



**NORTH DAKOTA PUBLIC SERVICE COMMISSION  
APPLICATION FOR A ROUTE PERMIT**

**SOUTHERN LIGHTS 20-INCH CRUDE LINE PROJECT**

Prepared by



April 2007

**ENBRIDGE PIPELINES (SOUTHERN LIGHTS) L.L.C.**  
**Application for a Route Permit**  
**Southern Lights 20-Inch Crude Line (LSr) Project**

**TABLE OF CONTENTS**

SECTION A	<u>DESCRIPTION OF PROPOSED FACILITY</u> .....	1
A.1.	TYPE OF FACILITY .....	1
A.2.	PRODUCT .....	3
A.3.	SIZE AND DESIGN .....	3
A.4.	TIME SCHEDULE .....	3
SECTION B	<u>LOCATION</u> .....	4
B.1.	APPLICANT'S POLICIES AND COMMITMENTS TO LIMIT ENVIRONMENTAL IMPACT .....	4
B.2.	DISCUSS THE FACTORS LISTED IN SECTION 49-22-09 NDCC TO AID THE COMMISSION'S EVALUATION OF THE PROPOSED PIPELINE ROUTE .....	7
B.3.	IDENTIFY AND MAP CRITERIA LEADING TO PROPOSED PIPELINE ROUTE LOCATION WITHIN CORRIDOR .....	11
B.4.	RELATIVE VALUE AND EFFECTS UPON EACH CRITERION INCLUDING LOCATION, CONSTRUCTION, AND OPERATION OF THE FACILITY .....	12
B.5.	THE CRITERIA TO BE EVALUATED SHALL INCLUDE AT A MINIMUM ALL OF THE FOLLOWING, WHICH ARE WITHIN THE DESIGNATED CORRIDOR .....	37
B.6.	MITIGATION MEASURES .....	37
B.7.	QUALIFICATIONS OF PERSONS CONTRIBUTING TO THE STUDY .....	40
B.8.	MAPS .....	40
B.9.	OTHER MATTERS .....	41

**LIST OF TABLES**

TABLE 1	North Dakota Public Service Commission Exclusion And Avoidance Areas – Transmission Facility Siting .....	13
TABLE 2	Rural Residences Within 500 Feet Of The Lsr Project Pipeline Route .....	14
TABLE 3	National Wetland Inventory Wetland Types Crossed By The Lsr Pipeline Route .....	18
TABLE 4	Accident Rates Of Petroleum Transportation Methods .....	22
TABLE 5	Mainline Pipeline Incidents – Enbridge (Lakehead) System .....	22
TABLE 6	Roads Crossed By The Lsr Project Pipeline Route .....	26
TABLE 7	Soil Characteristics In The Lsr Project Area .....	28
TABLE 8	Topsoil Depths And Slope Class In The Lsr Project Area .....	29
TABLE 9	Topsoil Depths On Prime Agricultural Land In The Project Area .....	29
TABLE 10	Waterbodies Crossed By The Lsr Project Pipeline Route .....	32

**LIST OF FIGURES**

Figure 1	General Project Location Map .....	2
Figure 2	Typical Pipeline Construction Sequence .....	42

## **APPENDICES**

- Appendix A Environmental Mitigation Plan
- Appendix B Spill Prevention, Containment, and Control Plan
- Appendix C Agency Correspondence
- Appendix D Maps of Exclusion and Avoidance Areas
- Appendix E Landowner List

# APPLICATION FOR ROUTE PERMIT

## SECTION A

### DESCRIPTION OF PROPOSED FACILITY

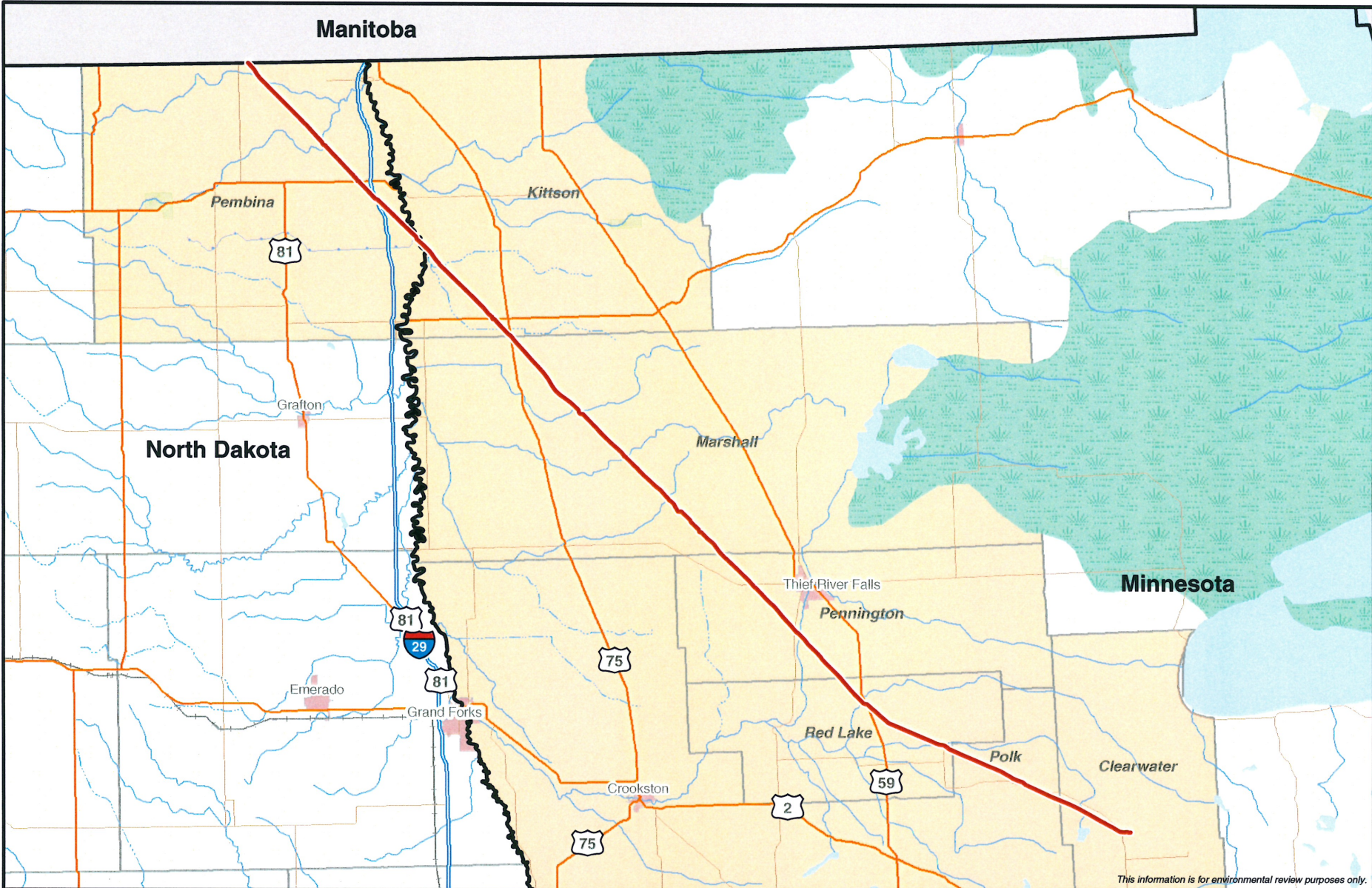
#### **A.1. TYPE OF FACILITY**

Enbridge Pipelines (Southern Lights) L.L.C. ("Enbridge" or "Company") proposes to construct, own, and operate a new 313-mile-long, 20-inch-outside-diameter liquid petroleum pipeline that will interconnect with existing Enbridge facilities for delivery at Enbridge's terminal at Clearbrook, Minnesota. The proposed pipeline will originate at affiliated Enbridge facilities in Cromer, Manitoba, and extend to the southeast, terminating at Enbridge's Clearbrook terminal and tank farm facility. The project is referred to as the Southern Lights 20-Inch Crude Line (LSr) Project.

The North Dakota portion of the proposed project consists of approximately 28 miles of 20-inch-outside-diameter pipeline. The pipeline will be buried underground on or adjacent to Enbridge's existing right-of-way and adjacent to existing pipelines primarily on Enbridge's multiple line rights easements in Pembina County. The pipeline will enter the State of North Dakota at the Canadian border near Neche, North Dakota and exit North Dakota at the Minnesota border approximately 2 miles northeast of Bowesmont, North Dakota. The proposed new pipeline will continue throughout northwestern Minnesota and terminate at Enbridge's existing Clearbrook, Minnesota tank farm. Figure 1 shows the general location of the proposed facilities.

The new pipeline will become part of the existing Enbridge pipeline system and will provide needed capacity to transport increased supplies of petroleum produced in western Canada into the United States. The capacity provided by this new pipeline segment provides independent utility to Enbridge and its customers, who will use the pipeline for the transportation of petroleum to Clearbrook breakout tanks for subsequent delivery to interconnected existing pipeline systems to the south (via Minnesota Pipeline, which is owned by others) and east (via Enbridge pipelines) of Clearbrook.

The estimated cost of the North Dakota portion of the proposed project is approximately \$31.5 million. The proposed facilities will add approximately 186,000 barrels per day (bpd) of capacity to the Enbridge system.



*This information is for environmental review purposes only.*

— Proposed Pipeline

0 10 20 Miles



**Figure 1**  
**Southern Lights 20-Inch Crude Line**  
 Enbridge Pipelines (Southern Lights) L.L.C



## **A.2. PRODUCT**

As defined by Enbridge's Federal Energy Regulatory Commission (FERC) Tariff on Rules and Regulations, the following commodities are transported by the Company:

- natural gas liquids;
- condensate;
- light crude oil;
- medium crude oil; and
- heavy crude oil.

This proposed 20-inch-diameter pipeline is expected to transport light crude oil.

## **A.3. SIZE AND DESIGN**

The pipe to be installed for the project will have an outside diameter of 20 inches, 0.250-inch wall thickness, API Grade X70, and be electric resistance welded (ERW) steel pipe.

## **A.4. TIME SCHEDULE**

Enbridge is planning to start construction of the Southern Lights 20-Inch Crude Line (LSr) Project during the spring/summer of 2008, with a planned completion and in-service date of December 2008. The project is on an aggressive schedule to meet the immediate and increasing U.S. refinery demand for incremental pipeline capacity from western Canadian production. Due to such demand, Enbridge continues to periodically experience apportionment of pipeline capacity on its existing mainline system.

Enbridge is prepared to work diligently to facilitate review of the LSr Project to strive to meet the December 2008 in-service date.

# APPLICATION FOR ROUTE PERMIT

## SECTION B

### LOCATION

#### **B.1. APPLICANT'S POLICIES AND COMMITMENTS TO LIMIT ENVIRONMENTAL IMPACT**

Enbridge's Environmental Policy states that protection of the environment is an integral element in the conduct of Company business. Environmental protection efforts will span the entire Project, from planning through construction, restoration, and into full operation.

##### B.1.a Construction

The Project involves installing a new pipeline on or adjacent to Enbridge's existing right-of-way, which currently has up to five lines located within the existing easements. Construction of the new 20-inch-diameter pipeline will result in temporary short-term impacts, but is not expected to result in significant long-term change to the environment.

Planning, design, construction, and restoration will incorporate the equipment and measures discussed in section B.6. Environmental monitoring, in the form of ongoing environmental inspection, will be conducted during and following construction. Third-party environmental inspectors will monitor compliance with required environmental protection measures, permit conditions, and specifications, and provide ongoing oversight for day-to-day issues that may arise during construction. The environmental inspectors will be trained and well-versed in the implementation of environmental best management practices during construction. Contract specifications will incorporate environmental protection and mitigation measures, and contractors will be expected to implement these measures in the field. Contractor training and project orientation will also be provided by Enbridge.

Most of the proposed pipeline route (more than 98 percent) is located on private land, and landowner concerns will be addressed during all phases of construction including final restoration. Land agents assigned to the project will work closely with landowners to negotiate agreements and will be responsive to issues that may arise during the course of the project.

Environmental data collected to date includes information on soils, land use, wetland and waterbody crossings, protected species, and cultural resources. Enbridge will continue to work with appropriate regulatory agencies and will continue to gather comprehensive information during the permitting process.

