will initiate automatic pipeline shutdown systems.

### 2.3.2 Abnormal Operations

To monitor for abnormal conditions, Keystone will perform aerial surveillance of the pipeline ROW at least 26 times a year and not to exceed three weeks without surveillance, in accordance with 49 CFR Part 195. In addition to visual surveillance and operator diligence, Keystone will employ two technology-based leak detection systems to facilitate the early detection of pipeline leaks. These systems include:

- Leak detection software associated with the SCADA monitoring system; and
- Volumetric balancing.

As described above, Keystone's SCADA system will constantly monitor pipeline operation to quickly detect abnormal operation, including the detection of leaks. The SCADA system and leak detection software will fully comply with industry standards (API 1149). Using real-time dynamic flow modeling software, line-pack compensated volumetric balancing, and a hydraulic gradient model, the SCADA system will check pipeline conditions (e.g., flow rates, pressure, temperature, and fluid density) every three to five seconds while the pipeline is actively transporting crude oil. Pressure transducers and other monitoring equipment will be located at pump stations and data from these locations will be transmitted via satellite to the centralized SCADA location. The SCADA system will acquire and accumulate these data, which will then be fed into a leak detection model for analysis and trending. Real-time measurements will be analyzed against predetermined thresholds; if a predetermined threshold is exceeded, the information will be sent to the SCADA system, and the operator will be informed to take corrective actions.

Abnormal operating procedures will be implemented when necessary, in accordance with 49 CFR Section 195.402(d). In the event of any unusual situation, the operations manager on duty will alter the pipeline's operation. In the event pressure indications show a change, higher or lower, the pipeline controller will immediately make an evaluation. If necessary, emergency response procedures (summarized in the next section) will be implemented.

If a leak is suspected and the pipeline is shut down, the operation of the segment will not be resumed until the cause of the alarm (e.g., false alarm by instrumentation) or the leak is identified and repaired. If a reportable leak were to occur, USDOT approval will be required to resume operation of the affected segment.

#### 2.3.2.1 Emergency Response Procedures

Potential system emergencies include leaks or fires located near or directly involving a pipeline or pipeline facility and pipeline or pipeline facility damage from natural and human causes. If an emergency were to occur, pipeline flow will be stopped and will not resume until the cause of the problem (e.g., instrumentation failure or leak) is detected and repaired.

As required by the USDOT regulations, Keystone will prepare an ERP for the system. The ERP will be submitted to and approved by the USDOT prior to operation. The ERP will:

1. Establish guidelines and procedures to be followed in emergencies and to minimize hazards resulting from pipeline emergencies;

2. Establish procedures for training Keystone's employees on emergency procedures; and

3. Establish guidelines for continuing educational programs designed to inform the public of the procedures to follow in recognizing and reporting an emergency condition in compliance with the recommended practice of API 1162.

If a spill were to occur, Keystone will be required to immediately notify the National Response Center (NRC) in the event of a release of crude oil that:

1. Violates water quality standards;

2. Creates a sheen on water; or

3. Causes a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines (40 CFR Part 112).

In addition to the NRC, Keystone will make timely notifications to other agencies, including the appropriate Local Emergency Planning Committees, sheriff's departments, the applicable state's DEQ, USEPA, and affected landowners.

Oil spill responses will be handled by Keystone. However, some spills may require assistance from local, state, or federal agencies. Under the National Contingency Plan, USEPA is the lead federal response agency for oil spills occurring on land and in inland waters. The USEPA will monitor all activities to ensure that the spill is being contained and cleaned up appropriately. In the unlikely event of a large spill, Keystone and its contractors will be expected to take the lead in recovery and cleanup.

A fire associated with a spill is relatively rare. According to historical data (OPS 2005), only about 3 percent of reportable liquid spills are ignited. In the event of a fire, local emergency responders will execute the roles listed above and firefighters will take actions to prevent the crude oil fire from spreading to adjacent foliage or structures. Fire departments might choose to extinguish a small- or moderate-sized crude oil fire, but in many cases the best course of action may be to let the fire burn itself out. Local emergency responders typically are trained and able to execute the roles described above without any additional training or specialized equipment. Keystone also will work with emergency response agencies to provide pipeline awareness education and other support.

#### 2.3.2.2 Remediation

Corrective remedial actions will be dictated by federal regulations and enforced by the USEPA and OPS. Required remedial actions may range from the excavation and removal of contaminated soil to allowing the contaminated soil to recover through natural environmental fate processes (e.g., evaporation, biodegradation). Decisions concerning remedial methods and extent of the cleanup will consider state mandated remedial cleanup levels, potential effects to sensitive receptors, volume and extent of the contamination, exceedences of water quality standards, and the magnitude of adverse impacts that will be caused by remedial activities.

# 3.0 Demand for Facility

The purpose of the Keystone Pipeline Project is to transport incremental crude oil production from the WCSB to meet growing demand by refineries and markets in the U.S.

The need for the project is dictated by a number of factors including:

1. Increasing WCSB crude oil supply combined with insufficient export pipeline capacity;

2. Increasing crude oil demand in the U.S. and decreasing domestic crude supply;

3. The opportunity to reduce U.S. dependence on foreign offshore oil through increased access to stable, secure Canadian crude oil supplies; and

4. Binding shipper commitments to utilize the Keystone Pipeline Project.

According to the U.S. Energy Information Administration (EIA), U.S. demand for petroleum products has increased by over 17 percent or 3 million bpd over the past 10 years and is expected to increase further. The EIA estimates that total U.S. petroleum consumption will increase by approximately 5.3 million bpd over the next 20 years, representing average demand growth of about 265,000 bpd per year (EIA Annual Energy Outlook 2006).

At the same time, domestic U.S. crude oil supplies continue to decline. For example, domestic crude production in the Petroleum Administration for Defense District II (PADD II), Keystone's initial target delivery area, continues to decline at an average rate of about 3 percent per year. Over the past 20 years, PADD II crude oil production has decreased by over 600,000 bpd or 60 percent (Canadian Association of Petroleum Producers [CAPP] April 2005).

The U.S. historically has compensated for decreases in domestic production through increased imports from Canada and foreign offshore sources. Canada is currently the largest supplier of imported crude oil and refined products to the U.S. (CAPP 2005), providing over 2.1 million bpd. Ten percent of oil consumed in the U.S. comes from Canada. U.S. imports of foreign crude and refined products continue to increase. Crude and refined petroleum product imports into the U.S. have increased by over 4.3 million bpd over the past 10 years. In 2004, the U.S. imported over 13 million bpd of crude oil and petroleum products (EIA 2006).

Keystone will provide a number of opportunities for refiners in the U.S. to utilize Canadian crude oil. Keystone's incremental pipeline capacity will provide the U.S. access to secure and growing Canadian crude supplies. Access to incremental Canadian crude supply also will provide an opportunity for the U.S. to offset declines in domestic crude oil production and decrease its dependence on offshore foreign crude supplies.

Reliable and safe transportation of oil will help ensure that U.S. energy needs are not subject to unstable political events. Established crude oil reserves in the WCSB are estimated at 179 billion barrels (CAPP 2005). Over 97 percent of WCSB crude oil supply is sourced from Canada's vast oil sands reserves located in northern Alberta. The Alberta Energy and Utilities Board estimates there

are 175 billion barrels of established reserves recoverable from Canada's oil sands. Alberta has the second largest crude oil reserves in the world, second only to Saudi Arabia.

CAPP estimates that, as a result of increasing production from the oil sands, the current level of crude oil production from the WCSB of about 2.3 million bpd is expected to increase by about 1.3 million bpd by 2015. CAPP also has made a high case forecast, which estimates potential growth of over 2 million bpd over the same 10-year timeframe.

Existing crude oil export pipeline capacity out of the WSCB is insufficient to accommodate the forecasted crude oil supply growth. After accounting for Canadian domestic consumption, approximately 850,000 bpd of incremental export pipeline capacity will be required by 2015 to accommodate increased WCSB crude supply, based on CAPP's moderate forecast. Additional capacity above supply requirements is required to avoid potential pipeline apportionment situations where short-term supply exceeds export pipeline capacity.

The Keystone Pipeline Project initially will provide 435,000 bpd of incremental export capacity to address this deficiency. With expansion, Keystone could provide up to approximately 590,000 bpd of incremental export capacity. Thus, the addition of the Keystone pipeline will significantly increase the WCSB pipeline export capacity needed to address forecasted supply growth.

Keystone conducted a binding Open Season in December 2005 to provide shippers an opportunity to participate in the Keystone Pipeline Project by entering into contractual commitments for pipeline capacity. Binding contracts for 340,000 bpd were received, which Keystone deemed sufficient to enable it to proceed with regulatory applications and, pending successful regulatory and environmental approvals, with construction of the pipeline. These binding commitments demonstrate the need for incremental pipeline capacity and access to Canadian crude supplies and represent a clear endorsement of the Keystone Pipeline Project. Keystone expects that the remainder of the excess capacity will be utilized by non-contract shippers at the tariff rate to be approved by the Federal Energy Regulatory Commission.

# 4.0 Proposed Route and Alternative Routes

## 4.1 Route Selection

Keystone's proposed route in South Dakota was developed through an iterative review and assessment of input from federal state and local agencies, other stakeholders, landowners, environmental studies, and cultural surveys. This iterative process has allowed the consideration of numerous environmental, design and construction factors in order to derive a route that balances these factors. Keystone has designed the proposed pipeline route to avoid, as much as practical, communities, high value habitat, aquifers, and recreational use areas. The proposed pipeline route minimizes potential adverse impacts to South Dakota's environment and communities while transporting crude oil to assist in meeting the Nation's energy demands.

The route selection process for the Keystone Pipeline Project is summarized in the following section. The process began with the identification of key project objectives, control points, and constraint information. Alternatives were then examined and compared with respect to these features. A preferred alternative was then selected. A more extensive analysis and evaluation of alternatives is set forth in Keystone's Environmental Report, which was filed with the DOS in April 2006 and updated in November 2006. A copy is provided as **Exhibit C**.

### 4.1.1 Objectives

Several high level objectives were established for the Keystone Pipeline Project, which serve to define the project. These include the following:

1. Gas Pipeline Conversion: Converting an underutilized natural gas pipeline in Canada to crude oil service will result in Keystone pipeline crossing into U.S. generally in the vicinity of Gretna, Manitoba at the Manitoba/North Dakota border.

2. Market Endpoints: Based on shipper requests, the primary market endpoints are: 1) the Conoco Phillips refinery at Wood River, Illinois; and 2) Patoka, Illinois (an interconnection point providing necessary access to other crude oil pipelines and tank storage).

3. Cushing and Gulf Coast Refineries: While not considered an initial market point, the ability to economically access Cushing, Oklahoma, and, therefore, Gulf Coast refineries, was a desired objective of the system.

### 4.1.2 Data Gathering

Based on these high level objectives, a general geographic region of interest was established. Data was then gathered for this region. These data included the following:

- Topographic Quadrangle Maps (1:250,000 Scale);
- Topographic Quadrangle Maps (1:24,000 Scale);
- Aerial Photography from various sources; and
- Geographic Information System (GIS) layers containing federal and state environmental and land use data.

All these data were compiled into a GIS-based constraint data set of the area to support the identification and evaluation of route options.

### 4.1.3 Constraints and Opportunities

A number of primary and secondary constraints were identified to guide the route selection process. With respect to Primary constraints, it is the general objective to avoid these constraints. Where this is not possible, the objective is to minimize the impacts to them to the extent possible. With respect to Secondary constraints, the objective generally is to avoid, if possible, or otherwise minimize. The constraints were:

Primary

- Federal and state lands;
- Large waterbodies;
- Native American and military lands;
- Extreme terrain;
- Large wetland complexes;
- Urban areas; and
- Wildlife refuges.

Secondary

- Water crossings;
- Wetland crossings;
- Waterfowl production areas (WPAs);
- Irrigated croplands;
- Bedrock;
- Rural communities;
- Aquifers;
- Extensive forested areas; and
- Residences and associated features such as driveways, outbuildings and wind breaks.

Opportunities refer to those features which are favorable features for pipeline routing and generally serve to simplify construction and decrease disturbance. These include:

- Existing linear features such as pipelines, power lines and roadways. Corridors containing other pipelines are typically preferred;
- Flat or gently rolling terrain;
- Soils which can be readily excavated; and
- Non-forested areas.

### 4.1.4 Definition of Control Points

Control points are fixed locations that are required to serve the stated purpose and need for the project. These are immobile and are therefore needed to be connected to the routing. The following control points served to define the route:

- U.S./Canada border crossing near Gretna, Manitoba;
- Delivery point at Wood River, Illinois;
- Delivery point at Patoka, Illinois; and
- Desire to develop a competitive (direct) route to serve Cushing, Oklahoma.

### 4.1.5 Route Alternatives Identification and Evaluation

Based on the above information and objectives, a number of initial alternative pipeline routes and route segments were developed. These routes and route segments met the basic project objectives. These routes and route segments respected the constraints and opportunities to varying degrees. The initial pipeline routes considered in the planning process are described in the Keystone Environmental Report (updated November 2006 – **Exhibit C**).

Each route alternative was then evaluated and compared with respect to the key criteria noted below:

- Length;
- Percentage of co-location with existing linear facilities;
- Waterbody crossings;
- Road crossings;
- Rail crossings;
- Utility crossings;
- National parks;
- Conservation areas;
- Wildlife areas; and
- Native American and Military Lands.

Through initial route evaluation, the Missouri River crossing emerged as a major control point in South Dakota due to the Recreational River designation (Wild and Scenic Rivers Act [WSRA]) along stretches of the river. Several Missouri River crossing location options were developed, and then linked with the various pipeline route alternatives. The Missouri River crossing at Yankton, South Dakota, which is co-located with two existing pipeline crossings and is near a highway bridge, was identified as the optimum crossing location. The crossing occurs at a relatively stable portion of the Missouri River where lateral migration is not expected to be significant. This crossing will be made utilizing the HDD method, which will avoid channel disturbance within the river and to the riverfront property under National Park Service (NPS) jurisdiction.

Through the course of the route evaluation process, Keystone held public meetings and one-on-one meetings with stakeholders to discuss and review the proposed routing through South Dakota. In October 2006, DOS held scoping meetings at Yankton and Clark, South Dakota, to solicit input with respect to the environmental issues to be considered by DOS in the EIS process.

## 4.2 Route Refinement

Several re-routes in South Dakota have been developed to respond to environmental, land use and project operational issues. The most significant re-routes are described as follows:

a. USFWS Hecla Sandhills Re-route (MP 190.0 to MP 225.2)

Subsequent to submitting its initial Environmental Report to the DOS in April 2006, Keystone developed an additional route alternative in North and South Dakota to respond to environmental, land use, and project operational issues. The 55-mile Hecla Sandhills Route alternative is located in Sargent County, North Dakota, and Marshall and Day counties, South Dakota. In response to USFWS input, this alternative shifts the proposed route west to avoid crossing over environmentally sensitive areas consisting of USFWS grassland easements within a stabilized dune field called the Hecla Sandhills. Specific concerns were stabilization and revegetation of sand dunes over the long term, the presence of listed and sensitive plant and animal species, and the lack of existing access to a proposed pump station site within the sandhills.