##### B.1.b Ongoing Pipeline Operation

The pipeline is a permanent, ongoing system; as such, Enbridge has a continuing commitment to conduct its operations in an environmentally responsible manner. Substantial, continual effort is placed on pipeline integrity, operational safeguards, emergency response, and landowner relationships, all of which reduce the impact of the pipeline to the environment. The Company also has an internal environmental staff responsible for monitoring compliance with environmental regulations, Company policy,

and a review program is in place to ensure policies and procedures are effective and compliant. Additional discussion on operations and safety is provided in section B.9.c.

#### B.1.c Energy Conservation Considerations

The completion of the LSr Project will result in an additional pipeline on the Enbridge system. The total crude petroleum throughput increase is expected to be proportionately higher than the energy usage (actual kilowatts per hour) increase.

Energy conservation is a major concern at Enbridge since energy/power costs represent the largest single recurring expense in pipeline operation. Attention is continually being directed toward energy conservation.

Enbridge has an Energy Management Department, which is responsible for negotiating contracts and allocating power to assure economical and efficient use of power for Enbridge. This department is continuously reviewing and tracking firm and non-firm power requirements, and works closely with electrical utilities in planning for transmission and generation needs.

Enbridge's energy conservation goal is to minimize power/energy unit costs, through the implementation of internal programs directed at continuous improvement of energy utilization efficiency.

Enbridge has considered several energy efficiency and conservation programs. The following provides a brief explanation of the programs reviewed during the project development phase:

##### Pipeline Diameter

Utilization of larger pipeline diameters reduces fluid velocities, resulting in reduced hydraulic line loss due to friction. Enbridge prefers to minimize the line losses ultimately reducing the overall operating cost. This, however, must be balanced with the project capital cost (funded by the shippers through rates) and batch quality degradation associated with lower fluid velocities.

##### Variable Frequency Drives (VFD's)

The installation of variable frequency induction motor drives is a program that has been in place for approximately 16 years. VFD's allow the pipeline operator to vary the pump rotation speed thereby controlling the pressure produced to match the desired flow rate. This eliminates the need to dissipate or waste pressure (energy) with pressure control valves (PCV's). VFD's, however, do introduce energy losses and therefore are considered only when there is a range of operating conditions (primarily flow rate, density and viscosity) that would often require dissipation of pressures produced by the pumps. Ideally if operating conditions were constant, the pump would deliver constant pressures eliminating the need for pressure dissipation. Therefore, operating conditions play a key role in designing the pumping stations for optimum efficiency.

### Pipeline Control Center

Enbridge pipeline control operators are trained in applied hydraulics and pipeline control through the use of a computerized pipeline control simulation system. They are trained to operate the pipeline at a natural flow rate using efficient combinations of pumps, thereby minimizing energy consumption. Operators have the capability to start and stop pumps and monitor pipeline operating conditions to assist in achieving an energy efficient operation.

### Energy Efficient Pumps and Motors

For new installations, Enbridge purchases high efficiency pumps and motors at a premium initial cost in an effort to conserve long range energy requirements. Specifically, a high polish is used on the pump impeller, and motors are custom designed for high efficiency. For example, a fully loaded 2,500 horsepower pump and motor unit, operating 300 days per year at 80% efficiency will consume 17 million kilowatt hours (kWh) of energy annually and sets a demand of 2,331 kW. Increasing the efficiency by only 1% translates into 170,000 kWh of energy savings. With this substantial potential for energy savings, it is desirable to optimize efficiency. Pumps are hydraulically designed and selected to obtain a high best efficiency point (BEP) at the desired flow rates. The forecasts are continually being evaluated and if the flow rate is outside the BEP range, impeller changes are typically implemented for improved efficiency.

### Electric Service Agreements

A unique electric service agreement was negotiated with Otter Tail Power. The contract structure motivates Enbridge to apply its unique load to maximize its use of non-firm energy. This minimizes the amount of firm capacity required to serve Enbridge's needs which reduces the amount of generation Otter Tail Power must build. The contract energy structure aligns with tariff "Time of Use" energy rates and motivates pipeline operators to consume more off-peak energy to further maximize the use of existing utility generation.

### Drag Reducing Agents (DRA)

Injections of DRA have been considered for use within the Enbridge system for over 11 years. Injection of DRA reduces flow turbulence of liquid hydrocarbons which results in reduced pressure loss between stations. This allows a high flow rate (increased throughput) at the same operating pressure, or a decrease in operating pressure while maintaining flow rate. These two scenarios allow increased throughput or decreased power use. The flexibility furthers opportunities to shift power use to improve economics or accommodate the utilities. In these cases, the economic benefits realized with the implementation of the DRA program have outweighed the material cost of the DRA. As a result, lower unit energy costs and greater efficiency have occurred.

In addition, during high throughput periods, 23% of our power is supplied on a non-firm basis which has reduced utility needs to add generation and transmission. Overall utility load factors and utilization of assets have improved, benefiting all regional electric customers.

Enbridge has received Conservation Improvement Program (CIP) funds from both Minnesota Power and Otter Tail Power. The funds were associated with Enbridge's Terrace III pipeline expansion project and were used for increasing system efficiency through the addition of large pipeline segments.

Other energy efficiency programs being investigated for future implementation include:

- Enhancements to the pipeline control system to allow further energy use optimization;
- Coordination of our energy use between utilities for mutual benefit; and
- Replace selected pump wear rings with new geometrically optimized pump wear rings to improve pump efficiency.

**B.2. DISCUSS THE FACTORS LISTED IN SECTION 49-22-09 NDCC TO AID THE COMMISSION'S EVALUATION OF THE PROPOSED PIPELINE ROUTE**

Factors which the North Dakota Public Service Commission (NDPSC or Commission) considers in evaluating the designation of corridors and routes include the following:

B.2.a Available Research and Investigations Relating to the Effects of the Location, Construction, and Operation of the Proposed Facility on Public Health and Welfare, Natural Resources, and the Environment

A discussion of the effects of the location, construction, and operation of the proposed pipeline on public health and welfare, natural resources, and the environment is included in section B.4. Research and investigation relating to these effects have included thorough cultural resource reviews, protected species and sensitive area reviews, and a field wetland delineation study conducted during the 1998 Lakehead (Enbridge) Terrace I Project.

B.2.b The Effects of New Energy Conversion and Transmission Technologies and Systems Designed to Minimize Adverse Environmental Effects

The Project does not include new energy conversion or transmission technologies that are expressly designed to minimize adverse environmental effects. As described in Enbridge's Environmental Mitigation Plan (EMP), current construction techniques and mitigation measures will be employed to minimize the effect of construction on environmental resources. Enbridge's EMP is provided as Appendix A. These measures are also discussed in sections B.6 and B.9.

B.2.c The Potential for Beneficial Uses of Waste Energy from a Proposed Energy Conversion Facility

The Project does not involve new energy conversion facilities; no usable waste energy will result from the Project.

B.2.d Adverse Direct and Indirect Environmental Effects, Which Cannot be Avoided Should the Proposed Site or Route be Designated

Unavoidable adverse direct and indirect environmental effects may include short-term or temporary effects on vegetation, wildlife, agricultural operations, transportation, and noise levels as described in section B.4. Additionally, Enbridge will implement thorough mitigation measures to minimize these impacts as described in section B.6 and in Enbridge's EMP (see Appendix A).

B.2.e Alternatives to the Proposed Site, Corridor or Route, Which are Developed During the Hearing Process and Which Minimize Adverse Effects

Enbridge has operated an existing pipeline system in North Dakota since the 1950s. This pipeline corridor provides an established, direct route between Cromer, Manitoba and Clearbrook, Minnesota, and was originally selected to avoid or minimize environmental and socioeconomic impact. Use of this existing corridor takes advantage of Enbridge's existing right-of-way, and mostly or in large part precluding the establishment of new permanent right-of-way and new severance on properties. No other corridor will offer these advantages over the proposed pipeline route. Enbridge has evaluated and developed a proposed pipeline alignment to further minimize environmental impact. That route is described in section B.3.

B.2.f Irreversible and Irretrievable Commitments of Natural Resources Should the Proposed Site, Corridor or Route be Designated

Enbridge is installing the pipeline within an existing previously disturbed corridor and, therefore, minimal irreversible or irretrievable commitments of natural resources will result from the Project.

B.2.g The Direct and Indirect Economic Impacts of the Proposed Facility

B.2.g.(1) The LSr Project presents an optimization of new and existing pipeline capacity to meet the needs for additional liquid petroleum transportation to this region.

As presented in section C.2 of Enbridge's Application for Corridor Certificate, which provides a description of feasible alternatives, projects considered for meeting these transportation needs can be classified as follows:

1. Optimize existing pipelines without addition of new pipelines.
2. Construct new pipe in connection with existing pipelines through existing routes (Enbridge's route).
3. Construct an entirely new pipeline.

4. Utilize alternative modes of transportation other than pipelines.

During the initial design of the LSr Project, all but two of these options were rejected as not feasible and/or uneconomical. Enbridge's current proposal represents an optimal use of new and existing pipelines on an existing route. Enbridge's shippers support Enbridge's proposal to be an appropriate economical response to the need for additional capacity.

B.2.g.(2) The LSr Project has significant economic benefits.

Currently, the Enbridge System supplies approximately 71 percent of Minnesota refinery capacity, 100 percent of Wisconsin refinery petroleum supply, and 62 percent of Greater Chicago refinery supply. The LSr Project will meet the increased demands of these and other markets with a reliable North American crude supply. The stable supply of petroleum to the region supports a healthy economic environment throughout the entire Upper Midwest.

Enbridge's current property taxes in North Dakota are \$500,000. The total assessed value resulting from the project will increase the estimated property taxes in Pembina County by about \$800,000. An indirect economic benefit to North Dakota is that through the expansion of the Enbridge system, growing supplies of Canadian crude oil will have increased access to pipeline transport east of Alberta into the Midwest. This, in turn, lessens the pressure to transport petroleum south of Alberta and worsen the over-supply at the Guernsey, Wyoming hub; a market condition that has resulted in discounts to northern Rockies producers.

The cost of the LSr Project in North Dakota and Minnesota will be approximately \$157 million (\$31.5 million in North Dakota alone). For the entire project, over 1,000 construction workers will be hired from pipeline contractors, equipment contractors, suppliers, and regional testing firms. Forty to fifty percent of the labor force is expected to be hired from the regional labor pool. In addition, environmental consultants and safety, environmental, and construction inspectors will also be employed during the project. During the months of preparation, construction, and testing, these workers will have a significant positive economic impact (e.g., payroll tax, local expenditures, sales tax) on Pembina County.

Pipe and other materials for the expansion are all expected to be from U.S. and North American suppliers. Much of the materials and equipment needed for construction, including welding supplies, heavy equipment, electrical components, and building materials will be supplied from this region. Although no permanent jobs are expected to be created by this expansion, the short-term positive effects of the construction activities on the region are significant.

B.2.g.(3) Enbridge is solely a transportation company.

Enbridge owns and operates a non-shipper-owned liquid hydrocarbon pipeline facility. Enbridge does not own any of the crude petroleum or natural gas liquids transported in its pipeline system. Enbridge does not determine markets or destinations for petroleum commodities. Enbridge's business activity is to provide a service which is available to anyone tendering commodities for transportation pursuant to tariffs published and on file

with the FERC and in accordance with their rules and regulations and the Interstate Commerce Act. Enbridge attempts to anticipate the need for additional pipeline capacity by relying upon forecasts for throughput generated by shippers on the system.

B.2.h Existing Plans of the State, Local Government, and Private Entities for Other Developments at or in the Vicinity of the Proposed Site, Corridor, or Route

Enbridge is not aware of other development by state, local or governmental entities at or in the vicinity of the proposed project corridor. Enbridge is currently planning an additional petroleum pipeline project, commercially referred to as the Alberta Clipper Project, which will result in the construction of a new 36-inch-diameter, buried petroleum pipeline within or adjacent to the existing Enbridge corridor. Enbridge will be applying to the NDPSA under separate cover for authorization for this facility in May 2007.

Enbridge is aware of another proposed petroleum transmission system, the Keystone Pipeline, which is planned to be located west of the existing Enbridge pipeline corridor in western Pembina County, North Dakota. The proposed Keystone Pipeline Project does not relate to or otherwise affect the routing, construction or operation of the LSr Project.

B.2.i The Effect of the Proposed Site or Route on Existing Scenic Areas, Historic Sites and Structures, and Paleontological or Archaeological Sites

Enbridge has reviewed existing site file data maintained by the State Historical Society of North Dakota, North Dakota State Historic Preservation Office (SHPO) to determine if any portion of the proposed pipeline route was surveyed previously for cultural resources. A total of six previous archaeological studies have been completed that directly relate to the proposed pipeline route. The entire Enbridge pipeline corridor between Neche, North Dakota and Clearbrook, Minnesota was surveyed as part of the 1994 Capacity Expansion Project (North Dakota SHPO No. 94-200). In 1998, portions of the previous survey corridor were included in a project named Terrace I or Terrace Expansion. The Terrace I project did not extend beyond the survey corridor for the 1994 Capacity Expansion and, therefore, no additional archaeological investigations were required for Terrace I.

Enbridge also reviewed the North Dakota SHPO's site files to identify previously recorded cultural resources within the proposed construction right-of-way. This review identified one archaeological site (32PB132) in North Dakota, a historic ox-cart trail referred to as Angle Road, which has been determined eligible for nomination to the National Register of Historic Places. The route will cross this feature. Enbridge has previously avoided impacts to this site by using conventional boring construction methods and plans to bore the Angle Road for the LSr Project as well; therefore the project is not anticipated to impact this site. Enbridge will be coordinating this crossing with the North Dakota SHPO.

B.2.j The Effect of the Proposed Route on Areas Which Are Unique Because of Biological Wealth or Because They are Habitats for Rare and Endangered Species

Enbridge has initiated consultations with the North Dakota Game and Fish Department (NDGFD) and the U.S. Fish and Wildlife Service (FWS) to identify known occurrences of federally listed threatened or endangered species, state-listed protected species, or critical habitat (unique biological areas or habitat) located on or near the proposed

pipeline route. Copies of correspondence from these consultations are included in Appendix C.

The NDGFD did not identify any state-listed protected species or unique biological areas within the project area. The NDGFD identified the Pembina and Tongue Rivers as Class III fisheries and the Red River of the North as a Class I fishery. The NDGFD recommended that Enbridge consider boring techniques for crossing these rivers to minimize impacts on the waterbodies. Enbridge is currently evaluating waterbody crossing methods for these waterbodies and will coordinate with the NDGFD regarding feasible waterbody crossing techniques at these locations.

The FWS identified two federally listed species, the bald eagle and the gray wolf, as potentially occurring within the vicinity of the proposed pipeline route. No recommendations to avoid or minimize impacts to these species were identified. Additionally, the FWS provided recommendations to minimize environmental effects of waterbody and wetland crossings.

The FWS also identified one parcel owned in fee by the FWS that will be crossed by the proposed pipeline route. That fee-owned parcel is located approximately at milepost (MP) 791.4 and is referred to as the Juhl National Wildlife Management Area (Juhl WMA), and is crossed by the existing Enbridge pipelines in the corridor. Enbridge has reviewed this crossing and determined that it is possible to avoid the Juhl WMA by making a slight route deviation within Enbridge's existing corridor. Therefore, Enbridge is proposing a route that avoids this parcel.

#### B.2.k Problems Raised by Federal Agencies, Other State Agencies, and Local Entities

No problems or concerns other than those identified in section B.2.j have been raised by commenters or identified by Enbridge.

### **B.3. IDENTIFY AND MAP CRITERIA LEADING TO PROPOSED PIPELINE ROUTE LOCATION WITHIN CORRIDOR**

The following criteria, which include but are not limited to the criteria required by North Dakota Administrative Code (North Dakota Rules) Chapter 69-06-08-02, were considered in evaluating the location of the proposed pipeline route: Exclusion and Avoidance Areas, Selection and Policy Criteria, Design and Construction Limitation, Economic Considerations, Human Environment, Soils, Vegetation/Wildlife, Land Use, Water Resources, and Cultural Resources. Detailed discussions of these criteria, including descriptions, potential impacts, and mitigation measures where appropriate are provided in sections B.4, B.5, and B.6. The pipeline route will cross or is in close proximity to three types of Avoidance Areas, the Juhl WMA at about MP 791.4), three rural residences within 500 feet of the proposed pipeline route, and Angle Road at MP 786.3, an Area of Historic, Archaeological, or Paleontological Significance. As described in section B.2.i, Enbridge intends to avoid the Angle Road historic site by using conventional boring construction methods. As described in B.2.j, Enbridge is proposing a route that avoids crossing the Juhl National Wildlife Management Area.

**B.4. RELATIVE VALUE AND EFFECTS UPON EACH CRITERION INCLUDING LOCATION, CONSTRUCTION, AND OPERATION OF THE FACILITY**

In accordance with North Dakota Rules Chapter 69-06-08-02, the proposed pipeline route has been situated after consideration of its impact on humans and the environment. Adverse effects of construction of the proposed pipeline are substantially minimized by using the existing Enbridge right-of-way. Alternative routes or options, which are discussed in section C.2 of the Application for Corridor Certificate, are not preferable and will typically result in more significant human and environmental impacts.

Underground pipeline installation minimizes potential impacts on human or animal welfare and aesthetics. Construction of the new pipeline will cause temporary disruption to the environment, but will not result in long-term changes to the environment. The following is a general analysis of the existing human and natural environment along the pipeline route and the potential impacts of pipeline right-of-way preparation, construction practices, and operation and maintenance procedures.

B.4.a Exclusion and Avoidance Areas (North Dakota Rules Chapter 69-06-08-02.1 and 69-06-08-02.2)

The NDPSC has identified certain sensitive or otherwise important environmental features that must be considered during the selection of a route for transmission facilities. These features have been classified as either "Exclusion Areas" or "Avoidance Areas." As defined in North Dakota Rules Chapter 69-06-08-02.1 and 69-06-08-02.2, Exclusion Areas are areas that are to be excluded from consideration for energy conversion sites and transmission facility routes. Avoidance Areas are areas not to be considered in the routing of a transmission facility unless it is shown that, under the circumstances, there are no reasonable alternatives. In 1978, the NDPSC published the Inventory of Exclusion and Avoidance areas for the Siting of Energy Conversion and Transmission Facilities, which lists these areas for each county in North Dakota (see table 1). Enbridge has confirmed with NDPSC staff that no new types of Exclusion or Avoidance Areas have been added to the inventory to date.

Appendix D contains maps depicting Exclusion and Avoidance Areas within a one mile study corridor centered on the proposed pipeline route.

TABLE 1

**North Dakota Public Service Commission Exclusion and Avoidance Areas – Transmission Facility Siting**

Avoidance and Exclusion Area	Category	Crossed By Route	Administering Agency
National Memorial Parks	Exclusion	No	National Park Service (NPS)
National Historic Sites and Landmarks	Exclusion	No	NPS
National Natural Landmarks	Exclusion	No	NPS
National Wilderness Areas	Exclusion	No	NPS and U.S. Forest Service (FS)
National Parks	Exclusion	No	NPS
National Monuments	Exclusion	No	NPS and State Historical Society
State Parks	Exclusion	No	State Park Service
State Historic Sites	Exclusion	No	State Historical Board
State Historical Markers	Exclusion	No	State Historical Board
State Archaeological Sites	Exclusion	No	State Historical Board
State Monuments	Exclusion	No	State Historical Society
State Nature Preserves	Exclusion	No	State Park Service
Areas Critical to the Life Stages of Threatened or Endangered Animal or Plant Species	Exclusion	No	U.S. Fish and Wildlife Service (FWS)
Areas Where Animal or Plant Species Unique or Rare in the State Would be Irreversibly Damaged	Exclusion	No	Various
County Parks and Recreation Areas, Municipal Parks, and Parks under other Governmental Jurisdiction	Exclusion	No	Various
National Wildlife Areas	Avoidance	No	FWS
National Wildlife Refuges	Avoidance	No	FWS
National Grasslands	Avoidance	No	FS
National Historic Districts	Avoidance	No	State Historic Society
National Wild, Scenic or Recreational Rivers	Avoidance	No	Heritage Conservation Recreation Service, State Outdoor Recreation Agency
State Wild, Scenic or Recreational Rivers	Avoidance	No	State of North Dakota Legislative Assembly
State Game Refuges	Avoidance	No	North Dakota Game and Fish Department
State Game Management and Management Areas	Avoidance	No	North Dakota Game and Fish Department
State Forests	Avoidance	No	State Forest Service
State Forest Management Lands	Avoidance	No	State Forest Service
State Grasslands	Avoidance	No	State Park Service
Irrigated Land	Avoidance	No	State Water Commission
Areas of Historic, Archaeological or Paleontological Significance	Avoidance	Yes	State and County Historical Society
Areas of Recreational Significance	Avoidance	No	Various
Reservoirs	Avoidance	No	U.S. Army Corps of Engineers and State Water Resource Commission
Municipal Water Supplies	Avoidance	No	State Water Resource Commission
Water Sources for Organized Rural Water Districts	Avoidance	No	State Water Commission
Areas which are Geologically Unstable	Avoidance	No	State Geologist Geological Survey
Within 500 Feet of a Residence, School, or Place of Business	Avoidance	Yes (see table 2)	Landowner

**B.4.a.(1) Juhl National Wildlife Management Area.**

The Juhl WMA was identified during Enbridge's environmental analysis of the pipeline route. National WMAs are Avoidance Areas as identified in the NDPSC's 1978 inventory. The existing Enbridge pipeline route will cross the extreme southwest corner of the Juhl WMA in the Northwest ¼ of Section 32, Township 162 North, Range 51 West. If Enbridge were to construct the LSr Project within its existing right-of-way, a Special Use permit or amendment to an existing permit would be required from the FWS prior to construction.

Enbridge has reviewed its existing system route and is proposing a modified route that avoids the Juhl WMA but remains within the Enbridge corridor. Because the potential crossing of the Juhl WMA using the existing pipeline route is minimal, a minor route modification enables Enbridge to construct the LSr Project in close proximity to the other existing pipelines currently operated by Enbridge through this area while avoiding this Avoidance Area. Finally, the cover type associated with this area is predominantly coarse grass interspersed with wetland. Project-related impacts on this type of vegetative cover will be temporary and short-term.

**B.4.a.(2) Areas of Historic, Archaeological, or Paleontological Significance.**

The proposed pipeline route will cross one area of Historic, Archaeological, or Paleontological Significance, an historic ox-cart trail referred to as Angle Road. This feature is located on Enbridge's existing right-of-way and Enbridge has previously avoided this feature by using conventional boring crossing methods at this location. Enbridge again plans to bore Angle Road, therefore the project is not anticipated to impact this site.

**B.4.a.(3) Areas within 500 feet of Farmhouse, Rural Residence, or Place of Business.**

The proposed pipeline route will pass near three farmhouses or rural residences. Table 2 provides the milepost and distance from the proposed pipeline route for each residence. No places of business or schools were identified within 500 feet of the proposed pipeline route.

TABLE 2		
Rural Residences Within 500 Feet of the LSr Project Pipeline Route		
Structure	Nearest Milepost	Approximate Distance from Pipeline (feet)
Residence	781.1	>100
Residence and Structures	788.5	>100
Residence and Structures	795.3	250

No residences or other occupied structures will be razed due to construction, nor will future residential development be precluded following completion of the pipeline, except as required by state and/or local setback ordinances and easement restrictions. Construction could temporarily restrict access to residences along the pipeline route. Where this potential exists, Enbridge will either limit the time such restrictions are in place or will make arrangements to accommodate the landowner's needs.

During construction, residences in close proximity to construction activities will be exposed to short-term increases in construction-related noise and dust. Some minor dust emissions are inevitable in any construction project; however, if excessive, the construction right-of-way and access roads near residential areas will be watered down to control dust during construction. After construction is completed, measures to stabilize and revegetate the right-of-way promptly will prevent further dust emissions.