Subsequent to submitting its revised Environmental Report in November 2006, Keystone conducted a review of shallow aquifers in the area was conducted. Additionally, the USFWS expressed concern about crossing grassland easements. Further field reconnaissance also indicated extensive wetlands along the revised route in South Dakota. As a consequence of this review and input, Keystone developed a new version of the Hecla Sandhills Reroute. This reroute is located in existing farmland, crosses less wetland acreage, avoids all USFWS grassland easements, and traverses only 1 mile of USFWS wetland easements (approximately). This route change was filed as an alternative in Keystone's January 2007 Supplemental Filing with the DOS (see **Exhibit C**).

b. USFWS Day County Grasslands Reroute (MP 262.5 to MP 271.1)

In a letter dated June 8, 2006, the USFWS requested that Keystone minimize impacts to Day County Grassland Easements, an area of native prairie protected by USFWS grassland easements. To minimize impacts to these grassland easements, the route was shifted to a maximum deviation of approximately 0.5 mile to the west of the original pipeline route.

c. USFWS Raymond Prairie Chicken Leks Reroute (MP 276.0 to MP 293.0)

In a letter dated June 8, 2006, the USFWS requested Keystone minimize impacts to habitat of the Raymond Prairie Chicken Leks, an area of tall grass prairie surrounded by intensively farmed cropland. The USFWS noted that these grasslands provide habitat for one of the few stable populations of greater prairie chicken leks in the eastern Dakotas.

To minimize impacts to the tall grass prairie, the route was shifted to a maximum deviation approximately 1 mile to the east of the original pipeline route.

d. Yankton Local Reroutes (MP 432 to MP 436)

Keystone consulted with city officials and other interested parties to revise the proposed route to minimize impacts to areas proposed for future development around Yankton.

## 4.3 Extent to Which Reliance on Eminent Domain Powers Could be Reduced by Use of an Alternative Site

Landowners will be paid compensation for easements based on fair market value of the easement area. Additional compensation will be provided for crop loss and other damages. Keystone intends to acquire sites for pumping stations in fee and will provide payment based on fair market value of the site.

Keystone intends to use eminent domain only as necessary where good faith efforts to acquire easements on a negotiated basis are unsuccessful. Landowners may retain counsel to represent them in eminent domain actions. In an eminent domain proceeding, the value of the easement will be determined by the forum.

Use of an alternative route for the pipeline would not reduce the potential need to exercise eminent domain powers.

# 5.0 Environmental Information and Effect on Physical Environment

This section describes the existing environment of the proposed Keystone Pipeline route and the anticipated effect on the physical environment. Keystone has evaluated the potential environmental impacts and has designed its project to minimize those impacts to the extent practicable

## 5.1 Environmental Information Filed with the U.S. Department of State

The following is a list of documents filed by Keystone with the DOS that evaluate environmental impacts. These documents are attached to this application in **Exhibit C** and are incorporated herein by reference. The contents of these documents are briefly described below.

Department of State

In order to construct pipeline facilities across the international border, Keystone is required to obtain a Presidential Permit from the DOS. As required by NEPA, the proposed pipeline facilities will be the subject of an Environmental Impact Statement being prepared by the DOS, with the assistance of other cooperating agencies. It is anticipated that the Draft EIS for the Keystone Project will be issued by the DOS in mid-summer 2007. In support of its Presidential Permit application, Keystone submitted studies and other environmental information to the DOS. The major environmental submittals are summarized below and are contained in **Exhibit C** in chronological order.

- April 19, 2006. Keystone Pipeline Environmental Report.

In order to facilitate DOS review under NEPA, Keystone submitted to DOS a comprehensive Environmental Report in April 2006. This document contains a project description, route alternatives considered, environmental baseline information, an initial assessment of environmental impacts, and a Construction, Mitigation and Reclamation (CMR) Plan that includes construction methods and best management practices (BMPs). This document was included as part of the November 2006 Environmental Report (see below).

- July 10, 2006. Supplemental Filing

Keystone filed supplemental information with the DOS that included an ERP (Oil Spill Response Plan), a preliminary pipeline risk and environmental consequence analysis, and a tract line list.

- September 15, 2006. Supplemental Filing

Keystone filed supplemental information with the DOS including an updated project description, refined route mapping, revised line list, and details of agency consultations.

- November 17, 2006. Keystone Environmental Report (April 2006 Environmental Report, Updated).

Keystone filed an updated Environmental Report that included project description updates and status updates for cultural, wetlands, and biological surveys (further described below).

- January 24, 2007. Supplemental Filing.

Keystone filed supplemental information with the DOS that included the Hecla Sandhills Alternative. The Supplemental Filing includes a comparison between the resources affected by pipeline and pump station construction and operation on the proposed route segment and the alternative route. Cultural and biological survey status reports, as well as agency coordination documents also were filed.

- March 30, 2007. Supplemental Filing.

Keystone filed updated project facility location information, supplemental biological and cultural survey information.

## 5.2 Summary of Environmental Impacts

**Table 3** provides a summary of the environmental impacts that are expected to remain after Keystone's CMR Plan is applied. This impact summary addresses the South Dakota portion of the project. These impacts include short-term uses of renewable resources, such as water withdrawn for hydrostatic testing and then discharged back to the land. These impacts also include long-term changes in land use, such as the prohibition of residential structures on the permanent pipeline ROW.

**Table 3 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 pump stations 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. |
| | • 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 will be lost to increased water and wind erosion acting on disturbed soil surfaces until grass and other herbaceous vegetation is restored. |
| | • Agricultural cropland and rangeland (including hayland) production will be lost from the construction ROW for the season during construction only. During the next growing season, production on all agricultural lands will be able to be resumed and 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 perennial streams and rivers. |
| | • 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 9 million gallons. Withdrawal rates and volumes will be designed to avoid impacts to |

**Table 3 Impact Summary**

| Resource | Impact Summary |
|---|---|
| | 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 103 acres of wetlands, river systems and open water in South Dakota. Of this total, approximately 97 acres are wetlands and 6 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; recovery of forested wetlands will require 20 to 50 years. No permanent loss of wetlands will occur as a result of this project. |
| Vegetation | • Pipeline construction will disturb a total of 3,521 acres including 633 acres of native and modified grassland and 3 acres of forested land. It is estimated that vegetation cover in native and modified grasslands will recover in 3 to 5 years, while recovery of forests and woodlands will require 20 to 50 years in the temporary workspace. Trees will not be permitted to grow on approximately 1.5 acres of currently forested woodlands during pipeline operations to allow for aerial surveillance. |
| Wildlife | • Approximately 734 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. |
| | • Power lines will be constructed to serve the pump stations. The power lines represent a collision hazard for waterfowl and other birds similar to existing electrical distribution lines. |
| Aquatic Resources | • Based on the implementation of mitigative measures at watercourse crossings, the project will experience only short-term (1 to 2 days) effects on fish and fish habitat at the four perennial river and stream crossings designed for open cut water-course crossing. These effects will consist of potential increases in total suspended solids and sediment deposition downstream from channel excavation. |
| 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. In 2006, Keystone initiated habitat and occurrence surveys for several federally listed and state sensitive species. Keystone will continue these surveys in 2007. |

**Table 3 Impact Summary**

| Resource | Impact Summary |
|---|---|
| | • 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. Keystone has adjusted its proposed pipeline route at several locations in South Dakota to reduce the length of wetland and native prairie crossings. |
| Land Use (including noise, transportation) | • Approximately 1,331 acres will not be permitted 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 and other aboveground facility sites. |
| | • A small parcel of state land (approximately 0.5 acre of surface disturbance) will be crossed in South Dakota. This state land is used for wildlife management purposes. Keystone has and will continue to consult with the state manager of this land to develop site-specific crossing plans to maintain public access and existing land uses. |
| | • Construction noise will be generated and potentially heard at nearby (generally 0.5 mile or less) residences during daytime construction activities over a period of several weeks. |
| | • Long-term operational noise from pump stations will be maintained at acceptable noise level thresholds. |
| | • Aboveground facilities (pump stations, power lines, valves, densitometers) will exist for the life of the project. The majority of these facilities will be located in rural areas. Power lines 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 may occur during construction across those roads. Major highways will be bored. There will be no long-term impacts to transportation. |
| Cultural Resources | • Keystone developed study plans that were approved by the State Historic Preservation Office. 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 introduction of 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) will 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 during construction within the construction corridor, work that could adversely affect the discovery will cease until consultation with appropriate cultural preservation agencies is completed. If a previously unidentified site is recommended as eligible to the NRHP, impacts will be mitigated through the procedures included in an Unanticipated Discovery Plan. |

**Table 3 Impact Summary**

| Resource | Impact Summary |
|---|---|
| | • Treatment of any discovered human remains will 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 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. An estimated 1,200 construction workers will be employed for the South Dakota section of the pipeline. 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 state and counties crossed by the pipeline. It is estimated that the project will pay about $6.5 million dollars in property taxes in South Dakota 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 was submitted to the DOS in April 2007. |

## 5.3 Physical Environment

The following discussion describes the physical environment through which the Keystone Pipeline Project will pass and delineates the effects of the proposed facility on the physical environment.

### 5.3.1 Land Forms and Topography

Aerial photograph maps that indicate topography of the Keystone Pipeline route in South Dakota are provided in **Exhibit A**. The Keystone Pipeline Project route crosses the Dakota-Minnesota Drift and Lake-bed Flats physiographic subdivision, which is typified by low relief and is covered by glacial moraines and lakebeds. The proposed route is in the James River Valley, a broad valley of low relief that trends north to south across the eastern portion of the state. The James River Valley was formed when the dam forming a large glacial lake (Lake Dakota) was breached and the outflow

carved the valley. The elevations in the James River Valley area at about 1,200 feet above mean sea level (amsl) and it is situated between areas of higher elevation, the Coteau du Missouri to the west and the Coteau du Prairies to the east. A major point of relief occurs in Yankton County along the Missouri River.

Elevations along the proposed route vary from around 1,300 feet amsl in the north to about 1,150 feet amsl in the south. There is very low relief along the route except where major drainages have cut into the glacial deposits. There is about 140 feet of relief where the route crosses the James River and about 100 feet of relief where the route drops into the Missouri River Valley.

### 5.3.2 Geology and Paleontology

The geologic surficial deposits along the proposed route are composed of glacial drift consisting of till deposits made up of material derived from the Cretaceous bedrock. The glacial till deposits can be hundreds of feet thick especially in the eastern part of the state. The surficial deposits also may include loess (fine-grained glacial material re-deposited by wind) and alluvium.

The bedrock geology that underlies the surficial materials along most of the proposed route is Upper Cretaceous units consisting of the Pierre Shale, Niobrara Formation, Carlisle Shale, Greenhorn Formation, and Graneros Shale. There may be minor areas of Dakota Formation which is Upper-lower Cretaceous. The Upper Cretaceous units are mainly composed of shale and minor amounts of limestone and sandstone. The Dakota Formation consists of medium- to coarse-grained sandstone with minor interbedded shale. In Hansen County, the bedrock is Precambrian in age and is composed largely of quartzite. The bedrock occasionally outcrops along road cuts and stream valleys.

There are potential karst features along the proposed route in southern portions of Miner County, northern portions of Hanson County, in the southern part of Hutchinson County, and all of Yankton County to the Nebraska State line. Karst occurs as a result of the dissolution of certain rocks by water. The dissolution can cause caves or can result in subsurface voids, which if manifested to the surface can cause hazards to life and property in the form of sinkholes. The area is underlain by carbonate rocks of the Cretaceous Niobrara Formation. Small fissures may develop in the Niobrara but are less than 1,000 feet long and 100 feet deep and are widely spaced with over 1,000 feet of competent rock between fissures. However, the Niobrara Formation where fissures occur generally is covered by 50 feet or more of cover.

In isolated places, where the Upper Cretaceous rocks outcrop, there is the potential of finding various fossils of marine organisms that lived in shallow seas in the late Cretaceous time and include turtles, fish, and invertebrates (clams, cephalopods, gastropods, corals, and crustaceans). The glacial deposits may contain fossils of large mammal vertebrates that were common during the ice ages: mastodon, bison, mammoth, and horse.

No unique geological features that have received state or federal protection will be disturbed by the project. Where karst terrain is present near the surface or suspected to be near the surface, Keystone will conduct studies necessary to characterize the karst features and evaluate effects on construction techniques. Generally, this will only be an issue where deep horizontal directional drilling is proposed at major water crossings.

There is the potential for discovery of Pleistocene-era mammal fossils during pipeline grading and trenching where the proposed route crosses continental glacial drift in South Dakota. Any mammalian fossils incidentally excavated during pipeline construction will not be recovered or studied for the scientific record.

No additional disturbance or loss of unique geological features, mineral resources, or scientifically important fossils will occur during operation of the project because there will be no additional surface disturbance required.

### 5.3.3 Economic Mineral Deposits

Sand and gravel and crushed stone are the major mineral resources extracted in the vicinity of the proposed route. Where the proposed route is not adjacent to an existing ROW corridor, it crosses sand, gravel, clay, and stone deposits. Day and Clark counties are important producers of sand and gravel and Hanson County is a major producer of crushed stone. Glacial sand and gravel deposits occur over a large area within the state and loss of access to underlying deposits will be very small relative to the available mineral materials supply.

There are no oil, natural gas, coal, or metallic ore resources in the vicinity of the proposed route. In addition, the proposed pipeline route does not cross any active quarries or mines. The proposed route does not cross the wellpads of any active oil and gas wells. Future wells can be located to avoid the pipeline ROW so that extraction of these resources will not be precluded.

### 5.3.4 Soils

Soil maps for the route in South Dakota are provided in **Exhibit A**. The Keystone Pipeline Project route will be located almost entirely within the northern part of the Central Lowlands physiographic province. Within the project region, the geologic surface has been formed by repeated episodes of continental glaciation. As a result, glacial deposits and re-worked alluvium form the parent materials for the majority of soils along the route. Most soils in the project area have formed in clays, silts, and sands from weathered glacial till and lacustrine deposits or from sands and gravels deposited as glacial outwash. Soil textures reflect the nature of the parent deposits, varying widely from clays to sands and gravels depending on location. Along major streams and river valleys, soils exhibit the stratified textures of alluvial deposits. The depth to bedrock is typically greater than 60 inches throughout the region.

In the northern portions of South Dakota (to central Miner County), most of the soils have thick, dark topsoil layers and mixed mineralogy. Houdek, Prosper, and Clarno soils series occur on nearly level to rolling glacial till plains. These are well drained to moderately well drained soils with thick, dark, fertile topsoil layers. Saline or sodic soils, such as the Dudley and Jerauld series, are interspersed on uplands with other soils more suited to cropland. Parnell and Tetonka soils occur in upland depressions with drainage restrictions. The average freeze-free period is about 130 to 155 days.

From central Miner County to the Nebraska state line, uplands are formed from both loess (wind-deposited silts) and medium-textured glacial till. Most of the soils are deep, silty or loamy, and have thick, organically enriched topsoil layers that make them well-suited for agricultural uses. Well drained, nearly level to moderately sloping soils, such as the Belfore and Moody series, formed from the loess parent materials. Other well drained, nearly level to moderately sloping soils, such as the Clarno, Egan, and Wentworth series, formed in glacial till. Upland depressions are typically poorly drained and contain wet, dark soils. In the Missouri River region, stream valley floors and

bottomlands contain poorly drained soils with thick, dark-colored topsoils, such as the Lamo and Luton series. These are interspersed with well drained to poorly drained, highly stratified soils, such as the Albaton and Haynie series, which formed in more recent mixed sediments. The average freeze-free period is about 135 to 165 days.