The heavy construction equipment needed to install the pipeline will generate unavoidable short-term increases in ambient noise levels. Increases in ambient noise levels due to equipment operation will be limited to the period of construction and will generally be limited to daylight hours. No noise will be generated along the right-of-way during normal operation of the proposed pipeline.

Although rural residences within 500 feet of the pipeline route are considered Avoidance Areas, Enbridge believes there is no reasonable alternative to avoid them. Disturbance of these areas will be temporary and short-term; long-term incremental impacts will be minimal. As previously noted, the proposed pipeline route is preferable to establishing a new route. A new route could possibly avoid these areas, but will likely result in greater environmental impacts and increase the number of affected landowners.

#### B.4.b Selection Criteria (North Dakota Rules Chapter 69-06-08-02.3)

State of North Dakota Rules specify several selection criteria to be considered in designating a pipeline corridor or route. Specifically, the NDPSC considers whether adverse effects from the location, construction, and maintenance of the facility as they relate to these criteria, will be at an acceptable minimum, and whether these effects will be managed and maintained at an acceptable minimum. Potential impacts, as they relate to each of the selection criteria, are discussed below. Measures Enbridge will implement to minimize these impacts are noted below and discussed in greater detail in section B.6.

##### B.4.b.(1) Impact on Agriculture.

The Project will be installed within or adjacent to Enbridge's existing pipeline right-of-way in Pembina County in northeastern North Dakota. The vast majority of the pipeline route will cross agricultural lands where crop production is the predominant economic activity. Principal crops include wheat, sugar beets, grain, corn, canola, and alfalfa.

#### Agricultural Production

The project will have only a temporary effect on agricultural land use. Current construction practices and the measures described in Enbridge's EMP (see Appendix A) have significantly reduced or avoided long-term impacts on crop production previously associated with underground utility installations. The effectiveness of these practices was observed by NDPSC staff during previous Enbridge construction projects.

The proposed pipeline will be buried deeper than typical tillage depth and at a depth comparable with other pipelines within the existing easement. Therefore, the pipeline will not interfere with normal agricultural operations on cropland after construction is complete. Above-ground facilities that may be located on cropland are limited to pipeline

appurtenances such as valves, line markers, and cathodic protection rectifiers. Therefore, minimal long-term loss of farmland use is expected.

Approximately 69 percent (234.0 acres) of the pipeline route will cross prime farmlands as classified by the Natural Resources Conservation Service (NRCS) (see table 7). This total includes prime farmland and land that would be considered prime farmland if drained. Prime farmland is defined as land with the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Prime farmland has the soil quality, growing season, and moisture supply needed to economically produce sustained high yield crops when treated and managed according to acceptable farming methods. Construction activities will not significantly affect the factors such as soil quality, growing season, or moisture supply that are considered in determining whether land is prime farmland.

Following construction, agricultural lands will be returned to preconstruction uses to the maximum extent practicable.

#### Family Farms and Ranches

The construction of the Project will not cause changes in patterns of land ownership or long-term disruptions of family farming operations. The Project will be constructed in large part or mostly on existing right-of-way and adjacent to other existing Enbridge pipelines. Payments made in connection with easements will directly benefit landowners along the route. Enbridge's crop loss compensation program will offset the temporary financial losses resulting from pipeline construction. Enbridge will also compensate landowners if future pipeline maintenance and repair activities result in crop damage. Wherever practicable, maintenance equipment will be confined to access routes agreed upon with the landowner to minimize soil compaction, drainage alteration, and damage to crops.

Pipeline construction can result in short-term disruption to livestock operations, and general inconvenience to farm activities. Potential impacts include the possible removal of or damage to fences and gates and possible disruption of private road use. Enbridge will minimize these inconveniences by limiting the length of time that the trench is open and generally working to confine construction activities such that attendant disruptions are kept to a minimum. Where appropriate, Enbridge will maintain temporary access ways across the trench as necessary to allow the passage livestock, farm equipment, or people, and will erect temporary fences (including gates) as necessary to contain and protect livestock from construction-related hazards. Construction activities are conducted sequentially, with the least possible amount of time between each task. After completing construction, fences and gates will be repaired or replaced to each landowner's reasonable satisfaction.

#### Lands Suitable for Irrigation

Construction of the Project will not impact irrigated lands. Land that is best suited for irrigation is relatively level and has soils that are well drained and highly permeable. The route crosses silt and clay soils which are poorly drained and have low permeability, making them unsuitable for irrigated agriculture. No aboveground irrigation systems have been identified along the route.

### Surface Drainage Patterns

Construction of the Project will not alter surface drainage patterns. Streams, swales, ditches, and other natural drains will be restored to preconstruction contours after construction. The pipe will be installed beneath drainage ditches in a manner that will not interfere with flow or future maintenance efforts by landowners or the drainage authority. Mitigation measures will include installation of the pipe at a sufficient depth to avoid being encountered by drain cleaning equipment, or installing concrete slabs above the pipe but below the grade of the ditch.

### Groundwater Flow Patterns

Groundwater flow could potentially be altered by pipeline construction through blasting and trenching activities. As described in section B.4.g, no exposed bedrock or areas of shallow bedrock will be encountered. Therefore, blasting is not anticipated. Other construction-related disturbance and excavation (trenching) could temporarily disturb the level of groundwater and increase the sediment in the groundwater. Because no surficial aquifers are crossed by the pipeline route, the effect of trenching on groundwater flow or quality is anticipated to be minimal. Given the low permeability of the soils crossed by the route, dewatering activities, if necessary, are not expected to have a significant effect on regional groundwater flow patterns.

The use of regulated materials, such as fuel, lubricants, and coolants during construction could present a potential for accidental discharges, which could affect groundwater. Enbridge's EMP (Appendix A) and Spill Prevention, Containment, and Control Plan (SPCC Plan) (Appendix B) describe preventative measures Enbridge will implement to prevent accidental discharges of fuels or other hazardous substances. The SPCC Plan also describes spill response, containment and clean-up procedures in the event a spill occurs. With the implementation of these protective measures, contamination of groundwater due to construction activities is not anticipated. A description of Enbridge's pipeline protection and emergency response procedures for pipeline operations and maintenance is provided in section B.9.c.

#### B.4.b.(2) Impact of Noise Sensitive Land Uses.

Five farmsteads with houses and structures are located within 500 feet of the right-of-way (see table 2). No other sensitive noise receptors such as schools or hospitals are located in the vicinity of the project. During construction, residences in close proximity to the construction spread will experience short-term increases in construction-related noise. The heavy construction equipment needed to construct the pipeline will generate short-term increases in ambient noise levels. Typical bulldozers, backhoes, and side booms used to install large-diameter pipelines generate between 80 to 90 decibels within 50 feet of the equipment. Increases in ambient noise levels due to heavy equipment operation will be limited to the period of construction, typically during daylight hours only.

No noise is generated along the right-of-way during normal operation of the pipeline. The existing pumping station at Joliette, North Dakota generates noise in the immediate vicinity of the facility. Noise levels at the fenced boundary of the station site average approximately 40 to 60 decibels. No additional pump stations or noise increases at the existing pump station are proposed as part of the project in North Dakota.

**B.4.b.(3) Impact on Visual Effect on the Adjacent Area.**

The only aboveground facilities that will be constructed in North Dakota as part of the Project are pipeline appurtenances such as mainline valves, line markers, and cathodic protection equipment. Mainline valves will be sited at existing aboveground facility sites. Other than these permanent above ground facilities, the Project will result in only short-term visual effects related to construction activities.

**B.4.b.(4) Impact on Extractive and Storage Resources.**

No extractive or storage resources will be affected by the Project.

**B.4.b.(5) Impact on Wetlands.**

The route crosses 28 wetlands totaling approximately 1.27 miles in length. Wetland crossings by milepost are described in table 3 below.

Milepost In	Milepost Out	Crossing Length (Feet)	Wetland Type <sup>b</sup>
774.99	775.01	113	PEM
775.24	775.29	221	PEM
775.37	775.41	214	PEM
775.48	775.49	90	PFO
775.55	775.57	98	R2U
790.73	790.75	115	PEM
790.76	790.79	187	PEM
790.79	790.92	651	PAB
790.92	790.99	382	PEM
790.99	791.04	269	PEM
791.04	791.08	199	PEM
791.08	791.10	111	PEM
791.10	791.16	313	PEM
791.16	791.20	248	PEM
791.20	791.31	540	PEM
791.31	791.32	74	PEM
791.32	791.46	709	PEM
791.46	791.50	221	PEM
792.35	792.39	173	PEM
792.43	792.44	78	PEM
792.57	792.67	515	PEM
795.13	795.16	137	PEM
795.13	795.16	137	PEM
797.65	797.69	239	PEM
799.52	799.55	137	PEM
800.36	800.38	107	PEM
801.67	801.72	238	PEM
801.72	801.76	205	R2U

TABLE 3 National Wetland Inventory Wetland Types Crossed by the LSR Pipeline Route <sup>a</sup>			
Milepost In	Milepost Out	Crossing Length (Feet)	Wetland Type <sup>b</sup>
		6,721	
<sup>a</sup> Data Source: National Wetlands Inventory, <a href="http://www.fws.gov/nwi/">http://www.fws.gov/nwi/</a> . <sup>b</sup> Wetland Types based on Cowardin et al. wetland classification system, 1979.			

Pipeline construction in wetlands will be conducted in accordance with applicable regulatory requirements and the measures specified in Enbridge's EMP. No wetlands will be permanently drained or filled as part of the project, and effects on wetlands are expected to be short-term and minor.

In unsaturated wetlands, topsoil will be segregated from the trench line during construction to preserve natural sources of seed and rootstock. During trenching, water quality of inundated wetlands adjacent to the construction area could be temporarily affected due to the suspension of sediments and organic matter. Silt fence or straw bales will be installed as needed to minimize this effect. Although wetland vegetation will be cleared for pipeline construction, these areas will be allowed to revegetate to their preconstruction structure and function. After the trench is backfilled, the topsoil will be replaced to facilitate the natural revegetation process in unsaturated wetlands.

Unsaturated wetlands will be seeded with annual rye to provide stabilization of the soil until natural revegetation occurs. The long-term operation and maintenance of the pipeline will not have adverse effects on wetland function or value.

#### B.4.b(6) Impact on Woodlands and Wooded Areas.

The route crosses scattered windrows and approximately 0.2 mile of wooded areas, primarily gallery forests associated with the crossings of the Pembina and Tongue Rivers.

Enbridge's existing permanent right-of-way is maintained in an herbaceous state to facilitate aerial patrol and access to the pipeline for maintenance. The Project will cross the Pembina River on the north side of the existing right-of-way to minimize environmental impacts during construction and operation of the proposed pipeline. Incremental clearing will be necessary at the Pembina River crossing to accommodate this route. At the Tongue River, the Project route deviates approximately 500 feet south and west of the existing maintained right-of-way. This route deviation minimizes environmental impacts to the Tongue River at the crossing location but will result in new clearing at the crossing location. The NDGFD has requested that Enbridge minimize loss of woody vegetation, therefore woody vegetation greater than 3 inches depth-breast-height will be replaced on a 2:1 basis.

Where additional temporary construction right-of-way or extra workspace beyond the permanent right-of-way is required, it may be necessary to clear some additional mature trees. These additional workspaces will be allowed to revert to woodlands following construction. Consequently, impacts on woodlands and wooded areas due to additional temporary workspace will not result in long-term changes in existing cover types.

Enbridge will work with appropriate state agencies to identify appropriate revegetation measures.

**B.4.b.(7) Impact on Radio and Television Reception, and Other Communication of Electronic Control Facilities.**

No impacts on television or radio reception or communication or electronic control facilities are anticipated as a result of the project.

**B.4.b.(8) Impact on Human Health and Human Safety.**

Enbridge has operated in the United States since 1950, when the first pipeline (then named Lakehead Pipe Line Company, Inc.) from Alberta to Superior, Wisconsin was completed. Since that time, pipelines have been extended across the Upper Peninsula of Michigan to eastern Canada and in 1968 and 1998 Enbridge extended its system to Chicago where the pipeline system now extends further east and south. By building and operating this extensive network, Enbridge is one of the largest pipeline companies in North America and experienced in managing construction and operating pipeline systems that protect the public's health and safety.

Causes of and Prevention of Accidents on Pipelines

The major causes of pipeline leaks in the United States are corrosion (both internal and external), excavation damage, pipe or weld failure, incorrect operations or natural causes (e.g. floods or outside force). To prevent these categories of failures, Enbridge will construct and maintain the LSr Pipeline to meet or exceed industry and governmental requirements and standards. Specifically the steel pipe will meet U.S. Department of Transportation (USDOT), Pipeline and Hazardous Material Safety Administration (PHMSA) federal codes under 49 CFR Part 195, follow standards issued by the American Society of Mechanical Engineers, National Association for Corrosion Engineers and American Petroleum Institute (API). As a safety factor, the proposed LSr Pipeline is designed to withstand pressures over and above its normal operating pressures and will operate according to codes and regulations. All pipe is inspected and integrity-tested at the factory and transported per the highest technical standards. All of the pipe will be manufactured with fusion-bonded epoxy coating to protect against corrosion. The actual installation of the pipeline and all construction and testing records will be subject to regulatory inspection, including by PHMSA inspectors. PHMSA also conducts regularly scheduled field inspections of the pipeline facilities to ensure compliance with federal regulatory requirements, including the integrity testing of the pipeline through the use of internal inspection devices.

Once installed, the pipeline will be subjected to careful testing to verify its integrity and compliance with specifications. Such testing will include checking coating integrity, examining by X-ray 100% of field welds (over and above the 10% required by regulations), internally inspecting the entire length of each line by using an in-line inspection tool known as a caliper pig, and hydrostatically testing the line to qualify the maximum allowable operating pressure. The pipeline will be placed into service only after inspection to verify compliance with all construction standards and requirements are met.

This new pipeline, as well as the existing pipelines in this same right-of-way, are maintained and inspected according to PHMSA regulations, industry codes and prudent pipeline operating techniques. All of Enbridge's mainline liquids pipelines are externally coated to resist corrosion, internally inspected at regular intervals using in-line inspection technology, and equipped with a cathodic-protection system to prevent external corrosion. Enbridge's cathodic protection system and internal inspection program were implemented prior to these techniques becoming a regulatory standard.

Enbridge Lakehead System's rights-of-way are patrolled and inspected by air at least every three weeks but not less than 26 times per year to watch for abnormal conditions or dangerous activities, e.g., unauthorized excavation, along the routes of the lines. Enbridge also conducts extensive public education and outreach programs that exceed industry (API Recommended Practice 1162) and federal (49 CFR 195.440) requirements concerning public awareness of pipelines and pipeline-safety matters. All Enbridge lines are marked with signage and warnings, per federal regulations, at road and highway crossings, railroad crossings, navigable rivers, and other locations to alert the public to the presence of underground lines and to provide information, contact numbers, and emergency data.

Pipeline workers and contractors performing critical tasks are qualified under OSHA safety standards and PHMSA "operator qualification" rules and are subjected to federal drug and alcohol testing requirements. Enbridge meets, and often exceeds, these requirements so that human error in construction and operation is avoided.

#### Baseline Transportation Accident Rates

Releases from interstate liquid petroleum pipelines are reportable to PHMSA as required by 49 CFR Part 195 Subpart B. Currently, the federal regulations require reporting of all releases greater than 5 gallons (and/or if other threshold reporting criteria are met), which becomes public record. In addition, Enbridge is required by North Dakota and Minnesota state rules to report releases to the North Dakota Department of Health and Minnesota Pollution Control Agency (MPCA).

There is no alternative mode of transportation or route to transport the equivalent daily volumes proposed by the Enbridge LSr Pipeline. However, it is illustrative to compare pipeline safety to other modes of transportation. Pipelines operate more safely than any other mode of oil transportation. In table 4, the numbers show how much more likely a transportation mode is to have an accident of a particular type compared to an oil pipeline. For example, truck accidents result in deaths at least 87 times more often than pipeline accidents. Likewise, truck accidents result in fires and/or explosions about 35 times more frequently per barrel of oil transported per mile. (These figures include only accidents involving petroleum shipments, not all accidents for a given transportation mode).

Method	Death	Fire/Explosion	Injury
Truck	87.3	34.7	2.3
Rail	2.7	8.6	0.1
Barge	0.2	4.0	3.6
Tank Ship	4.0	1.2	3.1

<sup>a</sup> Values less/more than 1.0 indicate risk of accident is lower/greater than pipeline transportation. Comparisons based on calculated rates per ton-mile.  
Source: Allegro Energy Group as posted on the Association of Oil Pipelines website: <http://www.aopl.org>

### Crude Oil Pipeline Accident Rates

An analysis of the historical record shows that the liquid petroleum pipeline industry's safety performance has improved significantly over the last 30 years. These improvements correlate with advancements in technology as well as increased environmental awareness. The annual number of spills has decreased by nearly 40%. Over the last 30 years, the number of spills has also dropped from an average of 318 in the first six years (1969 to 1974) to the most recent six year running average of 197 spills nationwide. The median size of a spill has greatly decreased. The annual volume of oil spilled from pipeline systems has fallen by about 60%, based on six year running averages (PHMSA website and Association of Oil Pipelines website).

### Enbridge Pipeline Incidents and Public Safety

According to available records or knowledge of staff, there have been no deaths or major injuries of landowners or members of the public as a direct result of a pipeline leak on the Enbridge Lakehead System since the system began operations in the U.S. in 1950 (previously named Lakehead Pipe Line Company, Inc. and Lakehead Pipeline, Limited Partnership).

### Enbridge Ten Year Pipeline Accident Record

Enbridge Energy, Limited Partnership's ten year pipeline accident record on the mainline pipe system is presented in table 5 below. Data excludes pipeline or facility leaks within Enbridge station or terminal properties.

Date	City	County	State	Milepost	Product Spilled b/	Volume Spilled (barrels)	Volume Recovered (barrels) c/	Primary Cause	Additional Detail/Notes
4/15/96		St. Louis	MN	1044.49	Crude	15.0	12.0	Failed Pipe	
9/16/98			MN	878.10	Crude	5,700	5,415	Outside Force Damage	Damage by Others
10/19/98			MN	878.10	NGL	950	0	Outside Force Damage	Damage by Others
1/16/99	Superior	Douglas	WI	1097.60	NGL	130	30	Corrosion	External
2/22/99			MN	834.50	Crude	400	385	Other	Loose Flange Bolts

**Table 5  
Mainline Pipeline Incidents – Enbridge (Lakehead) System a/**

Date	City	County	State	Milepost	Product Spilled b/	Volume Spilled (barrels)	Volume Recovered (barrels) c/	Primary Cause	Additional Detail/Notes
11/2/99			MI	1286.00	NGL	5,300	2,750	Outside Force Damage	Natural Forces
11/15/99		Taylor	WI	116.03	Crude	15	14	Other	Original Construction
2/7/00		Clearwater	MN	920.60	Crude	25	10	Failed Weld	
2/23/00		Cass	MN	957.10	Crude	10	5	Other	Pinhole Leak
5/9/00			MN	913.05	Crude	25	20	Other	Failed Repair
7/22/00		Clearwater	MN	914.10	Crude	50	10	Other	Sleeve Side Seam Weld Failed
1/25/01		Clearwater	MN	918.70	Crude	25	10	Other	Repair Sleeve Side Seam Weld Failed
3/4/01		Cass	MN	955.05	Crude	25	15	Failed Weld	Sleeve
7/4/02	Cohasset	Itasca	MN	1002.70	Crude	6,000	2,574	Material / Weld Failure	Pipe Seam Weld
1/24/03	Superior	Douglas	WI	1096.95	Crude	4,500	4,450	Material / Weld Failure	Terminal Leak d/
4/14/03	Trail	Polk	MN	892.95	Crude	125	75	Girth Weld	Pinhole Leak
2/19/04	Grand Rapids	Itasca	MN	1007.33	Crude	1,003	9	Natural Forces	Earth Movement
12/29/04	Juniata	Tuscola	MI	1677.50	HVL	1	1	Natural Forces	
1/14/05	Rio	Columbia	WI	268.82	Crude	3	3		
4/1/05	Carpentersville	McHenry	IL	379.16	Crude	5	5	Material / Weld Failure	Body of Pipe
12/22/05	Arpin	Wood	WI	182.30	Crude	0.1	0.1	Material / Weld Failure	
1/1/07	Owen	Clark	WI	149.17	Crude	1,500	1,450	Material / Weld Failure	Pipe Seam Weld
2/2/07	Exeland	Rusk	WI	84.9	Crude	3,000	2,534	Operator Excavation Damage	(not 3 <sup>rd</sup> party)

a/ Pipeline system leaks reportable to U.S. DOT, PHMSA 1996-2007. Reporting criteria for leaks changed in 2002 from 50 barrels to 5 gallons.  
b/ NGL = Natural gas liquids.  
c/ Initial volume recovered is the free oil and drain-up from pipe with special vacuum equipment and typically returned to the pipeline system. Remaining product in soil recovered by removing soils or other approved methods.  
d/ Occurred within station/terminal but recorded as off-site release. All other such releases not included (but reported).

**B.4.b.(9) Impact on Animal Health and Safety.**

General construction-related effects on domestic animals and wildlife will result primarily from activity in the project area during construction. The clearing of herbaceous and woody vegetation will temporarily reduce cover, nesting, and foraging habitat for some species. Clearing may also result in the loss of some members of small, slower moving species. However, most will move into adjacent undisturbed habitats until construction and restoration are complete. Overall habitat availability is not expected to change in the long term.

Pipeline trenching activities and associated spoil piles may result in a short-term barrier to movement of some wildlife species (typically two to four weeks at any one area). Except for short-term interruptions during construction, existing public roads, farm lanes, and livestock crossings will be kept open, providing crossing access. Shelter belts and trees will be protected to the extent practicable in a manner compatible with the safe operation, maintenance, and inspection of the pipeline.

**B.4.b.(10) Impact on Plant Life.**

During construction, vegetation will be removed from the construction right-of-way. Where extra workspace is required, additional vegetation will be removed. In non-agricultural areas, trees and shrubs cleared from extra workspace will be allowed to re-establish after construction, and revegetation measures will take into account recommendations from applicable regulatory agencies and arrangements with landowners. Overall, significant change in plant life is not anticipated.

**B.4.c Policy Criteria (North Dakota Rules Chapter 69-06-08-02.4)**

The NDPSC may give preference to an applicant that will maximize benefits resulting from the adoption of policies and practices of the NDPSC. These policies, and the extent to which the project aligns with or reinforces these policies, are described below.

**B.4.c.(1) Location and Design.**

Enbridge believes that the Project has been placed in the optimal alignment. No designated Exclusion Areas are crossed by the route. Mitigation measures will be implemented to avoid or minimize potential adverse impacts on Avoidance Areas crossed. Further, the proposed alignment is generally on or adjacent to Enbridge's existing pipeline right-of-way, minimizing the need for new right-of-way and the environmental and human impacts associated with a new route.

The Project is designed and will be operated in a manner that meets or exceeds state and federal engineering, safety and operational design standards.

**B.4.c.(2) Training and Utilization of Available Labor in this State for the General and Specialized Skills Required.**

No training of local labor is anticipated as a direct result of this pipeline expansion. During construction of the proposed facility, skilled and unskilled labor, both local and non-local workers will be employed by Enbridge or by the General Contractor selected to construct this proposed pipeline.

**B.4.c.(3) Economies of Construction and Operation.**

The Project is believed to be the most cost-effective and operationally sound means of meeting Enbridge's delivery obligations. Refer to section B.2.g of this Application and section C.2 of the Application for Corridor Certificate.

**B.4.c.(4) Use of Citizen Coordinating Committees.**

No Citizen Coordinating Committee is anticipated as a result of the project.

**B.4.c.(5) Commitment of a Portion of the Transmitted Product for Use in this State.**

No portion of the transported commodity will be delivered to terminals or refineries in North Dakota. On average, Enbridge delivered 1.52 million barrels of crude oil and other liquid hydrocarbons per day on its U.S. mainline system. The source of the liquid hydrocarbons is predominantly from western Canadian oil fields. These stable sources of North American petroleum supply well over 50 percent of the Upper Midwest refinery supply.