Additional analysis details on general soil characteristics can be found in Keystone's November 2006 Environmental Report (**Exhibit C**).

Grading and excavating for the proposed pipeline and ancillary facilities will disturb a variety of agricultural, rangeland, wetland, and forestland soils. Prime farmland soils maybe altered temporarily following construction due to short-term impacts such as soil compaction from equipment traffic, excavation and handling. Both compaction-prone and hydric soils are especially prone to structural and aeration damage when trafficked or excavated. Soil compaction to a degree that will adversely affect backfilling and restoration efforts will be most likely to occur during wet conditions. In some of these areas, drain tile systems may exist which could be disturbed by project construction. Acceptable clay texture soil replacement may be more difficult due to the presence of large clods or blocks of soil materials. Similarly, in areas of shallow bedrock (relative to the trench excavation depth), excavation may result in rock fragments remaining on the surface or within the trench backfill at levels that will limit the success of restoration efforts. Droughty soils will be prone to wind erosion during construction and will be more difficult to stabilize and revegetate successfully following construction. Saline and/or sodic soils often have drainage limitations and may undergo compaction impacts similar to the hydric or compaction–prone soils. In addition, the success of stabilization and restoration efforts in these areas may be limited unless additional treatments and practices are employed to offset the adverse physical and chemical characteristics of the soils.

Potential impacts to soils will be minimized or mitigated by the soil protection measures identified in the CMR Plan. The measures include procedures for segregating and replacing topsoil, trench backfilling, relieving areas compacted by heavy equipment, removing surface rock fragments, and implementing water and wind erosion control practices. In addition, Keystone will work closely with landowners and soil conservation agencies to identify and implement recommended soil conservation practices in specific areas where they are needed. Damaged irrigation and tile drainage systems will be repaired in accordance with the CMR Plan.

To accommodate potential discoveries of contaminated soils, Keystone will develop unanticipated contaminated soil discovery procedures in consultation with relevant agencies. These procedures will be added to the CMR Plan. If hydrocarbon contaminated soils are encountered during trench excavation, the state agency responsible for emergency response and site remediation will be contacted immediately. A remediation plan of action will be developed in consultation with that agency. Depending on the level of contamination found, affected soil may be replaced in the trench or removed to an approved landfill for disposal.

During operation of the pipeline, very small scale, isolated surface disturbance impacts resulting in accelerated erosion, soil compaction, spills, and related reductions in the productivity of desirable vegetation or crops could result from pipeline maintenance traffic and incidental repairs. Impacts related to excavation and topsoil handling are not likely to occur. If they do occur, they will be limited to small areas where certain pipeline maintenance activities take place.

### 5.3.5 Erosion and Sedimentation

Approximately 5 percent of the overall project surface disturbance will affect soils that are highly erodible by water.

Potential impacts to soils during construction will be minimized or mitigated by the soil protection measures identified in the CMR Plan. The measures include procedures for implementing water and wind erosion control practices.

### 5.3.6 Seismic, Subsidence, and Slope Stability Risks

The Keystone Pipeline Project is located mostly on relatively level terrain in South Dakota. In the few areas where the pipeline route crosses moderately steep slopes, additional grading may be required. Steep slopes often need to be graded down to a gentler slope for safe operation of construction equipment and to accommodate pipe-bending limitations. In such areas, the slopes will be excavated prior to pipeline installation and reconstructed to their original contours during restoration.

In areas where the proposed pipeline route crosses laterally along the side of a slope, cut and fill grading may be required to obtain a safe, flat work terrace. Topsoil will be stripped from the entire ROW and stockpiled prior to cut and fill grading on steep terrain. Generally, on steep side-slopes, soil from the high side of the ROW will be excavated and moved to the low side of the ROW to create a safe and level work terrace. After the pipeline is installed, the soil from the low side of the ROW will be returned to the high side and the slope's original contours will be restored. Topsoil from the stockpile will be spread over the surface, erosion control features installed, and seeding implemented.

In steep terrain, temporary sediment barriers such as silt fence and straw bales will be installed during clearing to prevent the movement of disturbed soil into wetland, waterbody, or other environmentally sensitive areas. Temporary slope breakers consisting of mounded and compacted soil will be installed across the ROW during grading and permanent slope breakers will be installed during cleanup. Following construction, seed will be applied to steep slopes and the ROW will be mulched with hay or non-brittle straw or covered with erosion control fabric. Sediment barriers will be maintained across the ROW until permanent vegetation is established.

South Dakota lies within an area considered to be at the lowest possible risk for earthquakes in the U.S. There have been no earthquakes of a magnitude capable of damaging welded steel pipelines within South Dakota during historical times. The risk of significant seismic risk in South Dakota is extremely low.

## 5.4 Hydrology

### 5.4.1 Surface Water Drainage

Surface water resources in South Dakota that occur along the proposed pipeline route are located in the Missouri River water resource region. Primary drainages include Foster Creek and associated tributaries in southwestern Clark County, Pearl Creek and its tributaries in northeastern Beadle County; the Wolf Creek drainage in Hanson and Hutchinson counties; and the James River, Beaver Creek, and the Missouri River in Yankton County. The Missouri River at the proposed crossing is approximately 2,000 feet wide and the crossing will be located at the head of a braided

reach downstream of the Highway 81 bridge. Marne Creek and a river side channel border the proposed approach to the river. Gavins Point Dam, a major control structure on the river, is located about 3 miles upstream of the proposed crossing. A large number of prairie potholes, ponds, and small lakes are located along the proposed route in southern Day County and Clark County.

The route maps in **Exhibit A** show the major waterbodies that the pipeline crosses in South Dakota. **Table 4** indicates the waterbodies that are within 10 miles of proposed crossings.

**Table 4 Named Waterbodies within 10 miles of Proposed Crossings**

| County | Stream Crossing Point | Approximate MP | Affected Downstream Reservoir/Fishery/ Wildlife Area | Other Description |
|---|---|---|---|---|
| Marshall | Renzienhausen Slough | 237 | Renzienhausen Slough | Renzienhausen Game Production Area (GPA), wetlands |
| Day | Tributary | 257.5, 257.7 | Amsden Lake | Camping and fishing area |
| Clark | Logan Creek | 294.0 | Logan Dam/Reservoir | Pipeline crosses directly upstream of reservoir |
| Clark | Tributaries to Fordham Reservoir | 299.0 | Fordham Reservoir | Area also includes Fordham GPA/Water Access |
| Beadle | Crossing of Pearl Creek | 326.0 | Reservoir/Dam | Reservoir and LeClaire WPA downstream of crossing |
| Kingsbury | Lake Iroquois | 329.0 | Lake Iroquois | Crosses very close to or through Lake Iroquois |
| Miner | Tributaries s to Twin lakes | 354.3 | Twin Lakes, National Wildlife Production Area (NWPA) | Downstream is Twin Lakes, NWPA, and associated GPA |
| Hanson | Tributaries to Lake Eli | 372.7 | Lake Eli | NWPA, fishing, and hunting area |

The only water control structure that will be crossed in the state is a spoil bank and ditch on Crow Creek in Marshall County.

Waterbody Crossings

Depending upon the construction technique used, the installation of the pipeline across water bodies can cause the following impacts:

- Temporary degradation of water quality in the form of increased suspended solids concentrations
- Sedimentation (deposition of solids introduced into suspension by construction activities)
- Channel and bank modifications

Keystone will utilize the following water crossing techniques in South Dakota:

- Open Cut Wet Crossings
- Open Cut Dry Flumed Crossing
- Open Cut Dry Dam and Pump Crossing
- Horizontal Directional Drill (HDD)

Keystone is currently proposing to use open cut wet crossings at the most of the crossings located in South Dakota. Depending on agency consultation and further assessment, Keystone may use other crossing techniques for selected waterbodies in the state. Details on other crossing methods can be found in the CMR Plan (**Exhibit B**). Open cut wet crossings involve the direct excavation of the channel and banks in contact with any flow present. At open cut wet crossings, the extent of increased suspended solids concentrations and downstream sedimentation impacts will depend on the flow conditions at the time of construction and the channel substrate. Measures related to managing spoil, timing, access, and equipment are included in the CMR Plan and will be fully implemented during construction. These measures will limit impacts of increased suspended solids concentrations and downstream sedimentation. Most open cut crossings will be completed in 48 hours or less. Larger open cut crossings may take upwards of 7 to 10 days.

Runoff and the resulting erosion of lands adjacent to water bodies can lead to the introduction of solids into suspension and the deposition of sediment in-stream. Keystone's CMR Plan includes extensive procedures to limit the extent of disturbed land adjacent to water bodies, to control erosion, and to apply methods to prevent sediments from entering water bodies or wetlands. These measures include BMPs, such as clearing limits, buffer strips, drainage diversion structures, and sediment barrier installations. In accordance with the CWA, Keystone will comply with the NPDES permit process with respect to pipeline construction and operation. Keystone will develop and file a Storm Water Pollution Prevention Plan (SWPPP) as part of the NPDES permitting effort. This SWPPP will include BMPs to minimize soil erosion and sedimentation.

Open cut crossings will involve disturbance of stream banks and channel bottoms. The CMR Plan includes procedures for limiting the extent of this disturbance and for restoring disturbed areas. Restoration includes grading, stabilization, and revetment BMPs. These BMPs embrace bioengineering concepts, which encourage the restoration of natural stream banks.

The pipeline will be buried at an adequate depth under channels, adjacent floodplains, and flood protection levees to avoid pipe exposure caused by channel degradation and lateral scour. Determination of the pipeline burial depth will be based on site-specific channel and hydrologic investigations where deemed necessary.

Some perennial streams may be crossed using HDD. The HDD method involves drilling a pilot hole under the waterbody and banks, then enlarging the hole through successive reamings until the hole is large enough to accommodate a prefabricated segment of pipe. Throughout the process of

drilling and enlarging the hole, a slurry consisting mainly of water and bentonite clay will be circulated to power and lubricate the down-hole tools, remove drill cuttings, and hold the hole open. Pipe sections long enough to span the entire crossing will be staged and welded along the construction work area on the opposite side of the waterbody and then pulled through the drilled hole. Ideally, use of the HDD method results in no impact on the banks, bed, or water quality of the waterbody being crossed.

The Missouri River has been designated a National Recreational River at the proposed crossing at the North Dakota/South Dakota border near Yankton, South Dakota and the Niobrara/Missouri National River Area is crossed at this location. Keystone's preliminary HDD plan will avoid direct land disturbance within the NPS WSRA administrative boundary associated with this Missouri River crossing. The NPS administers, but does not own, land at the proposed crossing location. The HDD entry point will be located on City of Yankton land on the north shore; the HDD exit point will be located on private land on the south shore. Keystone conducted preliminary discussions with the NPS and the City of Yankton in February 2006. A meeting was held in Yankton on May 19, 2006, to discuss the proposed directional drill under the Missouri River. Preliminary crossing drawings were provided. A Special Use Permit was obtained from the NPS to conduct geotechnical drilling near the banks of the river. Keystone submitted copies of NPS consultation documents to the DOS in the September 15, 2006 filing. A site-specific crossing plan utilizing HDD methods has been developed, which will maintain public access to the river, and avoid disturbance of existing land uses and designations.

### 5.4.2 Groundwater

Based on a review of published wellhead maps and aquifer protection areas, the pipeline will cross near a water supply well in Marshall County and will cross an aquifer protection area in Kingsbury County (see **Table 5**).

**Table 5 Public Water Supplies within 1 Mile of Pipeline Centerline (CL)**

| County | Approximate MP Marker (mi) | Well Distance From CL (mi) | Well Cardinal Direction from CL | PWS Name | Well ID |
|---|---|---|---|---|---|
| Marshall | 235.8-236.2 | Approximately 200 feet | West | Marshall County Source Water Area | Unknown |
| Kingsbury | 326.7 | Not Applicable | Not Applicable | Zone B Aquifer Protection Area | None |

The pipeline corridor also will pass through areas where shallow and surficial aquifers exist. "Shallow" and "surficial" aquifers are considered to have the greatest potential for yielding significant quantities of water for municipal, industrial, and agricultural purposes.

Since the pipeline will be buried at a shallow depth, it is unlikely that the construction or operation of the pipeline will alter the yield from any aquifers that are used for drinking water purposes. Keystone will investigate shallow groundwater when it is encountered during construction to determine if there are any nearby livestock or domestic wells that might be affected by construction activities. Appropriate measures will be implemented to prevent groundwater contamination and steps will be taken to manage the flow of any groundwater encountered. In the event that construction of the

pipeline damages a landowner's well, Keystone will either re-establish the well or provide compensation. Pipeline construction in areas with known surficial aquifers or wetlands will be performed according to current industry BMPs methods to minimize adverse impacts potentially associated with pipeline construction activities. The CMR Plan addresses this topic in further detail.

Rural water delivery systems (buried pipelines, etc.) are expected to be encountered along the entire proposed construction route. In preparation for excavation activities, those lines will be duly located by working with local water and irrigation districts and private owners. Wherever possible, the proposed pipeline will be routed under the existing water pipeline and any associated structures. Although not expected, the water pipeline owner will be compensated for any temporary loss of water delivery or other associated losses.

Reductions in groundwater quality from spills, leaks, or disposal practices are not anticipated during construction. Most of the aquifers along the route will be at least temporarily isolated from any spills which occur on the land surface. In the unlikely event of an incident, attending personnel will be able to respond to an incident before contaminants migrate into groundwater. Ground disturbance below the surface during construction is usually limited to 6 feet or less. It is possible that activities such as trenching, blasting, drilling, dewatering and backfilling could impact shallow aquifers and create minor and short-term effects on groundwater levels and quality. Impacts to deep aquifers are not expected. In areas with near-surface groundwater or in areas adjacent to surface waterbodies, additional procedures and measures will be implemented as previously discussed in this application and in the CMR Plan.

### 5.4.3 Water Use and Sources

The only significant water use that the Keystone Pipeline Project will require is hydrostatic test water during the final phases of construction. Water used for hydrostatic testing of the pipeline will be obtained from surface water resources. Depending on locations, state requirements, and availability, water will be obtained and withdrawn from nearby streams or privately owned reservoirs. Water withdrawal at each location will be approximately 5 to 10 million gallons. Recycling water between test sections will be maximized to reduce withdrawal volumes.

Currently, Keystone preliminarily has identified 5 surface water sources in South Dakota (listed in **Table 6** below) that could provide hydrostatic test water, depending on the flows at the time of testing and the sensitivity of the individual water bodies for other uses. Alternative water sources may be identified.

**Table 6 Proposed Withdrawal Locations for Hydrostatic Test Water**

| Water Source | County | MP |
|---|---|---|
| Unnamed Creek | Day | 251.0 |
| Foster Creek | Clark | 298.3 |
| Redstone Creek | Miner | 343.5 |
| Wolf Creek | Hanson | 375.5 |
| James River | Hanson | 421.65 |

If water is withdrawn from a sensitive surface water source during a low-flow period or at a time when particular flow ranges are needed for other uses, habitat reductions for water-dependent

resources (e.g., fisheries, aquatic invertebrates) could occur. A similar effect on surface water resources could occur if large withdrawals are made from aquifer zones that provide late-season base flows to streams.