Refined product pipelines operated by other companies originating from these Minneapolis/St. Paul or greater Chicago area refineries, in turn, are routed into North Dakota to supplement the refined product supplies for North Dakota residents.

**B.4.c.(6) Labor Relations.**

The Project will have no anticipated effect on labor relations within North Dakota.

**B.4.c.(7) Coordination of Facilities.**

The Project has been designed to optimally utilize Enbridge's existing transportation system.

**B.4.c.(8) Monitoring of Impacts.**

Enbridge believes that construction-related impacts will be adequately mitigated throughout the Project route by the use of best management practices, good construction techniques, and environmental inspection. Therefore, long-term monitoring of impacts directly related to the Project is not anticipated. Following the installation of the pipeline, a thorough inspection will be performed to ensure restoration efforts have been successful.

**B.4.c.(9) Utilization of Existing and Proposed Rights-of-way and Corridors.**

The Project will be in large part or mostly constructed within or adjacent to Enbridge's permanent existing right-of-way. Construction activities will generally occur within a 100-foot-wide right-of-way. Additional temporary workspace adjacent to the construction right-of-way may be necessary during construction in areas such as steep slopes and staging areas for waterbody, wetland, road, and utility crossings, for safety reasons, to provide an area for prefabrication of sections of pipeline, or storage of spoil material. Enbridge will acquire additional workspace from the landowners where necessary; use of unauthorized workspace is prohibited without the landowner and Enbridge's approval.

In all cases, the size of additional temporary workspace will be kept to the minimum necessary to safely conduct work. Temporary working areas will not be restricted by or subject to permanent easement restrictions upon completion of construction.

**B.4.c.(10) Other Existing and Proposed Transmission Facilities.**

This Project will be an addition to the five existing pipelines currently operated by Enbridge within its existing right-of-way. Construction practices will be implemented to protect the existing pipelines. No other existing or proposed transmission facilities will be involved in the proposed project within North Dakota.

**B.4.d Design and Construction Limitations**

See section A.3 of the Application for Corridor Certificate.

**B.4.e Economic Considerations**

See section B.2.g of this application and section C of the Application for Corridor Certificate.

**B.4.f Human Environment**

The Project will in large part or mostly be constructed within or adjacent to the existing Enbridge pipeline right-of-way in Pembina County in northeastern North Dakota. The project area is sparsely populated and farming is the predominant economic activity. Within Pembina County, the route crosses approximately 170 separate tracts of land owned by approximately 64 different landowners. Except for highway crossings, the remaining land crossed by the route is privately owned. Three rural residences (some with associated aboveground structures) are located within 500 feet of the right-of-way (see table 2 in section B.4.a(3)). The route does not pass through parks, recreation areas, or the incorporated limits of cities.

The pipeline route crosses 1 state highway (North Dakota State Highway 5/U.S. Highway 81), 1 federal highway (Interstate 29), and 33 public roads. Additionally, one active Burlington Northern Santa Fe Railroad single track is crossed at MP 795.28. Paved roads and the railroad will be bored. Interstate 29 will be directionally drilled and, therefore, use of these facilities will not be disrupted as a result of the Project. Gravel roads will be open cut. Open cutting a road will temporarily close it to traffic; however, the road network throughout the project area is sufficient that suitable alternative routes are readily available. Road and railroad crossings for the route are summarized in table 6.

TABLE 6	
Roads Crossed by the LSr Project Pipeline Route	
Milepost	Roadway Name
774.55	109th Street NE
775.77	108th Street NE
776.75	147th Street NE
777.11	107th Street NE (County Road 55)
778.23	148th Street NE
778.50	106th Street NE

TABLE 6	
Roads Crossed by the LSr Project Pipeline Route	
Milepost	Roadway Name
779.66	149th Street NE
779.87	105th Street NE
781.12	150th Street NE
781.28	104th Street NE
782.60	151st Street NE
782.65	103rd Street NE
783.97	152nd Street NE
784.04	102nd Street NE
785.39	County Road 1
785.51	153rd Street NE
786.76	100th Street NE
787.05	154th Street NE
788.46	155th Street NE
789.47	98th Street NE
790.82	97th Street NE
792.30	North Dakota State Highway 5/U.S. Highway 81
793.04	158th Street NE
793.57	95th Street NE
794.49	159th Street NE
795.05	94th Street NE
795.20	Interstate 29
795.24	Old ND Highway 44
795.28	Burlington Northern Santa Fe Railroad
795.84	160th Street NE
796.50	93rd Street NE
797.27	161st Street NE
797.91	92nd Street NE
799.00	162nd Street NE
799.29	91st Street NE
800.05	163rd Street NE
800.72	90th Street NE
801.12	163rd Street NE

**B.4.g Terrain and Geology**

The Project will cross the bed of glacial Lake Agassiz, which is a nearly level lacustrine plain. Surface elevations along the route range from 825 feet near the Manitoba border to approximately 770 feet near the Red River of the North. Glacial Lake Agassiz was formed 10,000 to 12,000 years ago as glacial ice melted and retreated northward, blocking the natural drainage to the north. The resulting lacustrine deposits in the project area consist of thick, horizontal beds of predominantly silts and clays which stratigraphically are part of the Coleharbor Group. More recent alluvial deposits of the Walsh Group are found along the Pembina, Tongue, and Red Rivers. The soils along the rivers tend to have a higher sand content than the soils formed in the older lacustrine deposits.

The lacustrine sediments in the project area are approximately 50 feet thick and underlain by approximately 150 feet of glacial till, which in turn is underlain by igneous

and sedimentary bedrock. The project area is seismically stable and there are no active mining operations, oil or gas wells, or gravel pits in the vicinity of the route.

**B.4.h Soils**

The route crosses the Red River Valley of the North Major Land Resource Area (MLRA). This area consists of a nearly level glacial lake plain that is bordered on the east by outwash deposits, gravelly beaches, and dunes. The dominant soils in this MLRA are Aquolls. These deep, somewhat poorly to poorly drained soils have a sandy to clayey texture and a frigid temperature regime. In general, the pipeline route crosses soils that formed in glaciolacustrine deposits.

Detailed soil characteristics along the pipeline route were identified and assessed using the Soil Survey Geographic database (SSURGO; U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), 2003). The SSURGO database is a digital version of the original county soil surveys developed by the NRCS for use with geographic information systems (GIS). It provides the most detailed level of soils information for natural resource planning and management. The mapping scale in the project area is 1:20,000, with a minimum delineation size of 4.0 acres. SSURGO is linked to an attribute database that gives the proportionate extent of the component soils and their properties for each map unit (USDA, NRCS 1995). The SSURGO database was used to define soil characteristics along the pipeline route in Pembina County. SSURGO attribute data consist of physical properties, chemical properties, and interpretive groupings. Attribute data apply to the whole soil (e.g., listed hydric, prime farmland soils, slope class) as well as to layer data for soil horizons (e.g., texture, permeability). The soil attribute data can be used in conjunction with spatial data to describe the soils in a particular area.

Tables 7, 8, and 9 list the soil associations, the approximate crossing length of each soil association, STATSGO map unit identification numbers (MUIDs) crossed by the pipeline route, and provides a summary of soil limitations for the proposed pipeline route. STATSGO MUIDs are geologically and geographically related soils which correspond to soil associations. Approximately 69 percent of the soils crossed by the pipeline route (19.3 miles) are NRCS-classified prime farmland, provided there is sufficient artificial drainage to remove excess surface water. Approximately 5.8 miles of the pipeline route cross soils classified as saline, which in severe cases precludes their use for agricultural production. This saline area is predominantly wetland or grassland and near the portion of the pipeline route by the Juhl WMA.

TABLE 7

**Soil Characteristics in the LSr Project Area <sup>a</sup>**

County	Total Acres in County	Prime Farmland	Hydric Soils	Compact. Prone	Highly Erodible		Reveg. Concerns	Stony/Rocky	Shallow to Bedrock
					Water	Wind			
Acres (percent)									
Pembina	338.6	234.0 (69)	214.5 (63)	304.9 (90)	0.4 (<1)	-- (-)	-- (-)	-- (-)	-- (-)

<sup>a</sup> Acreage is based on a 100-foot-wide construction right-of-way and does not include access roads, temporary extra workspace, or areas of open water, and does not account for reduced right-of-way widths in wetlands and forested areas.

**TABLE 8**

**Topsoil Depths and Slope Class in the LSr Project Area <sup>a</sup>**

County	Total Acres in County	Topsoil Depth (inches)				Slope Class (percent)				
		0-6	>6-12	>12-18	>18	0-5	>5-8	>8-15	>15-30	>30
		Acres (percent)								
Pembina	338.6	55.1 (16)	11.6 (3)	-- (-)	271.9 (80)	335.5 (99)	1.5 (<1)	0.4 (<1)	1.2 (<1)	-- (-)

<sup>a</sup> Acreage is based on a 100-foot-wide construction right-of-way and does not include access roads, temporary extra workspace, or areas of open water, and does not account for reduced right-of-way widths in wetlands and forested areas.

**TABLE 9**

**Topsoil Depths on Prime Agricultural Land in the Project Area <sup>a</sup>**

County	Total Acres in County	Topsoil Depth (inches)		
		0-6	>6-12	>12-18
		Acres (percent)		
Pembina	234.0	6.6 (3)	7.4 (3)	-- (-) (94)

<sup>a</sup> Acreage is based on a 100-foot-wide construction right-of-way and does not include access roads, temporary extra workspace, or areas of open water, and does not account for reduced right-of-way widths in wetlands and forested areas.

Potential temporary effects on soil resources include the loss of soil productivity due to erosion, soil mixing, or soil compaction. Soil disturbances associated with clearing, grading and trenching will expose soils to water and wind and increase the potential for erosion. Analysis of STATSGO data indicates that soils in the project area are not susceptible to erosion by wind. Soil erosion by water is not common along the proposed pipeline route because the land is nearly level. Less than 0.1 mile of the project area contains highly erodible soils. During construction, the effects of erosion by water on steep slopes will be mitigated by use of silt fence and other erosion control measures as described in Enbridge's EMP (see Appendix A).

Soil productivity could potentially be affected if topsoil were to become mixed with subsoil during construction. To minimize this potential in agricultural land and other areas where soil productivity is an important concern, Enbridge will segregate topsoil during trench excavation. In cropland, topsoil will be removed to a maximum depth of 12 inches from the trench and spoil storage area unless otherwise requested by the landowner. During frozen conditions topsoil will be stripped from the trench line only. Topsoil will be stored separately from the trench spoil and will be returned to its approximate original location after the trench is backfilled.

Heavy equipment used to construct the pipeline may cause soil compaction along the right-of-way. Soils will be tilled with a chisel plow or other deep-tillage equipment to loosen the soil to the reasonable satisfaction of the landowner. Because the soils of the project area generally have a high shrink-swell potential, compaction will correct itself over time as the soil goes through wet-dry and freeze-thaw cycles.

### B.4.i Vegetation and Wildlife

#### Vegetation

The route crosses predominantly agricultural land. Agricultural areas are discussed in detail in sections B.4.b(1) and B.4.j. Non-agricultural areas include wetlands, woodlands at river crossings, windrows, and approximately 0.8 mile of grassland located in an area of wetlands and saline soils around the Juhl WMA.

The primary impact on vegetation will result from construction-related removal or disturbance of vegetation on the right-of-way. Vegetation will also be removed from areas where extra workspace is required (e.g., road and waterbody crossings). Enbridge will clear the right-of-way only to the extent necessary to assure suitable access for construction, safe operation, and maintenance of the pipeline. At waterbody crossings, Enbridge will maintain a 10-foot-wide vegetative cover until the actual crossing of the waterbody takes place.

In areas that require permanent revegetation, Enbridge will specify appropriate seed mixes, application rates, and seeding dates, taking into account recommendations of appropriate state and federal agencies and landowner requests.

During construction in unsaturated wetlands, topsoil will be segregated from the trench line to preserve natural sources of seed and rootstock. After the trench is backfilled, the topsoil will be replaced to facilitate the natural revegetation process. Consequently, significant changes in cover types are not anticipated.