Hydrostatic test water withdrawals from surface waterbodies will be made at controlled rates and with equipment that will minimize impacts on stream beds and aquatic life. Keystone will coordinate with federal and South Dakota agencies to further identify such water sources and seasonal concerns. Similarly, discharges of hydrostatic testing waters will be made such that water quality requirements are met. Discharge controls will include restrictions on pipeline dewatering rates, velocity control devices (such as splash pups or diffusers) and/or temporary synthetic channel linings.

The maximum hydrostatic test section will be 50 miles in length. The volume for a 50-mile test section of 30-inch pipeline is approximately 9 million gallons. Withdrawal rates and volumes will be designed to avoid impacts to aquatic life and downstream water users. Hydrostatic test water typically will be discharged back into its source waterbody.

Water quality will not be reduced by pipe cleaning or hydrostatic test waters because discharged water will be required to meet water quality standards imposed by the discharge permits issued by the individual states for the permitted discharge locations. Water discharge rates will not exceed the daily discharge criteria referenced in the permits.

Groundwater will not be used as a source of hydrostatic test water. Heated water will not be generated or discharged. Deep well injection will not be used.

### 5.4.4 Spill Prevention

Refueling and lubricating of all construction equipment will be restricted to upland areas at least 100 feet away from the edge of any streams, wetlands, ditches, and other waterbodies and at least 150 feet away from groundwater wells. Wheeled and tracked construction equipment will be moved to an upland area more than 100 feet away from streams, wetlands, ditches, and other waterbodies for refueling when necessary. Fuels and lubricants will be stored in designated areas and in appropriate service vehicles. Whenever possible, storage sites for fuels, other petroleum products, chemicals, and hazardous materials, including wastes will be located in uplands or at least 100 feet from waterbodies and wetlands. Spill Prevention, Control, and Countermeasure (SPCC) procedures are described in the CMR Plan and will be implemented in the various states in compliance with 40 CFR 112 (for oil spills) and corresponding state regulations (including NPDES requirements for spills of other substances that may occur during construction activities).

In a few cases, such as for pumps or directional drill equipment located within or near a waterbody or wetland, refueling will be completed within or near a waterbody or wetland. In these situations, the specific measures identified in the SPCC portion of the CMR Plan will be followed.

Normal operations will not adversely affect water resources. Minor surface disturbance activities from pipeline inspection and maintenance may occur infrequently and at widely spaced locations.

Spill prevention and response procedures for pipeline operation are discussed in Section 2.3.

## 5.5 Terrestrial Ecosystems

### 5.5.1 Vegetation Communities

Vegetation types crossed by the Keystone Pipeline Project were delineated based on the review of aerial photographs, general observations made during field reconnaissance activities, and detailed information collected during wetland and waters of the U.S. delineation activities and grassland assessment surveys. Seven major vegetation types or general land use categories are crossed by the proposed route including cropland, grassland/rangeland, upland forest, non-forested wetland, forested wetland, open water and developed land. The predominant vegetation community is agricultural/cropland followed by grassland/rangeland, wetland/riparian and forest. Descriptions of the cropland, grassland/rangeland, and developed land are presented under Land Use in Section 5.7.

#### 5.5.1.1 Wetland/Riparian

Construction of the pipeline will disturb approximately 98 acres (3 percent of the proposed corridor) of wetland/riparian areas. These wetlands are almost entirely palustrine emergent wetlands (wet meadows) – only 0.31 acre of forested wetlands will be affected. Effects on wetland vegetation will be greatest during and immediately following construction. To mitigate the potential for these impacts, Keystone will implement specific procedures as outlined in the CMR Plan. The construction ROW width will typically be reduced to 85 feet through wetlands with saturated soils to minimize potential effects. Keystone will restore or mitigate impacts to wetlands affected by construction activities, to the extent practicable. Pipeline construction through wetlands must comply, at a minimum, with USACE Section 404 permit conditions. Section 404(b)(1) guidelines restrict the discharge of dredged or fill material into wetland areas where a less environmentally damaging practicable alternative exists.

Smaller streams and ephemeral or intermittent drainages will likely be open cut and wetlands located in these areas will be crossed by trenching. However, no installation of surface facilities will occur in wetlands and no permanent loss of wetlands will occur as a result of this project. Herbaceous vegetation in palustrine emergent wetlands is expected to reestablish to pre-construction levels within 3 to 5 years following the completion of reclamation, resulting in a short-term loss of vegetation and available habitat for some wildlife species. Trees in forested wetlands will recover in 20 to 50 years.

As described in the CMR Plan, specific construction techniques will be used to retain the hydrological and vegetation characteristics of wetlands that will be disturbed by construction. These techniques will include:

- Narrowing the ROW for certain wetlands;
- Minimizing the duration of construction-related disturbance within wetlands to the extent practicable;
- Attempting to use no more than two layers of timber riprap to stabilize the construction ROW;
- Cutting vegetation off at ground level leaving existing root systems in place and remove it from the wetland for disposal;

- Limiting pulling of tree stumps and grading activities to directly over the trench line. Not grading or removing stumps or root systems from the rest of the construction ROW in wetlands unless safety-related construction constraints require removal of tree stumps from under the working side of the construction ROW;
- Segregating the top 12 inches of topsoil from the area disturbed by trenching in standard wetlands, where practicable. After backfilling is complete, restoring topsoil to its approximate original stratum;
- Dewatering the trench in such a manner that does not cause erosion and heavily silt-laden water does not flow directly into any wetland or waterbody;
- Avoiding sand blasting in wetlands to the extent practicable. If sandblasting is performed within a wetland, a tarp or suitable material will be placed in such a way as to collect as much waste shot as possible and dispose of the collected waste. All visible deposits of wastes will be cleaned up and disposed at an approved disposal facility;
- Removing all timber riprap and prefabricated equipment mats upon completion of construction;
- Locating hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable;
- Not storing hazardous materials, chemicals, fuels, or lubricating oils, or performing concrete coating activities in a wetland, or within 100 feet of any wetland boundary; and
- Refueling all construction equipment in an upland area at least 100 feet from a wetland boundary.

Over the operational life of the pipeline, woody vegetation in forested wetlands will be removed periodically above the pipeline (approximately 15 feet on each side of the centerline) to maintain visibility of the area above the pipeline for aerial pipeline observation and to permit access to all areas along the pipeline in the event of an emergency.

#### 5.5.1.2 Forest

Construction of the pipeline will disturb approximately 3 acres (0.1 percent of the proposed corridor) of forested areas in South Dakota. Construction of the pipeline will necessitate clearing of the ROW and permanent conversion of the affected wooded areas for the permanent ROW. Within that permanent ROW, a 30-foot-wide corridor, centered on the pipeline, will be maintained free of trees. Trees and shrubs will be removed during clearing activities and converted to early successional herbaceous and grassland communities. Trees and shrubs eventually will reinvade the temporary easement area after construction. However, shrubs will not become reestablished in the temporary easement area naturally for approximately 5 years or more and trees will require a minimum recovery period of 20 years or more, depending on species and age of woodlands cleared.

Additional mitigation measures for wooded areas will include:

- Selective cutting of mature shrubs and trees in the construction ROW to preserve such vegetation where possible; and
- Cutting of vegetation flush to the surface of the ground, where practical, so that root stock is left in place to promote re-growth after construction.

Keystone will monitor revegetation success along the pipeline ROW in accordance with applicable permits and agency guidance.

## 5.5.2 Wildlife

### 5.5.2.1 Biological Consultations

Keystone developed general wildlife habitat and occurrence information from published sources and interviews with state agency staff. This information is included in the Environmental Reports provided in **Exhibit D**. Keystone coordinated with the USFWS and the South Dakota Game and Fish Department (SDGFD) to identify listed, candidate, and species of special concern that could be affected by pipeline construction and operation. Keystone obtained a list of species from both the USFWS and the South Dakota Natural Heritage Programs (SDNHP). Based on the information received, Keystone initiated biological surveys in the summer of 2006, and the winter of 2006-2007.

Keystone also initiated wetland surveys in 2006 along the pipeline as support for the U.S. Army Corps of Engineers (USACE) Section 404 permit applications. Estimates of acreages of wetlands affected by construction by type have been included in filings to the DOS.

A summary of Keystone's consultations with respect to biological resources and wetlands is provided in **Exhibit D**.

The following biological reports are included in **Exhibit D** in chronological order.

- October 2006. A Field Survey of the Keystone Pipeline Project Construction Corridor in North and South Dakota for Dakota Skipper (Hesperia dacotae), Western Prairie Fringed Orchid (Platanthera praeclara) Habitat, and for Native Grassland. Prepared by ENSR Corporation. Fort Collins, Colorado.
- October 2006. Keystone Pipeline Project Progress Report for Wetlands Surveys. Prepared by ENSR Corporation, Fort Collins, Colorado.
- March 2007. Bald Eagle and Raptor Nest Survey Report. Prepared by ENSR Corporation, Fort Collins, Colorado.

In 2007, Keystone will collect additional biological data on proposed South Dakota pump station sites, short pipeline reroute segments, proposed access roads, and on mainline pipeline segments for which access was denied in 2006.

### 5.5.2.2 Wildlife Habitat

Wildlife habitats along the proposed route consist of cropland, native prairie, range or pasture land, deciduous forest lands, wetlands, and aquatic habitats. A majority of the route corridor will cross cropland or other agricultural areas. Although cropland is undeveloped land that represents open space, it has limited value as wildlife habitat since vegetative cover and food sources are present primarily on a short-term basis due to seasonal harvesting and cultivation. Of the 2,929 acres of construction ROW, approximately 734 acres represent potential wildlife habitat.

Important wildlife habitats that will be crossed by the project route include approximately 0.5 mile of a SDGFD designated GPA and the Missouri River.

#### 5.5.2.3 Potential Impacts to Wildlife

About 63 percent of the approximately 3,521 acres necessary for construction of the pipeline and ancillary facilities will consist of agricultural land that is tilled annually or already developed land. Rangeland, forestland, and wetlands together constitute about 37 percent of the total disturbance. The effects of long-term habitat loss on native wildlife populations will be relatively small since the majority of habitat disturbance will be located in agricultural habitats.

Project construction will affect only a single big game species, white-tailed deer, since the ranges of other potential big game species are very peripheral to the project area and impacts to these wide-ranging species will be negligible or non-existent. Impacts to white-tailed deer will include the incremental loss of potential forage (native vegetation and croplands) and will result in an incremental increase in habitat fragmentation within the proposed surface disturbance areas. However, these incremental losses of vegetation will represent a small percentage (far less than 1 percent) of the overall available habitat within the project region. No sensitive habitats for white-tailed deer have been identified along the proposed route. Indirect impacts will result from increased noise levels and human presence during surface disturbance activities. Because white-tailed deer have adapted to human activities and land uses, displacement from construction areas are likely to be short-term.

Potential direct impacts to small game and non-game species could include nest or burrow abandonment or loss of eggs or young where construction occurs during the breeding season. Of greatest concern is the potential for loss of waterfowl nests if pipeline construction occurs in or near wetlands or surface water during the nesting and brood rearing season (approximately March 1 through August 31). Overall, losses of these species and their habitats will be relatively small since most habitat loss will occur within agricultural habitats. In addition, there is the potential for disturbance of pheasant habitat and nesting cover. However, if disturbance were to involve important habitat, such as greater prairie chicken leks, loss of this habitat could have a significant effect on local related populations.

Five raptor nests have been identified in the pipeline ROW in South Dakota. If surface disturbance activities occur during the breeding season for passerines, raptors, and other summer avian residents (approximately March 1 through August 31), nest or territory abandonment or the loss of eggs or young (loss of productivity) for the breeding season could result. Impacts to nesting birds will depend on the nest location relative to the proposed disturbance area, the phase of the breeding period, and the level and duration of the disturbance. Of the active nest sites that were documented during the 2006 raptor surveys, almost all were occupied by red-tailed hawks, Swainson's hawks, and great-horned owls. These species are known to be relatively tolerant of human activity and development. This is consistent with the observed presence of these species within the project area, which is characterized by intense agricultural activity. As a result, direct impacts to nesting raptors would be limited primarily to the incremental loss of potential nest structures within the construction ROW. Since the projects include very minimal tree clearing, this potential is minor. Impacts resulting from increased noise and human presence are expected to be minor.

Normal pipeline operations will have negligible effects on terrestrial wildlife resources. Direct impacts to wildlife species populations and habitats from extensive maintenance activities such as physical pipe inspections or ROW repair will be the same as those discussed above for construction. In order to reduce potential impacts to important wildlife resources as a result of

maintenance activities, Keystone will consult with the appropriate state wildlife agencies prior to the initiation of maintenance activities beyond standard inspection measures.

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 there will be a very low likelihood of a crude oil release from the pipeline, which could injure wildlife individuals and habitat.

### 5.5.3 Threatened and Endangered Species

The information presented in this section reflects responses received from appropriate state and federal agencies at the time this document was prepared. This information will continue to be updated throughout the pre-construction process based on continued consultations.

#### 5.5.3.1 Sensitive Plant Species

Information on sensitive plant species potentially found along the proposed ROW was obtained from the USFWS, the SDNHP, state wildlife agencies, and field surveys. Surveys were conducted in 2006 in South Dakota along the proposed Keystone Pipeline Project construction ROW for native grassland habitat and for native grassland species. Based upon these information sources, a total of four sensitive plants (one special status species and three species of special concern) were identified as potentially occurring within the proposed state's project area.

Of these, one is a federally listed threatened and endangered plant species, the western prairie fringed orchid. The western prairie fringed orchid is generally associated with native tallgrass prairie or wetland/riparian habitats. If a population were located within the construction ROW and on state or federal lands, suitable mitigation measures will be developed in consultation with the USFWS.

The three species of special concern have been identified by the SDNHP as occurring near or within the proposed route. They are:

- Wooley milkweed (*Asclepias lanuginose*)
- Prairie loosestrife (*Lysimachia quadriflora*)
- Prairie willow (*Salix humilis*)

#### 5.5.3.2 Sensitive Terrestrial Wildlife Species

Coordination with SDGFP and the USFWS was initiated in January 2006 in a project overview and information request letter. A species list and occurrence data were obtained from state and federal agencies, state natural heritage programs, agency websites, and other applicable websites (e.g., NatureServe). State agency meetings were held in February and March of 2006. Following consideration of agency comments and compilation of available data, packages summarizing potential habitat for special status species and species of special concern were sent to state and federal agencies for their review and input in June 2006. Follow-up agency meetings were held in July and October 2006. Based on the input from the USFWS as well as state agencies, work plans were developed for surveys. The work plans include the species to be surveyed, locations (MPs and maps), survey periods, and survey requirements. Proposed surveys were described for 2006, 2007, and pre-construction in 2008.

On June 8, 2006, the USFWS provided a letter regarding several segments of the proposed pipeline route that cross USFWS grassland and wetland easements in South Dakota. The letter included maps and descriptions of potential reroute recommendations that would reduce the extent of wetland and grassland impacts. Proposed reroute areas included the Raymond Prairie Chicken Leks, Miner County Grassland Easement, and Day County Grassland Easements. The USFWS indicated that crossing USFWS refuge lands and easements would require ROW permits.

In response to the USFWS June 8 letter, a reroute proposal was developed and presented to the USFWS refuge staff in a meeting in Fargo on July 18. The results of the meeting were: 1) Keystone would refine its route to move the route onto farmlands away from the Day County Grasslands and Raymond Chicken Leks; and 2) Keystone would make a minor reroute to avoid the Miner County Grassland. On September 11, Keystone provided revised route maps for the entire segment in South Dakota to the USFWS for its review and comment.

A total of seven special status wildlife species (eastern spotted skunk, bald eagle, whooping crane, piping plover, interior least tern, false map turtle, and Dakota skipper) and 14 wildlife species of special concern (red necked grebe, American white pelican, Cooper's hawk, broad-winged hawk, black tern, common tern, northern cricket frog, Blanding's turtle, spiny softshell, small softshell, ringneck snake, fox snake, Ottoe skipper, and Powesheik skipperling) potentially could occur within suitable habitat along the proposed route in South Dakota.

Based on correspondence and consultation with the SDGFD and the USFWS, respectively, species surveys would only be required for breeding and roosting bald eagles, interior least tern, piping plover, and Dakota skipper. Surveys for nesting and roosting bald eagles will occur at all river crossings, if construction were to occur during the breeding and roosting periods. Two active bald eagle nest sites were identified within 0.25 mile of the Missouri River crossing. Surveys for the interior least tern and piping plover will occur at the Missouri River, if construction were to occur during the breeding period.

A total of 3.7 miles of potential Dakota skipper habitat was identified at six locations in South Dakota (MP 265.2 to MP 266.2, MP 296.9 to MP 297.9, MP 390.9 to MP 391.7, MP 419.6 to MP 420.0, MP 420.6 to MP 420.8, and MP 421.8 to MP 422.1). Occurrence surveys for this species will occur in 2007.

Direct impacts to sensitive species from surface disturbance activities include the incremental long-term loss or alteration of potential breeding and/or foraging habitats and increased incremental habitat fragmentation until native vegetation has become reestablished. Potential impacts also could include mortalities of less mobile species as the result of exposure to vehicle and construction equipment traffic, and the potential abandonment of a nest site or territory, including the loss of eggs or young (e.g., piping plover, interior least tern). Other impacts will include short-term displacement of some of the more mobile species from the disturbance areas as a result of increased noise and human presence. Removal of large trees or snags along rivers, streams, or in wetlands, particularly in the vicinity of the Missouri river, could result in the loss of wintering bald eagle roosts or nesting habitat.

A number of occurrences of state-listed threatened or endangered species or species of special concern have been identified by the SDNHP as occurring near or within the proposed route. Increased mortality rates could occur in species that are less mobile as the result of exposure to vehicles and construction traffic. This will result in the loss of some individuals but the relatively

narrow and linear disturbance area that will be associated with pipeline construction is unlikely to have measurable adverse effects on local populations of sensitive species.

The majority of construction disturbance will occur within agricultural lands and these disturbances will be unlikely to affect populations of sensitive species. Preconstruction surveys for federally listed threatened and endangered species, which will be completed prior to surface disturbance activities, are still to be determined through consultation with the USFWS and state wildlife agencies. Once these surveys are complete and if important habitat or populations are identified, appropriate protection measures will be implemented in order to minimize potential impacts to these species.

In order to reduce potential impacts to sensitive wildlife species as a result of maintenance activities, Keystone will consult with the appropriate state wildlife or land management agency prior to the initiation of maintenance activities beyond standard inspection measures.

## 5.6 Aquatic Ecosystems

### 5.6.1 Wetlands

Wetlands and riparian areas were identified along the Keystone Mainline by completing field surveys and reviewing aerial photographs for areas where reroutes have been developed. Wetlands and waters of the U.S. along the proposed route were delineated in accordance with the direction provided by the USACE – Omaha District. Keystone coordinated with USACE representatives regarding features that needed to be field-checked and delineated.

Wetlands and riverine habitats occupy approximately 4 percent of the proposed pipeline route. Approximately 95 percent of the wetlands crossed are characterized as palustrine, which includes classifications such as marshes, bogs, and prairie potholes. The remaining 5 percent are riverine or areas that are contained within a channel. A portion of the palustrine wetlands potentially crossed by the ROW is identified as farmed wetlands. A number of wetland areas are located in actively grazed rangeland. None of the proposed pump stations will be located in wetlands, based on NWI mapping.

Effects on wetland vegetation will be greatest during and immediately following construction. To mitigate the potential for these impacts, Keystone will implement procedures as outlined in the CMR Plan. A summary of these protection measures also are discussed in Section 5.5.1.1.

### 5.6.2 Fisheries

Aquatic biology resources, categorized as “fisheries”, include fish and invertebrate communities that inhabit perennial streams and pond/lake environments. The description of aquatic communities focuses on important fisheries, which are defined as species with recreational or commercial value or threatened, endangered, or sensitive status (i.e., special status). The study area for aquatic resources includes the perennial streams, rivers, and ponds/lakes that will be crossed by the proposed pipeline route.

Five perennial streams are crossed by the proposed pipeline route in South Dakota. The Missouri River is the largest waterbody and is classified as a warmwater permanent fishery. Of the other streams that have been classified, habitat is considered more limited as indicated by a warmwater semi-permanent (James River) or warmwater marginal (Wolf and Beaver Creeks) classification.

The Missouri River contains the most diverse list of game fish with 19 species or groups, while the James River contains five game species. The Missouri River is approximately 2,000 feet wide at the crossing with deep water habitat and two channels adjacent to an island. The other smaller streams support two to six game fish species. The most popular game fish species include catfish, northern pike, and bass species. State record catfish have been caught in the Missouri and James River. The only known stocking efforts in these waterbodies consist of paddlefish in the Missouri River. This indicates that game fish populations are sustained by natural reproduction.

## 5.6.3 Potential Impacts

### 5.6.3.1 Crossings

Keystone will directionally drill the Missouri River crossing. Drilling at this river will aid in minimizing impacts to important game and commercial fish species and special status species. Directional drilling will not alter or remove habitat because construction within the channel will not be required. It is possible that mud from the directional drilling could inadvertently enter the active stream along the drilling route. However, if mud seepage is detected, the drilling operation will be stopped immediately to reduce pressure within the bore hole. Corrective measures will be implemented to eliminate or minimize seepage. If any seepage enters the stream, increased turbidity or physical impact to the covering substrate will be localized and short-term (less than 1 day).

Open-cut trenching will be used at the other perennial streams, and can have the following impacts:

- Loss of in-stream habitat through direct disturbance;
- Loss of bank cover;
- Disruption of fish movement;
- Direct disturbance to spawning;
- Water Quality effects; and
- Sedimentation Effects.

In-stream Habitat

Backfilling the in-stream trench can either improve or lessen the quality of habitat available. This habitat quality change will depend largely on the nature of the soil materials from the lower depths of the trench with respect to those near the surface. If backfilling results in a different material on the stream bed surface than the adjacent areas, a local habitat modification may have occurred. However, the limited extent of the disturbed area and the active bottom substrate sorting by a river suggest any such habitat modification will be small and of short duration in most stream environments.

Bank Cover

Loss of bank cover may result in increased water temperatures, reduced food supply, impaired aesthetics, and reduced productivity. The potential for channel migration also can be increased since the removal of vegetation destabilizes the banks at discrete locations. Given the relatively small width of disturbance associated with a pipeline crossing, the above impacts tend to be negligible relative to an entire stream system. The CMR Plan provides bank restoration measures

that will insure short-term bank stability (temporary erosion control structures) and rapid vegetation recovery (replanting woody species where appropriate).

Interruption of Fish Movement

Most water crossing methods allow movement of fish across the ROW; however, some techniques such as dry crossing procedures, may block or delay normal movements unless it includes a flume. Interruptions during sensitive periods typically are not a concern since in-stream construction generally can be performed outside of sensitive periods. Blockage of non-spawning related fish movement for limited periods (less than 7 days) should not affect fish growth and behavior. Delays of less than 3 days will not adversely affect spawning migrations.

Direct Disturbance of Spawning

In-stream construction activities can displace spawning fish from preferred habitat and result in the utilization of lower quality spawning habitat. Generally, this is of limited concern for water crossing construction since in-stream activities generally are not scheduled during spawning period. Keystone will work with agencies as necessary to further define spawning periods and to refine construction schedules to avoid, where possible, in stream activities during sensitive periods.

Water Quality Effects

It is widely recognized that in-stream excavation activities result in short-term increases in Total Suspended Solids (TSS) levels and turbidity. These levels decrease with distance from the source as particles settle. The levels also decrease with time following cessation of in-stream activities. The waterbodies in the project area experience wide ranges in seasonal flow rates, large peak flows due to precipitation events, and drain through areas with relatively fine grained soils. These factors cause sudden natural peaks in suspended solids concentrations. The aquatic systems supported by these waterbodies are adapted to such increases.

The extent of the increase in TSS levels will be mitigated by Keystone through the use of BMPs described in the CMR Plan. These BMPs include measures to reduce the period of in-stream activity, spoil handling techniques, equipment access installation procedures and dry crossing techniques, where warranted. The BMPs also address upland erosion and sediment control procedures to limit the potential for runoff from disturbed areas to contribute to increased in-stream TSS levels.

Sedimentation Effects

Solids introduced into suspension in a waterbody ultimately will settle on the streambed downstream of the crossing. Sedimentation can cover or alter fish habitat, cover fish eggs or cover benthic organisms. Suspended sediment can prevent the successful incubation and hatching of fish eggs or the emergence of fry. This is an issue only when construction occurs during a spawning period. Post construction studies have shown that benthic invertebrate populations generally have recovered to normal within 1 to 2 months of construction.

The BMPs adopted for the Keystone Pipeline Project as described in the CMR Plan will mitigate the short-term effects of downstream sedimentation.

#### 5.6.3.2 Hydrostatic Testing

**Table 6** in Section 5.4.3 lists five streams and rivers in South Dakota as potential water sources for hydrostatic testing on the Keystone Mainline. The water sources are located throughout the length of the proposed route. The water is likely to be withdrawn from water sources during summer and fall months. Relatively small one-time withdrawals will occur from the streams or rivers designated for hydrostatic test water in accordance with withdrawal permits.

Water withdrawal could entrain small fish and drifting macroinvertebrates. The expected numbers of organisms removed during entrainment is considered to be relatively small in relation to the overall numbers in the stream or river. In summary, hydrostatic testing will result in minor impacts to aquatic biota. The discharge of hydrostatic test water will follow state permit requirements, which will reduce potential effects on water quality or aquatic organisms. Energy dissipaters also will be used to prevent erosion at discharge locations.

#### 5.6.3.3 Pipeline Operation

Routine maintenance of the pipeline ROW will consist of periodic vegetation clearance. Vegetation removal adjacent to waterbodies will be limited to the removal of trees encroaching on the 50-foot operational ROW. As a result, maintenance activities will not affect aquatic biota or their habitat. 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 there will be a very low likelihood of a crude oil release from the pipeline that could injure aquatic biota and habitats.

### 5.6.4 Sensitive Aquatic Species

Sensitive aquatic species identified as potentially occurring in waterbodies crossed by the proposed route include fish and freshwater mussel species. Seven waterbodies crossed by the proposed route in South Dakota contain known or potential habitat for federally and state-listed species fish and mussel species. These include Foster Creek (Topeka shiner), South Fork Pearl Creek (Topeka shiner), Redstone Creek (Topeka shiner), Rock Creek (Topeka shiner), Wolf Creek (Topeka shiner), James River (pallid sturgeon and winged mapleleaf mussel), and the Missouri River (pallid sturgeon and scaleshell and Higgins' eye mussels). These same streams also contain potential habitat for special concern fish and mussel species.

As part of determining suitable habitat for the federally endangered Topeka shiner, habitat characterization surveys were conducted at 21 stream crossings in South Dakota in September 2006. A mussel survey was conducted at the proposed James River pipeline crossing in September 2006, to determine if two federally listed mussel species, winged mapleleaf (*Quadrula fragosa*) and scaleshell (*Leptodea leptodon*), were present. No specimens of either species were collected at the proposed crossing.

Construction-related impacts on sensitive species occurring at the Missouri River crossing will be minor, since directional drilling will eliminate disturbance within the channel. In contrast, open-cut trenching at other streams will result in alteration of bottom substrates, temporary increased sedimentation, and possible removal of riparian vegetation. The degree of impact will depend upon whether important habitat is altered or whether organisms are present within the trenched area. Generally, impacts could range from several weeks to several years, depending on the life stages that are affected and whether future spawning will be affected.

Potential sources for hydrostatic testing and dust control water could include the following streams that contain sensitive fish and mussel species: Rock Creek, Wolf Creek, James River and the Missouri River. Water use from any of these streams will result in a relatively small one-time flow reduction. Water withdrawal is expected to represent a relatively small percentage of base flow conditions. Therefore, impacts on fish or mussel habitat will be considered minor in the mid-size to large streams. The discharge of hydrostatic test water will follow state permit requirements, which will eliminate potential water quality effects on sensitive species.

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 there will be a very low likelihood of a crude oil release from the pipeline that could injure sensitive aquatic species and habitats.

## 5.7 Land Use and Local Land Controls

### 5.7.1 Existing Land Use

Of the 219.7 mile route in South Dakota, all but 0.5 mile is privately owned. The 0.5-mile segment is state-owned and managed. No Tribal or federal lands are crossed by the proposed route.

**Table 7** provides the overall miles of various land uses that will be crossed by the pipeline in South Dakota. These land use categories are consistent with those outlined in the PUC guidelines. The basis for these estimates of land uses affected is photointerpretation of high quality aerial photography, wetland field delineations, and field reconnaissance of native grasslands. The boundaries of the various land uses within the pipeline corridor were incorporated as polygons in the project GIS database. The land uses crossed are illustrated on maps at a scale of 1:24,000 in **Exhibit A**. The land use table and explanation below address each of the PUC land use categories. The explanation includes Keystone's interpretation of the land use category, the relative amount of the land use crossed, and other information.

**Table 7 Land Uses Affected by Pipeline Corridor**

| Land Use | Miles Crossed | Acreage Disturbed During Construction |
|---|---|---|
| 1. Land used primarily for row and nonrow crops in rotation | 158 | 2,112 |
| 2. Irrigated Land | 0.2 | 2 |
| 3. Pasturelands and Rangelands | 44 | 588 |
| 4. Haylands | 2 | 29 |
| 5. Undisturbed native grasslands | 12 | 166 |
| 6. Existing and potential nonrenewable resources | 0 | 0 |
| 7. Other major industries | 0 | 0 |
| 8. Rural residences and farmsteads, family farms, and ranches | 0.2 | 3 |
| 9. Residential | 0 | 0 |
| 10. Public, commercial, and institutional use | 2 | 29 |
| 11. Municipal water supply and water sources for organized rural water systems | 0 | 0 |
| 12. Noise sensitive land uses | 0.2 | 3 |

1. Land used primarily for row and non-row crops in rotation. This land use is interpreted as those farmlands that are tilled annually. Primary row crops are corn and cereal grains. For purposes of this analysis, alfalfa plantings and tame grass cut for hay are included in the haylands categories.