#### Wildlife

Enbridge contacted the NDGFD and the FWS to identify known occurrences of state and federally listed threatened or endangered species and critical habitat located along the route. In response to this consultation, the FWS identified the bald eagle and gray wolf as potentially occurring in the project area. No recommendations to protect or minimize effects to these species were provided and FWS stated that providing a list of these species fulfills the FWS' requirements under Section 7 of the Endangered Species Act (see Appendix C).

The NDGFD reviewed the route and has advised Enbridge that the State of North Dakota does not maintain an endangered species list, and that they defer to the FWS-maintained federal list. The NDGFD has previously identified common terrestrial wildlife in the project area. These species include moose, white-tailed deer, beaver, badger, raccoon, mink, weasel, muskrat, sharp-tailed grouse, Hungarian partridge, songbirds, migratory waterfowl, and raptors.

Although some loss of members of smaller, slower moving species may occur during construction, most species will move away from the right-of-way into adjacent undisturbed habitats until construction and restoration are complete. Long-term habitat availability is not expected to change as a result of the project, as the right-of-way will be restored to pre-construction conditions to the extent feasible.

Typical fish species within the project area include catfish, walleye, perch, white bass, and white sucker. Additional species occurring in the Red River of the North include

muskellunge, sauger, northern pike, bullhead, and lake sturgeon. Less commonly occurring fish species in the project area include the common and large stone rollers, blacknose shiner, and rosy-faced shiner. Construction-related impacts on aquatic species will be temporary and limited mainly to areas immediately at or downstream from the pipeline crossings.

The NDGFD and FWS recommended that construction at major waterbody crossings be scheduled to avoid fish spawning periods. The FWS also recommended that construction in wetlands be scheduled to avoid disruption of waterfowl and other wildlife during nesting season. Enbridge will continue to work with these agencies to address concerns about wildlife and aquatic resources.

#### B.4.j Land Use

Agricultural production is the predominant land use in the project area. Principal crops include wheat, barley, potatoes, dry beans, sunflowers, soybeans, sugar beets, grain corn, canola, and alfalfa. The Project will have only a temporary effect on agricultural land use. Crop production will be temporarily disrupted in cases where the construction period overlaps with the growing season. Landowners will be compensated for crop loss or reduced yields caused by construction of the pipeline. Deep tillage or other measures will be implemented as necessary to mitigate effects of soil compaction.

The only industrial area crossed by the pipeline route is the existing Enbridge Joliette pumping station, which is owned and operated by the Company. Construction and operation of the proposed and existing pipelines will preclude future unrelated industrial development on lands occupied by the permanent maintained right-of-way; however, as previously noted, the Project will be located on or adjacent to existing right-of-way, therefore impacts to land use are anticipated to be minimal. Furthermore, after installation of the pipeline, disturbed areas will be restored to preconstruction conditions to the extent practicable, and will generally revert to preconstruction uses. Therefore, no long-term change in land use is anticipated.

#### B.4.k Water Resources-Ground Water

Groundwater in the project area is strongly influenced by the Dakota Group sandstone, which contains saline water under artesian pressure. Groundwater along the proposed route is low in quality and most domestic water is obtained from surface water sources and piped to residences by a rural water authority.

No wells will be installed or abandoned as part of this Project, nor will require connection to a municipal water supply. Groundwater can be adversely affected by pipeline construction that involves blasting. For the Project, no blasting of bedrock is anticipated, and other construction-related disturbance of soils is not expected to adversely affect groundwater.

Another potential source of adverse impacts on groundwater is the introduction of contaminants resulting from accidental spills of construction-related chemicals, fuels, or hydraulic fluid. This potential effect is greatest near water wells. Enbridge's EMP and SPCC Plan describe preventative measures that the Company will implement to prevent accidental discharges of fuels or other hazardous substances, including specific storage and handling requirements. The SPCC Plan also describes response, containment, and

reporting and clean-up procedures. With the implementation of these protected measures, contamination of groundwater due to construction activities is not anticipated.

### Water Resources-Surface Waters

Topographic maps and current aerial photos were reviewed to identify streams, rivers, and lakes crossed by the proposed pipeline route. The three major waterbodies crossed by the pipeline route are the Pembina River, Tongue River, and Red River of the North. The pipeline route also crosses several drainage ditches and intermittent waterbodies; however, the proposed pipeline route does not cross any lakes or ponds. No state or federally designated wild or scenic rivers are crossed by the proposed pipeline route. Waterbodies crossed by the Project are listed in table 10.

Milepost	Waterbody Name	Type	Hydrology	County
775.59	Pembina River	River	Perennial	Pembina
777.65	East Branch, County Ditch #42	Stream	Intermittent	Pembina
778.82	County Ditch #42	Canal/Ditch	Canal/Ditch	Pembina
781.25	Ditch to Loudon Coulee	Stream	Intermittent	Pembina
781.48	Loudon Coulee	Stream	Intermittent	Pembina
782.68	County Drain #33	Stream drain	Intermittent	Pembina
783.34	Tongue River Cutoff	Canal/Ditch	Canal/Ditch	Pembina
785.71	Tongue River	Stream	Intermittent	Pembina
785.72	Tongue River	Stream	Intermittent	Pembina
785.82	Trib to Tongue River	Stream	Intermittent	Pembina
786.21	Tongue River	River	Perennial	Pembina
787.80	Trib. to Tongue River	Stream	Intermittent	Pembina
789.96	Ditch to Loughton WMA	Stream	Intermittent	Pembina
790.62	Ditch to Loughton WMA	Stream	Intermittent	Pembina
795.78	County Ditch #39	Stream	Intermittent	Pembina
797.21	County Ditch #7	Stream	Intermittent	Pembina
798.58	County Ditch #6	Stream	Intermittent	Pembina
799.99	County Ditch #5	Stream	Intermittent	Pembina
800.92	Trib. to the Red River	Stream	Intermittent	Pembina
801.82	Red River of the North	River	Perennial	Pembina

The Pembina River has been designated on the Nationwide Rivers Inventory (NRI). The NRI is a listing of more than 3,400 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance. Under a 1979 Presidential directive, and related Council on Environmental Quality procedures, federal agencies must seek to avoid or mitigate actions that will adversely affect designated NRI river segments. Enbridge will consult with appropriate regulatory agencies regarding measures to be implemented during the crossing of the Pembina River to protect its status on the NRI.

The FWS has recommended that Enbridge avoid construction in river channels during fish migration and spawning periods from April 15 – June 1 and that appropriate erosion control measures be installed to reduce sediment transport into waterbodies and

wetlands. Implementation of the measures described in Enbridge's EMP will provide adequate protection to water resources during construction.

Waterbody crossings are planned to be constructed using either horizontal directional drill (HDD) or open-cut construction techniques, with most waterbodies crossed by the open-cut method. The HDD method is an expensive and complex technique used for wide waterbodies where there is a need to avoid disturbance of the streambed and banks. HDD is typically used for large river crossings because of the magnitude of the crossing length, disruption of navigation, long duration of trenching, and potential sedimentation. Subject to engineering evaluations, Enbridge plans to use the HDD method to cross the Red River of the North.

For the HDD crossing at the Red River of the North, temporary extra workspace will be established on each side of the river as staging areas for drilling equipment and to assemble the pipe. A slant drill until will be placed on one bank and a small-diameter pilot hole will be drilled under the river along a prescribed profile. Electromagnetic sensors will be used to monitor and guide the path of the drill bit. After the pilot hole has been completed, it will be enlarged with the use of a barrel reamer to accept the pipeline. Drilling mud will be circulated to remove cuttings and to maintain the integrity of the hole.

HDD essentially eliminates increases in sediment that will result from trenching; however, potential impacts include the inadvertent flow of stored drilling mud into the waterbody and the possibility that pressurized drilling mud will seep to the surface through natural fractures or voids in the soil. The feasibility and ultimate success of a directional drill is dependent on site-specific soil conditions. Enbridge's successful completion of a directionally drilled crossing of the Red River of the North during previous construction projects increases the likelihood that this method will be feasible for the Project.

The other waterbodies crossed by the route are much smaller than the Red River of the North and these waterbodies will be crossed by means of the "wet trench" (open-cut) construction technique. In a wet trench crossing, backhoes excavate a trench in the waterbody channel, leaving "hard plugs" of soil in place on each bank of the crossing. When the trench has been excavated and the crossing section fabricated, the hard plugs are removed and the pipe segment is moved into place. The newly installed pipeline is welded in place and the trench is backfilled with native materials or as required by applicable permits.

Temporary, incremental increases in sediment load can be expected downstream of open-cut waterbody crossings during the excavation and backfilling phases of construction. Additionally, some incremental increase in surface run-off sedimentation may be expected to occur at each of the crossings due to the close proximity of exposed soils. No significant or long-term increase in sedimentation is expected from construction of the proposed waterbody crossings.

Enbridge will obtain applicable permits for waterbody crossings, including authorization from the North Dakota State Water Commission to cross the Red River of the North. One or more third-party environmental inspector(s) will be retained to monitor compliance with applicable permit requirements and specifications required by Enbridge's EMP.

### Wetlands

In planning its 1994 Capacity Expansion project, Enbridge conducted field wetland delineations to identify wetlands crossed by the pipeline route. This wetland delineation, in conjunction with aerial photo-based alignment sheets and USGS topographic maps, were used to identify wetlands along the proposed pipeline route.

#### Section B.4.b.(5), Impact on Wetlands

Construction of the Project will not result in the permanent drainage or filling of wetlands. Enbridge will implement the measures identified in its EMP to minimize adverse effects on wetlands during construction and restore wetlands following construction. Effects on wetlands are therefore expected to be short-term and minor. During trenching, water quality of inundated wetlands will be temporarily affected due to the suspension of sediments and organic matter. Construction of the Project will result in temporary disturbance to some of the existing vegetation along the pipeline route and within the right-of-way.

During construction in unsaturated wetlands, topsoil will be segregated from the trench line to preserve natural sources of seed and rootstock. After the trench is backfilled, the topsoil will be replaced to facilitate the natural revegetation process. The long-term operation and maintenance of the pipeline will not have adverse effects on wetland function or value.

Construction in wetlands will require authorization by the U.S. Army Corps of Engineers (COE). Enbridge will be obtaining necessary authorization for wetland crossings and work in wetlands will be conducted in accordance with applicable permit conditions.

### Water Use

The Project will not significantly affect water use patterns. Following construction, drains, swales, and flowages will be restored to preconstruction conditions to the extent practicable to minimize disruption of water resources.

The Project will require temporary appropriations of water (likely surface water) for use in the hydrostatic testing of the newly installed pipeline. Additionally, some temporary trench dewatering will be required, particularly during road bores. No significant effect on existing and future water uses is anticipated.

Discharge of water used to hydrostatically test the new pipeline is not expected to have an impact on the environment or receiving waters. The discharge is regulated by the North Dakota Department of Health under a North Dakota Pollutant Discharge Elimination System (NDPDES) general permit issued specifically for temporary dewatering activities including hydrostatic testing and trench dewatering (Permit No. NDG-070000). Water appropriated for hydrostatic testing will be subject to permit conditions from the North Dakota State Water Commission and is not expected to have an environmental impact.

### Surface Water Runoff

Potential construction-related effects on surface waters are primarily related to sedimentation from uncontrolled erosion of disturbed areas. Much of the pipeline route is level or only gently sloping, which limits the potential for runoff effects. Because the right-of-way will be restored to preconstruction conditions, area runoff following construction will generally reflect surrounding land use.

Enbridge will obtain authorization under a general permit for Storm Water Discharges Associated with Construction Activity from the North Dakota Department of Health, which implements a federal program under the Clean Water Act. Enbridge's EMP, which was developed in part to meet requirements of this permit, describes best management practices Enbridge will implement to minimize off-site erosion from site stormwater runoff. These practices will protect surface water and soil resources within the project area. Enbridge's EMP will be included in the construction specifications for the Project and enforced by one or more third-party environmental inspectors during construction.

#### Discharges to Surface Waters

During construction, point source wastewater discharge will be generated from hydrostatically testing the new pipeline prior to placing it in service. Discharges will also occur as needed for trench dewatering during construction. The North Dakota Department of Public Health has developed a General Permit (Permit No. NDG-070000) which authorizes the discharge of waters related to temporary dewatering and hydrostatic testing. Enbridge will obtain authorization for construction-related discharges and will conduct trench dewatering and hydrotest water discharges in a manner consistent with the NDPDES General Permit.