2. Irrigated lands. The only lands included in this category are center pivots. Other types of irrigation practices (furrows, flood from water received from lateral ditches) were not observed.

3. Pasturelands and rangelands. This land use includes lands that were plowed at some time in the past and replanted to pasture grasses, and wetlands.

4. Haylands. Alfalfa plantings and tame grass cut for hay.

5. Undisturbed native grasslands. Remnant native grasslands are almost universally grazed in South Dakota. The native grasslands included in this category are those that have not been plowed or not plowed recently, and that contain a high fraction of native prairie species.

6. Existing and potential non-renewable resources. No mineral extraction sites will be crossed by the project, based on photointerpretation of existing aerial photos. Sand and gravel deposits are widely distributed within glacial deposits crossed by the project. No detailed analysis was conducted on potential sand and gravel sources because the effect of constructing the project on the availability of the resources is expected to be very small.

7. Other major industries. The Keystone project will not cross, or be co-located with any major industry sites.

8. Rural residences and farmsteads, family farms and ranches. This category includes in the individual farmsteads and outbuildings, as well as farmstead windbreaks. Buildings were identified wherever they fell within the construction corridor; however, many buildings are uninhabited, and in some cases, abandoned. To the extent possible, the pipeline will not cross active farmsteads, but will cross near these sites (see noise sensitive areas [NSA] below).

9. Residential. This category includes suburban and urban residential areas. The only location where this land use occurs is the vicinity of Yankton and rural towns near the pipeline route.

10. Public, commercial, and institutional use. This category includes county road, highway, and railroad ROWs, commercial developments, schools, and churches.

11. Municipal water supply and water sources for organized rural water districts. This category includes surface water reservoirs used for domestic water supplies and municipal water supply wells that withdraw water. The project will not intercept or cross within 500 feet of any known municipal water supply wells and will not cross any water supply

reservoirs. The pipeline will be installed under the Missouri River, which serves a municipal water supply upstream and downstream of the proposed crossing.

12. Noise sensitive land uses. Noise sensitive land uses are considered to be rural residences and farmsteads, and other residential areas. Eighteen residences are within 500 feet of the proposed centerline.

### 5.7.2 Displacement

No homes or residents will be displaced by the construction or operation of the Keystone Pipeline.

### 5.7.3 Compatibility with Existing Land Use and Measures to Ameliorate Adverse Impacts

The Keystone Pipeline will be compatible with the predominant land use, which is rural agriculture, because the pipeline will be buried to a depth of four feet in fields, and will not interfere with normal agricultural operations. In most locations, the pipeline will be placed below agricultural drain tiles and drain tiles that are damaged will be repaired. The only aboveground facilities will be pump stations and block valves located at intervals along the pipeline. The pipeline will be located away from existing rural residences and farmsteads, reducing the likelihood of interference with construction of future structures and installation of buried utilities.

Pump stations will be located in areas of low existing residential density where practical. The pump units generally will not be enclosed in buildings and will be connected via aboveground piping and valves. Other facilities will include an electrical transformer and a small control building to house electrical, measurement and control system components. The pump station site will be enclosed by a chain link fence approximately 6 feet high. **Exhibit 4** in Chapter 2.0 presents an artist's rendering of a typical pump station. A small utility building and aboveground piping will be evident at each site. The pump stations will be located near existing county roads, which will minimize interference with agricultural operations on adjacent land.

The electrical pumps represent the noise sources at the pump stations. Keystone will evaluate expected noise generation from these pumps. If necessary, Keystone will install noise attenuation to ensure that noise levels from Keystone's pump station facilities comply with applicable local regulations. **Table 8** describes the number of residential and other structures within 1 mile of the proposed pump stations.

**Table 8 Structures within 1 Mile of Pump Stations**

| Stations State/County | Pump Station | MP of Pump Station | Distance to NSA (feet) | Direction from Pump Station | Number of Structures Within 1 Mile of Pump Stations |
|---|---|---|---|---|---|
| Sargent[1] | PS19 | 216.8 | 4,100 | SE | 5 |
| Day | PS20 | 263.1 | -- | -- | 0 |
| Beadle | PS21 | 310.1 | 3,550 | NE | 3 |
| Miner | PS22 | 358.1 | -- | -- | 0 |
| Hutchinson | PS23 | 406.2 | 2,800 | SE | 6 |

[1]PS 19 is in Sargent County, North Dakota, but is very close to the North Dakota/South Dakota border.

The pump stations will require electrical service provided by power lines constructed by local and regional electrical utilities. The poles and conductors will be similar to existing electrical service distribution lines that already parallel many county roads throughout South Dakota. Although the specific locations of electrical power lines will be provided by the electrical utilities, it is anticipated that these facilities will be located along county roads, and along section lines to minimize interference with existing farming operations.

### 5.7.4 Local Land Use Controls

Keystone will compile and analyze any applicable zoning regulations and county permit requirements and then will design, construct, operate and maintain the pipeline and pump stations in compliance with these zoning and permit requirements. Keystone will either comply with the applicable requirements or seek any variances or special use permits, to the extent necessary.

**Table 9** summarizes the permit requirements by county for the pump station facilities.

**Table 9 Permit Requirements for Pump Stations**

| Pump Station | Nearest MP | County | Permit Requirements |
|---|---|---|---|
| 20 | 263 | Day | Building Permit |
| 21 | 310 | Beadle | Conditional Use Permit, Building Permit |
| 22 | 358 | Miner | Conditional Use Permit |
| 23 | 406 | Hutchinson | Building Permit |

## 5.8 Water Quality

The CWA, Section 303(c), requires each state to review, establish, and revise water quality standards for all surface waters within the state. To comply with this requirement, South Dakota has developed its own beneficial use classification system to describe state-designated use(s). South Dakota's water quality standards include default narrative standards, nondegradation provisions, a Total Maximum Daily Load (TMDL) regulatory process for impaired waters, and associated minimum water quality requirements for the designated uses of listed surface waterbodies within the state.

The permit for hydrostatic test water discharges will impose pollutant limits on those discharges that will be protective of the designated uses of the receiving waterbodies. In addition, construction methods for stream crossings (detailed in the CMR Plan) also will protect those streams and water bodies from exceedances of water quality standards. The one-time construction and hydrostatic test water use will not result in appreciable short or long-term impacts to water quality.

## 5.9 Air Quality

Potential sources of emissions along the proposed pipeline ROW can be classified as one of three types: stationary, mobile, and fugitive. Stationary sources include the emergency generator at each pump station; all other equipment at the pump stations are electric and are not considered to be potential sources of stationary emissions on the Keystone Pipeline Project. Mobile sources of emissions are the vehicles and equipment used during construction of the pipeline, pump stations,

and other ancillary facilities. Fugitive sources include road dust, dust from the operation of earthmoving equipment, and leaks or programmed releases of volatile constituents in fuels and crude oil from valves, fittings, or sump tanks.

The quantity of fugitive dust (particulate matter) generated by construction is dependent on the area of surface disturbance and the type of equipment causing surface disturbance. Local dust concentrations increase as the silt fraction in the soil increases and as excavation and clearing equipment increase in size. A general particulate matter ($PM_{10}$) emissions factor for all types of construction activity is 0.11 ton per acre per month (South Coast Air Quality Management District 1996). The majority of pipeline construction activities will pass by a specific location within 8 to 12 weeks, resulting in temporary increases in hydrocarbon combustion emissions (nitrogen oxides, carbon monoxide) and local airborne particulate matter concentrations. South Dakota is in attainment for $PM_{10}$. No dust control or mobile emissions permits from the SD DENR are expected to be required.

Keystone will limit dust impacts in residential and commercial areas adjacent to pipeline construction by utilizing dust minimization techniques (primarily watering disturbed surfaces) in accordance with the CMR Plan. Wind-generated dust after construction will be controlled utilizing land surface reclamation measures outlined in the CMR Plan.

Once the pipeline and pump stations are in operation, all pipeline pumps will be electrical and no crude oil storage tanks will be installed at any location along the pipeline. Each pump station will have a small gasoline powered emergency generator with a small (180-gallon) gasoline storage tank. The emergency generator will only be operated during occasional power outages and for a monthly operational check. Total annual operating hours are estimated at 20 hours. Total emissions from each generator will be minimal – the estimated emissions will be low enough so that an air permit will not be required from the SD DENR. There also will be a very small volume of fugitive emissions from valves and pumping equipment.

## 5.10 Solid Wastes

Construction of the Keystone Pipeline Project will generate non-hazardous pipeline construction wastes including human waste, trash, pipe banding and spacers, waste from coating products, welding rods, timber skids, cleared vegetation, stumps, rock and all other miscellaneous construction debris. All waste which contains (or at any time contained) oil, grease, solvents, or other petroleum products will be segregated for handling and disposal as hazardous wastes.

Human wastes will be handled and disposed of exclusively by means of portable self-contained toilets during all construction operations. Wastes from these units shall be collected by a licensed contractor for disposal only at licensed and approved facilities.

All trash will be removed from the construction ROW on a daily basis unless otherwise approved or directed by Keystone. All drill cuttings and drilling mud will be disposed at an approved location. Disposal options may include spreading over the construction ROW in an upland location approved by Keystone, hauling to an approved licensed landfill, or other site approved by Keystone. All extraneous vegetative, rock and other natural debris will be removed from the construction ROW by the completion of clean-up. All trash and wastes will be removed from contractor yards, pipe yards and staging areas when work is completed at each location. All waste materials will be disposed at licensed waste disposal facilities. Wastes will not be disposed of in any other fashion.

All transporters of oil, hazardous substances, and hazardous wastes will be licensed and certified according to the applicable state vehicle code. Incidents on public highways shall be reported to the appropriate agencies. All hazardous wastes being transported off-site will be manifested.

# 6.0 Community Impact

The proposed route lies in predominantly rural and sparsely populated areas, with population densities generally ranging from approximately three to 50 people per square mile for the majority of the route.

## 6.1 Economic Impacts

### 6.1.1 Employment/Labor Market

#### 6.1.1.1 Construction Labor

The Keystone Pipeline Project construction work will be temporary. The pipeline and facilities will be constructed utilizing organized labor from union locals whose geographic jurisdictions include South Dakota for the United Association, Teamsters, Operators, and Laborers. Each of these labor unions has requirements for joining their unions and also provides training and apprenticeship programs for new members.

#### 6.1.1.2 Local Labor Needs and Benefits

Approximately 400 to 500 construction personnel (Keystone employees, contractor employees, construction inspection staff, and environmental inspection staff) are expected to be associated with each spread. Additionally, construction of pump stations will require an additional 20 workers per station.

The job classifications and number of personnel required for construction of the pipeline in South Dakota based on an estimated three construction spreads are described in **Table 10**.

**Table 10 Construction Labor Needs**

| Position Type | Required Range of Workers |
|---|---|
| Supervision (Superintendents, foremen, office manager, clerical, etc.) | 180 to 225 |
| United Association (Welders, Welder Helpers, Pipe Fitters, etc.) | 270 to 330 |
| Teamsters (Truck drivers) | 90 to 120 |
| Operators (Equipment operators) | 340 to 405 |
| Laborers | 300 to 360 |
| Construction management, surveyors, inspectors, etc. | 120 to 150 |
| Total | 1300 to 1590 |

The net economic effect on local communities should be positive for the duration of the construction period (approximately 18 months). The majority of construction will occur in the first 9 months.

A small percentage of permanent jobs may be awarded to local workers for pipeline operations. For example, Keystone may hire a small number of permanent employees to monitor the pump stations and to perform other routine surveillance and corridor maintenance duties.

#### 6.1.1.3 Local Labor Resources

Keystone expects that its construction contractors will hire temporary construction personnel from the local communities where possible. It is estimated that approximately 10 to 15 percent of the total construction workforce could be hired locally, with the remaining portion (85 to 90 percent or more) consisting of non-local personnel.

Utilization of available labor in South Dakota for pipeline construction will be limited to persons that are current members or join the referenced labor unions. Since pipeline construction is very specialized, it is likely most local hiring will be for office staff, general labor or truck drivers.

The number of construction workers that will be hired locally will vary by contractor and by the availability of specifically trained residents available for pipeline construction employment.

### 6.1.2 Agriculture

Impacts to agriculture and farms will be mitigated as follows:

#### 6.1.2.1 Agricultural/Cropland

Agriculture is the predominant land use within proposed corridor in South Dakota. Construction of the pipeline will disturb approximately 2,169 acres (75 percent of the proposed corridor) of agricultural use lands. Keystone will implement mitigation measures to minimize short-term impacts on agriculture productivity. The mitigation measures will include:

- Burying the pipeline deeper than typical tillage depths;
- Cleaning heavy equipment to limit transport of weeds or soil pests prior to project use;
- Prohibiting construction during prolonged, heavy rainfall to minimize the potentials for soil compaction and reduced productivity;
- Deep tilling or chisel plowing soils or other landowner or land management agency approved method to alleviate compaction;
- Stripping and storing topsoil from over the trench line and returning topsoil to original horizon during backfilling;
- Implementing temporary erosion and sediment control BMPs during construction to minimize loss of soil due to wind or water erosion;
- Removing rocks exposed at the surface during clean-up to restore conditions present prior to construction as closely as practicable;
- Applying tackifier, if required due to excessively windy conditions, following the removal of the topsoil;
- Compensating landowners for crop loss and associated damages;
- Coordinating irrigation and drainage systems disruptions with landowners and compensating for damages and resulting lost production; and
- Repairing, replacing, or compensating landowners where irrigation and/or drainage systems are damaged by construction.

Reclamation and revegetation will be in accordance with applicable permits. Land will be re-contoured to approximate pre-existing conditions and disturbed structures, ditches, bridges, culverts, fences, and slopes will be restored. Rocks that are exposed during construction activities, warning signs, and other construction materials will be removed. Temporary gates will be replaced with permanent fences unless the landowner requests otherwise. Additional mitigation measures are detailed in the CMR Plan.

Permanent impacts on agricultural production are not expected since the pipeline will be buried deep enough to allow continued use of the land. Agricultural production across the permanent ROW will be allowed to resume following final clean-up of pipeline construction. Keystone will be responsible for reclaiming all lands to an equivalent level of capability and will provide compensation for crop loss, diminished productivity and other damages to farmland.

#### 6.1.2.2 Grassland/Rangeland

Construction of the pipeline will disturb approximately 633 acres (21 percent of the proposed corridor) of grassland/rangeland. Grassland and rangeland areas are primarily a mix of tall to short grass prairie with occasional occurrence of non-native, cool season grasses. Grasslands in South Dakota primarily support native grass and forb species typically associated with the mixed grass prairie and are considered important habitat areas for special status plant and wildlife species. Dominant species include bluestem, blue grama, green needlegrass, needle and thread and Western wheatgrass.

The proposed project will impact grassland and rangeland areas by temporarily clearing vegetation in the corridor. These areas are expected to recover in one to three growing seasons after construction is completed. Long-term or permanent impacts are not expected. Keystone will promote recovery of these areas by removing and then restoring topsoil and reseeding all disturbed areas with grass mixtures approved by the local Natural Resource Conservation Service office or the landowner.

Ranches and rangeland will be mainly affected during construction by the prohibition of grazing on those lands required for pipeline construction, which may result in obstacles to livestock movement across construction areas. Once construction is completed, grazing and livestock movement over the permanent ROW may resume. Landowners will be compensated for the temporary loss of land use. Grazing may return to normal after vegetation is re-established.

To minimize the impacts to grazing and movement, the proposed project will implement the following measures, where applicable:

- Arrange with landowners to move or keep livestock to fields not affected by the proposed project;
- Cut and brace fences crossed by the pipeline or other activities;
- Install temporary fencing where appropriate to prevent livestock movement across the ROW;
- Leave access lanes for movement of livestock across the ROW during the construction period, where necessary;
- Strip the existing topsoil, where there is a well-established sod layer, up to a maximum depth of 12 inches, from over the trench only;

- Store topsoil separately and return to its original horizon during backfill;
- Restore the work area to pre-construction contours and re-seed with native mixtures approved with landowner;
- Defer grazing in ROW area until vegetation becomes re-established; and
- Compensate landowners for incremental costs resulting from temporary loss of land use.

Access to and work on pasture and farmlands will be in accordance with applicable permits and regulations. Temporary gates used for access will remain closed at all times. The temporary gates will be replaced with permanent fence.

Keystone prohibits feeding or harassment of livestock or wildlife, firearms, and pets on the construction ROW. Food and food wastes will be stored and secured.

#### 6.1.2.3 Irrigated Land

The proposed route in South Dakota crosses one 40-acre land parcel (2.2 acres of disturbance) irrigated by a pivot system. Keystone will coordinate with the landowner during construction to minimize irrigation and drainage system disruptions and compensate for damages and resulting lost production; and repair, replace, or compensate the landowner if the pivot system is damaged by construction. The operational phase of the Keystone pipeline project will be underground and will avoid impacts to irrigated land.

Additional detail on mitigation measures can be found in the CMR Plan.

### 6.1.3 Commercial and Industrial Sectors

The local economies could benefit from temporary hiring of local employees and from the influx of non-local construction workers. Payroll taxes for the project will increase income tax revenue. Economic benefits to local businesses will likely be increased through the sales of food, goods, services, and lodging that will be generated by the temporary non-local workforce. This increase in consumer demand could temporarily boost the local economies through hiring of additional temporary employees or longer work hours for the existing employed workforce.

Food and lodging expenditures are anticipated to be approximately $3.25 million. Temporary workers' estimated retail purchases with added state and local government taxes will add approximately $270,000 of additional revenue.

Keystone will purchase some construction materials and other supplies for the project from local businesses. Local purchases for construction will include consumables, fuel, equipment rental, space leasing, miscellaneous construction-related materials such as office supplies, and some medical/dental needs. It is estimated that local materials purchase costs will exceed $750,000.

There will be no significant impacts to the industrial sector.

### 6.1.4 Land Values

The Keystone Pipeline Project will be constructed in predominantly rural, agricultural areas. Keystone will acquire pipeline ROW easements from landowners and will provide landowners with monetary compensation for the conveyance of those easements. Construction activities will create

the potential for damage to land and property, including drainage tiles, irrigation systems, and fences. Keystone will restore damage or disturbance to lands. Keystone also will repair or restore drain tiles, irrigation systems, fences, and other items and features that are damaged or temporarily disturbed during pipeline construction. Repair and/or monetary compensation for damage to land and property during construction are discussed in detail in the CMR Plan.

Certain existing land uses will be converted to long-term utility use for the duration of the pipeline's operation. This conversion represents a long-term future constraint on development of private land because dwellings cannot be placed on the permanent pipeline ROW for the duration of the ROW easement. The 50-foot-wide operational ROW will be maintained in an open condition for the life of the pipeline facilities.

It is expected that property values will not be affected by the installation or presence of a large diameter pipeline in rural areas, similar to those areas found along the proposed Keystone Pipeline Project route.

### 6.1.5 Taxes

Sales taxes, land based taxes, and other taxation methods will be of greater economic significance to state and local revenues. Based on current tax rates, the Keystone pipeline after construction is estimated to generate approximately $6.5 million in tax revenues to the state in the first year.

Keystone will pay ad valorem taxes to the local governments during the years of operation of the pipeline for the use of the corridor and associated pipeline facilities. The construction cost initially provides the basis for the pipeline system valuation assessment. With time, the assessment focuses on the pipeline facilities' contribution to the system-wide income and depreciated value. Generally, the assessment decreases over time. However, ongoing revenues to the counties should be significant.

Taxes that may apply, other than property taxes levied by various state, county, or local taxing jurisdictions, include taxes on gross receipts from the sales of equipment, goods and services. These taxes and fees vary by region or locality and will be received only during the construction period (18 months).

### 6.1.6 Other Economic Benefits

Purchases, equipment rental leases, equipment maintenance and repairs, storage areas, fuel for construction vehicles and associated equipment, licensing and permitting fees will all provide additional economic prosperity to the state during pipeline construction.

## 6.2 Infrastructure Impacts

The limited number of permanent employees associated with the proposed project will result in negligible long-term impacts on public services.

### 6.2.1 Housing

It is expected that most project workers will use temporary housing, such as hotels/motel, recreational vehicle parks, and campgrounds. Most of the temporary workers will seek housing in the more populated, service-oriented towns located within a reasonable commuting distance to the

work site. Temporary workers will not be housed in locations where they would overtax the available services.

### 6.2.2 Energy

Long-term electrical service requirements for the proposed project include utilizing existing service lines and constructing electrical transmission and distribution power lines to pump stations. Because local electrical power providers, not Keystone, will be constructing and operating the electrical power lines, the electrical power companies will be responsible for obtaining any necessary approvals or authorizations from federal, state, and local governments.

New electrical transmission power lines (i.e., power line with voltage of 69 kilovolts [kV] or greater) will be constructed to service the four pump stations along the pipeline route in South Dakota. Other electric power requirements (e.g., valve sites) will be supplied from distribution service drops from adjacent distribution power lines (i.e., power line with voltage below 69 kV). Each of these distribution service drops will require the installation of approximately one or two poles and a transformer.

Temporary short term use of power during the construction phase is expected to be minimal. Long-term power supply is expected to be provided by existing utility providers, utilizing existing power generation capacity.

### 6.2.3 Sewer and Water

There will be increased utilization of water and sewage facilities due to the pipeline construction offices and influx of temporary construction workers utilizing local lodging. However, there should not be any significant impacts from workers for the pipeline project on local communities' water, sewage or other public utilities. It is not expected that workers will overtax these facilities in the area of the project and the local communities should not see any impact on their public utilities as a result of the pipeline project.

### 6.2.4 Solid Waste Management

There will be increased utilization of solid waste management facilities due to the pipeline construction offices and influx of temporary construction workers utilizing local lodging and services and solid wastes from pipeline construction (stumps, rock, spacer ropes, end caps, welding rods, pipe shavings, and other trash/debris).

Solid waste generated by construction activities will be managed according to applicable federal, state and local regulations. Local waste disposal transporters and landfills will be utilized where appropriate. Hazardous wastes, which will be limited to very small volumes, will be transported to permitted hazardous waste disposal facilities by licensed transporters.

### 6.2.5 Transportation

Transportation logistics that will identify possible routes to be utilized during construction will be established prior to construction as necessary to support state and local permitting.

The following state agency has jurisdiction over the federal and state highway system in South Dakota and is responsible for issuing transportation-related permits to accommodate construction vehicles and traffic.

Department of Commerce and Regulation
Division of Highway Patrol
500 E. Capital Avenue
Pierre, SD 57501-5070
(605) 773-4578 (information)
(605) 698-3925 (permit center)

In addition, Keystone expects local road permitting to be conducted at the county level. Keystone has initiated contacts with local permitting authorities for the purpose of establishing timelines for road approvals.

During construction, traffic on highways and secondary roads will be increased due to the construction activities and due to the influx of construction workers. Hauling of line pipe and most construction equipment will be within state road and bridge weight limits. There will be isolated hauling of equipment that will require special permits for weight and/or width. There may be an increased temporary demand for permits for vehicle load and width limits. The primary impact will be deterioration of gravel or stone surfaced roads requiring grading and/or replenishment of the surface materials.

State and local road approval processes related to traffic will commence in late 2007 and continue throughout construction in 2008 and 2009. Input from the pipeline construction contractors and pipe suppliers will be required to obtain appropriate approvals. Any required traffic studies will be completed at that time.

### 6.2.6 Cultural and Historical Resources

In January 2006, Keystone's cultural resources consultant, Metcalf, prepared a research design for the cultural resources field inventory conducted along the proposed route in South Dakota. The ideas and concept underlying the research design were the result of informal discussions with the Review and Compliance Officer at the South Dakota State Historical Preservation Office (SHPO). The research design included a sampling strategy comprised of five levels of investigation. The first level, a literature and files search of an area 1 mile wide centered on the proposed route, was completed in January 2006. The second level of investigation was a reconnaissance of the proposed route by a geomorphologist in order to identify areas that required closer investigation and conversely, areas that were not archaeologically sensitive. The third level was an intensive pedestrian field survey of selected segments of the proposed route in areas with high potential to contain archaeological resources. Approximately 38 miles of the proposed 220-mile route in South Dakota were selected for an intensive pedestrian field survey. The fourth level was a reconnaissance survey of approximately 52 miles of the proposed route. The fifth level was no survey, which applied only to areas determined to have essentially no potential for the presence of cultural resources. These areas were determined by the results of the previous four types of investigations. In a letter dated March 28, 2006, the South Dakota SHPO concurred with the proposed cultural resources survey protocol as defined in the research design. The research design and SHPO concurrence letter are included in the September 15, 2006 submittal.

In January 2006, Metcalf conducted a literature and files search of an area 1 mile wide, centered on the proposed pipeline centerline at the South Dakota Archaeological Research Center in Rapid City and the Department of Tourism and State Department in Pierre. The search identified 30 previously documented cultural resources within the 1-mile-wide study corridor. The identified cultural resources included 10 prehistoric sites, 17 historic sites, and three site leads.

Additionally, there were 243 architectural sites on record at the Department of Tourism and State Department that were located within the 1-mile-wide study corridor. The sites included several architectural properties in the communities of Iroquois and Yankton, plus farms and homesteads scattered throughout various counties.

Results of Field Investigations

Cultural resources field surveys within selected survey areas consisted of close inspection of a 300-foot-wide corridor centered on the proposed pipeline centerline. The initial field survey of selected survey areas in South Dakota was completed in August 2006. Approximately 15 miles of reroutes and USFWS easements remain to be surveyed in 2007.

To date, 17 cultural resources and two isolated finds were located during the field surveys. Site records for five previously recorded historic railroads located within the project area were updated. The 12 cultural resources included prehistoric lithic scatters, two rock cairns, historic foundations, a house, shed, and farmstead. Of these, the two rock cairns and one archaeological artifact scatter were recommended as potentially eligible for the NRHP. Both of the rock cairns and the artifact scatter will be avoided by rerouting the proposed pipeline centerline.

Shovel probes were conducted at five locations. One prehistoric artifact scatter was recorded as a result of the shovel probes. Evaluative testing was recommended for the site in order to determine the site's NRHP eligibility, however, the proposed pipeline centerline has been rerouted to avoid the site.

During the windshield survey, 56 localities were selected for geomorphological core sampling. The core sampling currently is underway and expected to be completed in November 2006, weather permitting.

A preliminary survey report, that included the results of the field surveys, evaluative testing, and geomorphological investigations, was submitted to the South Dakota SHPO and DOS in January 2007. This report is attached to this application as **Exhibit C**.

Construction Phase Mitigation

Those areas in which impacts are planned or are likely to occur are referred to as the "area of potential effect" or APE. Specifically, the APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of NRHP-eligible sites, if any such sites exist.

Only those cultural resources located in the APE were reviewed to determine if any would be subject to impacts that could affect their eligibility for the NRHP based on NRHP criteria for evaluation. For the proposed Keystone pipeline project, the APE is the 200-foot-wide survey corridor in areas where the proposed pipeline parallels an existing pipeline, the 300-foot-wide

survey corridor in greenfield areas, and the footprint of proposed pump stations, plus a 50-foot buffer.

Construction activities and associated operations also could adversely affect undiscovered archaeological sites. If previously undocumented sites are discovered within the construction corridor during construction activities, all work that might adversely affect the discovery will cease until Keystone, in consultation with the appropriate agencies such as SHPO, can evaluate the site's eligibility and the probable effects. If a previously unidentified site is recommended as eligible to the NRHP, impacts will be mitigated through an Unanticipated Discovery Plan, which will be included in the cultural resources survey reports prepared for each state.

If construction or other project personnel discover what they believe to be human remains, funerary objects, or items of cultural patrimony on federal land, construction will cease within the vicinity of the discovery and the appropriate agency will be notified of the find. Treatment of any discovered human remains, funerary objects, or items of cultural patrimony found on federal land will be handled in accordance with NAGPRA. Construction will not resume in the area of the discovery until the authorized agency has issued a notice to proceed.

If human remains and associated funerary objects are discovered on state or private land during construction activities, construction will cease within the vicinity of the discovery and the county coroner or sheriff will be notified of the find. Treatment of any discovered human remains and associated funerary objects found on state or private land will be handled in accordance with the provisions of applicable state laws.

Operation Phase Mitigation

The pipeline will be buried except for the relatively few aboveground facilities. The primary impact of the operation phase of the Keystone Pipeline Project is the potential introduction of visual or audible elements (e.g., pump stations), which could alter the setting associated with historic properties. Keystone will mitigate these operational impacts to NRHP-eligible sites by the use of landscaping or other techniques that will minimize or eliminate effects on the historic setting or ambience of standing structures.

## 6.3 Community Services

### 6.3.1 Health Services and Facilities

Local health facilities will provide health services to Keystone workers during the construction and operation phases of the project. There should not be any impacts to the local health care facilities as a result of this pipeline project.

### 6.3.2 Schools

While it is difficult to determine the specific demographic and "family unit" data on the projected increased labor force, depending on geographical distribution and location, it would be prudent to assume that the number of new students wanting to enroll in the local schools as a result of the pipeline project would be minimal. Most workers do not travel with their families or enroll their children in the local schools. Because of this limited potential for new students, local schools should be capable of providing more than adequate opportunities and accommodations for any new students.

### 6.3.3 Recreation

South Dakota is blessed with extensive recreational opportunities including but not limited to swimming, boating, open water fishing, ice fishing, hiking, camping, hunting, exploring, biking, sightseeing, and photography. The area lakes provide yearly recreational opportunities to residents and visitors alike. Communities near the pipeline construction project provide special events. It is possible that some temporary workers will buy hunting and fishing licenses and utilize them during the project construction period.

There should be limited recreational impacts from the pipeline project and it is not expected that workers will overtax the many recreational facilities in the area of the project.

### 6.3.4 Public Safety

Law enforcement agencies in the communities adjacent to the pipeline project should not experience a significant impact from the pipeline workers. Local law enforcement agencies should have adequate full and part-time law enforcement officers to accommodate the additional labor personnel as a result of the pipeline project although the project could result in a minor short-term increase in workloads for those agencies.

Response times to highway or construction-related accidents may be lengthy given communication, dispatch, and travel time considerations. In these areas, it may be necessary to provide on-site first responder services, however, Keystone will work with the local law enforcement, fire departments, and emergency medical services to determine the best course of action and coordinate for effective emergency response.

## 6.4 Other Impacts

### 6.4.1 Population and Demographics

Work on the Keystone Pipeline Project in South Dakota is proposed to commence in early 2008 and to be completed by late 2009. Approximately 1,200 to 1,500 construction personnel per spread are expected for the three spreads associated with the pipeline construction in South Dakota. It is estimated that approximately 10 to 15 percent of the total construction workforce could be hired locally, with the remaining portion (85 to 90 percent or more) consisting of non-local personnel. Thus, the local population may be increased by up to approximately 1,200 workers for up to a year. Actual pipeline construction time will probably be shorter than this estimate.

The project construction period will be relatively short in any given area and most non-local workers will not be accompanied by their families during their work tenure. The limited number of permanent employees associated with the proposed project will not significantly affect local populations or demographics.

### 6.4.2 Protection of Human Health and Safety

The United States has the world's largest petroleum pipelines network. Pipelines are the safest, most reliable, and efficient mode of transporting large volumes of crude oil. Pipeline transportation of crude oil involves some risk to the public despite its excellent safety record. The risks include the potential for fire and toxic exposure, ingestion, and inhalation from crude oil.

Pipeline safety is mandated under the authority of the USDOT. The USDOT pipeline standards (49 CFR Part 195) are intended to ensure public protection and to prevent accidents and failures. 49 CFR Part 195 specifically addresses petroleum pipeline safety issues and specifies material selection, qualification, minimum design requirements; and protection from internal, external, and atmospheric corrosion. The OPS of the USDOT administers the national regulatory program to ensure safe transportation of crude oil and other hazardous materials by pipelines. OPS develops safety regulations and risk management approaches to encompass safety in pipeline design, construction, testing, operation, maintenance, and pipeline facilities emergency response.

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, there will be a very low likelihood of a crude oil release (leak or spill) from the pipeline that could enter surface water resources and drinking water supplies. On July 10, 2006, Keystone submitted two key documents to the DOS: a preliminary ERP and a preliminary pipeline risk assessment and environmental consequence analysis. The ERP outlines the measures that Keystone will implement in the event of an accident. The preliminary risk assessment evaluates 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, a final risk assessment and environmental consequence analysis was submitted to the DOS in April 2007.

To reduce the amount of product that could enter surface waters, federal regulation (49 CFR Section 195.260(3)) stipulates that new pipelines must have valves installed on both sides of any waterbody, which has at least a 100-foot width between ordinary high water marks. These additional valves will further aid in minimizing the amount of material, which could be released into other waterbodies in the unlikely event of a spill. The location of valves, spill containment measures, and Keystone's ERP will minimize adverse effects to perennial, intermittent, and ephemeral waterbodies, as well as to groundwater.

The OPS Rules on Pipeline Integrity Management in HCAs for Hazardous Liquid Operators specify conventions for assessing, evaluating, repairing, and validating the integrity of hazardous liquid pipeline segments that could have high consequences. HCAs, as defined by 49 CFR Section 195.450, are high population areas (urbanized area that contains 50,000 or more people and that has a density of at least 1,000 people per square mile), other populated areas (a place that contains a concentrated population), unusually sensitive areas as defined by 49 CFR Section195.6 (ecosensitive and drinking water), and commercially navigable waterways.

Pipeline operators are required to develop a written integrity management program (IMP) that must include methods to measure the program's effectiveness in assessing and evaluating integrity and protecting HCAs. Keystone will develop and implement an IMP for the entire pipeline including the HCAs. 49 CFR Part 195 also requires pipeline operators to develop and implement public awareness programs consistent with the API's Recommended Practice 1162, Public Awareness Programs for Pipeline Operators. The purpose of Recommended Practice 1162 is to enhance pipeline safety and security by increasing the public understanding of the role of pipelines in transporting energy, informing the public how to recognize and respond to a pipeline emergency, and notifying the public of whom to contact in an emergency. Recommended Practice 1162 contains provisions for enhancing liaison with emergency responders and public officials. Keystone's public awareness program applies to the relevant portions of the CMR Plan to construct and operate the proposed pipeline.

### 6.4.3 Noise Impacts

The existing noise environment is characterized by determining ambient noise levels, identifying existing noise sources, identifying noise sensitive receptors in the vicinity of project noise sources, and evaluating local terrain features that may affect noise transmission.

The Keystone Pipeline Project will occur primarily in rural agricultural areas. Because of the primarily agricultural and rural land uses, existing ambient noise levels along the pipeline route are quite low. It is estimated that day-night average levels range between 40 decibels on the A-weighted scale (dBA) (rural residential) and 45 dBA (agricultural cropland). Ambient (background) noise levels occur from roadway traffic, farm machinery on a seasonal basis, pets, and various other household noises. Pipeline areas along major highways and interstate highways may experience higher ambient noise levels of approximately 68 to 80 dBA.

Residences within 500 feet of the ROW will experience short-term inconvenience from construction equipment noise for a period of 1 week to 30 days. For the entire South Dakota corridor, there are 18 residences within 500 feet of the ROW. During construction, Keystone will comply with all municipal noise guidelines. In addition, Keystone will limit construction activities primarily to daylight hours. Noise impacts from construction activities will be mitigated according to the CMR Plan.

During operation of the pipeline, the noise impact associated with the electrically driven pump stations will be limited to the vicinity of those facilities. As previously discussed, noise impacts from the electrically powered pump stations are anticipated to be minor.

### 6.4.4 Visual Impacts

An analysis of the proposed project corridor did not identify any designed scenic outlooks of viewing areas on or along the route. Visual resource impacts associated with construction of the Keystone Pipeline include removal of existing vegetation, exposure of bare soils, earthwork and grading scars, and landform changes that introduce contrasts. Keystone has aligned the pipeline route to avoid aesthetic features to the extent possible. Visual resource impacts from construction activities will be of short duration with no significant long-term impacts due to implementation of Keystone's mitigation measures outlined in the CMR Plan.

The long-term impacts of aboveground facilities on visual resources will depend on the location of each individual facility and its visibility from the surrounding area. Keystone has located the pump stations based on hydraulic and engineering design considerations but also has considered impacts on aesthetics and sensitive environmental resources in determining the facility locations. Pump stations are located on private land and each will require a small footprint of about 5 acres (217,800 square feet). There will be a series of two to three electrically driven pump units initially installed at each pump station; the number of pumps could be expanded to four or five, depending on whether Keystone elects to expand the throughput capacity of its system. The pump units generally will not be enclosed in buildings and will be connected via aboveground piping and valves. Other facilities will include an electrical transformer and a small control building to house electrical, measurement and control system components. The pump station site will be enclosed by a chain link fence approximately 6 feet high. **Exhibit 4** in Chapter 2.0 presents an artist's rendering of a typical pump station.

## 6.5 Amelioration of Potential Adverse Community Impacts

Amelioration of potential adverse community impacts have been discussed in this section and throughout the remainder of the application. In general, community impacts are expected to be positive and any potential impacts will be ameliorated through thoughtful design, construction and operation.

# 7.0 Other Information

## 7.1 Monitoring of Impacts

Keystone is committed to protecting the environment and complying with all applicable laws, regulations, and standards. Keystone will ensure environmental compliance during construction through environmental training, environmental inspections, and post-construction monitoring. In addition, operations and maintenance programs per the Keystone IMP will be performed. During operations, Keystone will utilize a SCADA system that provides for continuous, remote monitoring and control of pipeline operations. Additionally, visual surveillance will be conducted in accordance with 49 CFR Section 195.412.

Keystone is proposing to implement training and two types of monitoring on this project to help ensure compliance with environmental, safety, landowner, and company requirements as follows:

### 7.1.1 Environmental Training

Experienced, well-trained personnel are essential for the successful construction and operation of the proposed pipeline project. To communicate the project requirements to personnel, Keystone will require environmental training of all project personnel prior to construction. In addition, Keystone and its contractors will undergo prevention, response, and general safety training. The training program will be designed to improve awareness of environmental and safety requirements, pollution control laws and procedures for proper operation and maintenance of equipment.

Keystone will require that the contractors ensure that all persons (contractors' and subcontractors' personnel) engaged in work associated with the pipeline's construction are informed of the construction issues and concerns, and that they attend and receive training regarding these requirements as well as all laws, rules and regulations applicable to the work. Required environmental training and certification will be required for all personnel including Keystone personnel visiting or working on the job site.

Different levels of training will be required for different groups of contractor personnel. Contractor supervisors, managers, field foremen, and other contractor personnel designated by Keystone will attend a full-day, comprehensive environmental training session. All contractor personnel will attend a 1- to 2-hour group training session before the beginning of construction and during construction as new personnel are assigned or as environmental issues and incidents warrant. All visitors and any other personnel without specific work assignments will be required to attend a brief safety and environmental awareness orientation.

Training will be acknowledged on a training form and the records of proof-of-training will be maintained for the duration of the project. Each successfully trained individual will receive a copy of the training material and a hardhat certification sticker. Only personnel displaying the hardhat training sticker will be allowed on a job site. A copy of environmental training certification will be maintained in each individual's personnel file.

To provide on-site documentation of compliance, Keystone will utilize a team of inspectors overseeing environmental, safety and, quality. Keystone will require training of all inspectors to the

company's construction specifications. A review of the landowner and permit requirements with the applicable inspectors also will be required.

### 7.1.2 Environmental Inspection

Keystone is committed to environmental compliance. Keystone's environmental inspectors will be responsible for overseeing the contractor's compliance with environmental requirements, project specifications, permits and landowner requirements during construction activities. The environmental inspector's primary responsibility will be to observe construction-related activities and monitor compliance with, and provide interpretation of, the environmental requirements specific to the Keystone project. The environmental inspector will be qualified to perform the environmental compliance evaluations and interpretations required to preserve the environment. The environmental inspector's duties include documenting and preparing written project compliance and non-compliance reports and recommending corrective measures where non-compliance is observed. The inspectors will follow up to see and document that all non-compliances are corrected. If environmental damage or the safety of the workers or the public is imminent, the environmental inspector will have the authority to stop a non-compliance activity until the concern can be resolved.

On-site environmental compliance by Keystone's contractors will be documented. Keystone will use at least one full-time environmental inspector during active construction activities. The site supervisor will be responsible for the inspector's duties if the environmental inspector in not available on site.

### 7.1.3 Post-Construction Monitoring and Maintenance Programs

Keystone will conduct post-construction monitoring of the project area to minimize the potential for long-term adverse impacts to the environment. Operations and maintenance programs such as vegetation management, pipeline maintenance, integrity surveys, hydrostatic testing or other programs may have an impact on the final reclamation of the ROW. To ensure that the integrity of the facility and land surface reclamation of the ROW is maintained after completion of construction and that regulatory requirements are adhered to during operations, the following measures will be implemented unless otherwise directed by Keystone in response to site specific conditions or circumstances:

- Post construction monitoring inspections will be conducted of disturbed areas after the first growing season to determine the success of revegetation. Areas that have not been successfully re-established will be revegetated by Keystone or through compensation to the Landowner to reseed the area. If, after the first growing season, revegetation is successful, no additional monitoring will be conducted.
- In non-agricultural areas, revegetation will be considered successful if, upon visual survey, the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed lands. In agricultural areas, revegetation will be considered successful if crop yields are similar to adjacent undisturbed portions of the same field.
- Keystone will maintain communication with the landowners and or tenants throughout the operating life of the pipeline to allow expedient communication of issues and problems as they occur. Keystone will provide the landowners with corporate contact information for these purposes. Keystone will work with landowners to prevent excessive erosion on lands disturbed by construction. Reasonable methods will be implemented to control erosion.

This may not be implemented if the property across which the pipeline is constructed is bare cropland which the landowner intends to leave bare until the next crop is planted.

- In wetland areas, all timber riprap, timber mats, and prefabricated equipment mats will be removed upon completion of construction. The contractor will replace topsoil, as applicable, and spread as closely to its original contours in the wetland as possible with no crown over the trench. Any excess spoil will be removed from the wetland. The contractor will stabilize wetland edges and adjacent upland areas by establishing permanent erosion control measures and re-vegetation, as applicable, during final clean up. For each standard wetland crossed, the contractor will install a permanent slope breaker and trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. The contractor will locate the trench breaker immediately upslope of the slope breaker.
- Vegetation maintenance will not be conducted over the full width of the permanent ROW in wetlands. However, to facilitate periodic pipeline corrosion/leak surveys, a corridor centered on the pipeline and up to 30 feet wide may be maintained in an herbaceous state. In addition, trees within 30 feet of the pipeline greater than 15 feet in height may be selectively cut and removed from the permanent ROW.
- Herbicides and pesticides will not be used in or within 100 feet of a wetland except as allowed by the appropriate land management agency or state agency.

The success of wetland re-vegetation will be monitored after construction until wetland re-vegetation is successful except in circumstances where property is purchased for aboveground facilities. Wetland re-vegetation will be considered successful if the cover of herbaceous and/or woody species is at least 80 percent of the type, density, and distribution of the vegetation in adjacent wetland areas that were not disturbed by construction. If re-vegetation is not successful at the end of 3 years, a remedial re-vegetation plan will be developed in consultation with a professional wetland ecologist to actively re-vegetate the wetland. Re-vegetation efforts will continue until wetland re-vegetation is successful.

## 7.2 List of Witnesses

The individuals listed below are available to provide direct testimony in support of the matters averred to herein, if required. In addition, Keystone reserves the right to designate additional witnesses as necessary.

Dean Cowling, TransCanada Keystone
Michael Koski, Trow Engineering
L.A. Gray, Universal Ensco, Inc.
William Berg, ENSR
Robert Berry, ENSR
James Burrell, ENSR
Rollin Daggett, ENSR
Scott Ellis, ENSR
Charles Johnson, ENSR
Kim Munson, ENSR
Vince Scheetz, ENSR
Jon Schmidt, ENSR
Heidi Tillquist, ENSR

# 8.0 Applicant's Verification

**VERIFIED APPLICANT'S SIGNATURE**

PROVINCE OF: Alberta, Canada

CITY OF: Calgary

Dean Cowling, being duly sworn, deposes and says that he is Project Manager of the Keystone Pipeline Project and is the authorized agent of TransCanada Keystone Pipeline, LP, and is also authorized to sign this application on behalf of the Project Owner, TransCanada Keystone Pipeline, LP.

He states that he does not have personal knowledge of all of the facts recited in the foregoing application, but the information in the application has been gathered by and from employees and contractors of the owner of the Keystone Pipeline Project and that the information in the application is verified by him as being true and correct on behalf of TransCanada Keystone Pipeline, LP.

Dated this 26th day of April 2007.

(Signature)

JENNIFER R. SCOTT
BARRISTER & SOLICITOR
Notary Public in Province of Alberta
(no expiry date)

# Exhibit A

## Route Maps, Land Use Maps and Soil Maps

*(provided on DVD)*

# Exhibit B

## Construction Mitigation and Reclamation (CMR) Plan

*(provided on DVD)*

# Exhibit C

## Filings with the Department of State

*(provided on DVD)*

# Exhibit D

# Biological Reports

*(provided on DVD)*