Testing and discharge is anticipated to be consistent with past practices and experience. Discharges of hydrostatic test water typically are controlled discharges directly to the ground surface or occasionally into Waters of the State. Specific discharge point(s) for hydrostatic test water for the proposed pipeline have not been determined at this time. In most cases, it is anticipated that this water will be acquired from several of the rivers crossed by the pipeline route and discharged back to the original source. The NDPDES permit specifies that discharge water must be free from process and other wastewater discharge.

#### Protection from Fuel Spills

Enbridge has developed a SPCC Plan to minimize the potential for accidental releases of petroleum or other substances during construction. Water resources will be protected from fuel spills by prohibiting the storage of fuel within 100 feet of a wetland or surface water body. Refueling and overnight parking of equipment will not be allowed within this zone unless, due to site-specific conditions, there is no practical alternative. Enbridge's EMP and SPCC Plan describe protective measures that must be implemented. Contractors will be required to provide adequately trained personnel, and proper equipment and materials to contain and clean up spills of fuel, lubricating oil or hydraulic fluid that result from equipment failure.

#### B.4.I Cultural Resources

Enbridge reviewed existing site file data maintained by the North Dakota SHPO to determine if any portion of the route was surveyed previously for cultural resources. A total of six previous archaeological studies have been identified that directly relate to the proposed pipeline route. The entire Neche, North Dakota to Clearbrook, Minnesota portion of the corridor was first surveyed as part of the 1994 Capacity Expansion project. In 1998, portions of the previous survey corridor were included in a project named Terrace I or Terrace Expansion. The Terrace I project did not extend beyond the survey corridor for the 1994 Capacity Expansion and, therefore, no additional archaeological investigations were required for Terrace I. The reports of these previous surveys are as follows:

- Breakey, Kim C., and Clark Dobbs  
*1993 Files Search and Literature Review of Lakehead Pipeline Between Clearbrook, Minnesota and Neche, North Dakota.*
- Dobbs, Clark A., Kim Breakey and Howard Mooers  
*1994 A Model of Archaeological Sensitivity for Landforms Along the Lakehead Pipe Line Company Corridor from Neche, North Dakota to Clearbrook, Minnesota.*
- Breakey, Kim, Clark Dobbs and Matthew Murray  
*1994a Phase I Archaeological Investigations of Selected Areas of the Lakehead Pipe Line Company Corridor between Neche, North Dakota and Clearbrook, Minnesota.*  
*1994b Evaluation of the Archaeological Sites on the Lakehead Pipe Line Company Corridor between Neche, North Dakota and Clearbrook, Minnesota.*  
*1994c Evaluation of the archaeological Sites on the Lakehead Pipe Line Company Corridor between Neche, North Dakota and Clearbrook, Minnesota: 32PB153 and the Angle Road, Tongue River, Pembina County, North Dakota.*
- Foth & Van Dyke and Associates Inc.  
*1998 Archaeological Monitoring at the Pembina River Crossing, North Dakota, Lakehead Pipe Line Company Terrace Expansion Project.*

Enbridge reviewed the North Dakota SHPO's site files to identify previously recorded cultural resources within the proposed construction right-of-way. This review identified one archaeological site (32PB132) in North Dakota, which has been determined eligible for nomination to the National Register of Historic Places. The route will cross a historic ox-cart trail known as the Angle Road. Enbridge has previously avoided effects to this site by using conventional boring construction methods to cross this feature. Enbridge plans to bore the Angle Road again and, therefore, the Project is not anticipated to affect this site. Enbridge will consult with the North Dakota SHPO regarding treatment and protection of this historic resource.

**B.5. THE CRITERIA TO BE EVALUATED SHALL INCLUDE AT A MINIMUM ALL OF THE FOLLOWING, WHICH ARE WITHIN THE DESIGNATED CORRIDOR:**

- Exclusion Areas;
- Avoidance Areas;
- selection criteria;
- policy criteria;
- design and construction limitations; and
- economic considerations

Complete descriptions, potential impacts, and mitigation measures relevant to the six criteria cited above are provided in section B.4 in conjunction with the descriptions of potential impacts. Below is a discussion of additional measures Enbridge will employ.

**B.6. MITIGATION MEASURES****B.6.a Measures to Preserve the Human Environment**

The Company will require its construction contractor to clean up on a daily basis personal litter, bottles and paper deposited by right-of-way preparation and construction crews. Waste and scrap that is the product of pipeline construction will be removed and properly disposed of in accordance with applicable regulations before construction is completed.

To the maximum extent practicable, the Company will minimize noise and dust resulting from construction near residential areas.

The Company will obtain applicable permits prior to conducting road crossings. Temporary signs will be posted at each crossing as appropriate to alert motorists of construction activity. Paved roads and railroads will be bored which will minimize interference with traffic flow caused by construction activities.

**B.6.b Measures to Protect Terrain and Geological Resources**

The Company will, to the maximum extent practicable, restore the area affected by pipeline construction to the natural conditions that existed immediately before construction of the pipeline. Restoration will be compatible with the safe operation, maintenance, and inspection of the pipeline.

To the maximum extent practicable, the Company will restore the construction area to pre-construction contours. Measures such as slope breakers, erosion control blankets and revegetation will be employed to maintain the stability of slopes along the right-of-way. No crown of backfill material will be left over the trench in wetlands.

Fuel and all other hazardous materials will be stored in accordance with the requirements of Enbridge's SPCC Plan (Appendix B). The SPCC Plan also describes response, containment, and cleanup measures.

### B.6.c Measures to Protect Soils

Enbridge will implement temporary and permanent erosion control measures as specified in the EMP (Appendix A). The EMP will be included in contract documents and enforced as such throughout the project.

Temporary erosion and sedimentation control measures may include installation of silt fence, straw bales, slope breakers, trench breakers, erosion control fabric and mulch.

To minimize potential impacts on soil productivity, topsoil will be segregated during trench excavation in agricultural land, unsaturated wetlands, and if applicable, other areas where soil productivity is an important consideration. Unless otherwise requested by the landowner, topsoil in cropland will be removed to a maximum depth of 12 inches from the trench and spoil storage area and stored separately from the trench spoil. During frozen conditions, topsoil will be stripped from the trench line only. After the trench is backfilled, topsoil will be returned to its approximate original location.

Compaction of agricultural soils will be minimized by restricting construction activities during periods of prolonged rainfall. Where unacceptable levels of compaction occur in agricultural lands, deep tillage, a chisel plow or other deep tillage equipment will be utilized to loosen the soil to the reasonable satisfaction of the landowner.

The Company will retain third-party environmental inspectors to monitor the contractor's compliance with applicable requirements to protect soil resources during construction of the Project.

### B.6.d Measures to Protect Vegetation and Wildlife

The Company will clear the right-of-way to the extent necessary to assure suitable access for construction, safe operation, and maintenance of the pipeline.

In areas that require permanent revegetation, Enbridge will specify appropriate seed mixes, application rates, and seeding dates, taking into account recommendations of appropriate state and federal agencies and landowner requests. In non-agricultural areas, vegetation cleared from extra workspace will be allowed to revegetate after construction depending on arrangements with the landowner. Consequently, significant changes in cover types are not anticipated.

After completion of waterbody crossings, the Company will revegetate disturbed stream banks in accordance with the EMP and requirements of applicable state or federal permits. During construction in unsaturated wetlands, topsoil will be segregated from the trench line to preserve natural sources of seed and rootstock. After the trench is backfilled, the topsoil will be replaced to facilitate the natural revegetation process.

The Company will take appropriate precautions to protect livestock and crops affected by construction. Operation of the proposed pipeline is not anticipated to significantly affect terrestrial wildlife, fisheries resources, or other aquatic species. Shelter belts and trees will be protected and restored by the Company to the extent practicable in a manner compatible with the safe operation, maintenance, and inspection of the pipeline.

#### B.6.e Measures to Protect Land Use Permits

The Company will obtain and comply with applicable county permits regulating zoning and land use. These permits may include, but are not limited to grade and fill permits, ditch crossing permits, road and utility permits and conditional use permits. The Company will retain one or more third-party environmental inspectors to monitor compliance with environmental conditions of county permits.

The Company will repair surface drains disturbed during right-of-way preparation, construction and maintenance activities. The Company will repair private roads and farm lanes damaged when moving equipment or when obtaining access to the right-of-way. The Company will repair or replace fences and gates removed or damaged as a result of right-of-way preparation, construction or maintenance activities.

The Project will be installed at a minimum depth of 36 inches from the surface contour to minimize the potential for environmental damage resulting from deep tillage activities unless modified to accommodate special construction issues at the site.

Shelter belts and trees will be protected by the Company to the extent possible in a manner compatible with the safe operation, maintenance, and inspection of the pipeline.

#### B.6.f Measures to Protect Water Resources

Enbridge will obtain applicable permits for crossing wetlands and waterbodies and for water appropriations related to hydrostatic testing and trench dewatering. Third-party environmental inspectors will monitor compliance with applicable waterbody and wetland protection requirements during construction of the proposed facilities.

Measures to protect water resources have been discussed to some extent in section B.4.k and in previous mitigation sections on soils (see section B.6.c) and vegetation and wildlife (see section B.6.d). Enbridge's EMP describes these measures in detail, and contains illustrations of how sediment control devices are typically installed at waterbody crossings. Additionally, Enbridge will maintain a 10-foot-wide vegetative buffer until the actual crossing of the waterbody takes place. Temporary sediment control measures such as silt fence installed at each crossing will minimize the introduction of sediment into waterbodies during construction and minimize the movement of spoil and sediment from surface runoff during and after construction. Permanent erosion control measures, such as vegetation and installation of slope breakers, will effectively stabilize riparian zones. The Company will stabilize streambanks disturbed during construction using methods as directed by applicable state and/or federal permits.

For open-cut crossings, "hard plugs" of soil prevent the flow of water from the waterbody into the adjacent trench and the migration of sediment from the adjacent trench into the waterbody. After the pipe is installed, the trench will be backfilled in such a manner to restore the natural contours of the waterbody to the extent practicable. Directional drilling of the Red River of the North will minimize construction-related disturbance of this river because in-stream trenching and backfilling will not be necessary. Enbridge is currently evaluating crossing methods for the Pembina and Tongue Rivers and will coordinate with the NDGFD and the FWS regarding crossing methods for these two rivers.

Wetland crossings will be conducted in accordance with applicable regulatory requirements. If construction mats or timbers are placed in wetlands to support equipment, they will be removed after construction is completed. In order to maintain surface water hydrology within wetlands, preconstruction contours will be restored and no crown will be left over the trench. If there is a potential for a wetland to be drained by trenching, trench plugs will be installed as needed at the edge of a wetland. In unsaturated wetlands, topsoil will be replaced to facilitate the natural revegetation process.

Enbridge's EMP and SPCC Plan specify several measures to protect wetlands and waterbodies from pollution during construction by fuels or other hazardous materials. These plans prohibit the storage of fuel or other hazardous materials within 100 feet of a wetland or waterbody. The EMP also specifies that equipment must be refueled at least 100 feet from waterbodies unless, due to site-specific conditions, there is no practical alternative. In that case, the contractor must implement site-specific protective measures and containment procedures described in the SPCC Plan. Contractors will be required to provide trained personnel, appropriate equipment and materials to contain and clean up spills of fuel, lubricating oil or hydraulic fluid that result from equipment failure when working in or near wetlands or surface water bodies.

Water appropriations for hydrostatic testing will be conducted in accordance with applicable permits. The Company will conduct trench dewatering and hydrostatic test discharges in a manner consistent with the NDPDES General Permit. Enbridge's EMP describes best management practices that will be implemented to minimize off-site erosion from surface water runoff, and protect water and soil resources within the project area.

Much of the concerns associated with the quality of the water being discharged are addressed by the fact that no additives to the water are permitted unless written approval is received from Enbridge and applicable permits authorize such additives. Environmental Inspectors will monitor compliance with permits. Where appropriate, water will be discharged into an energy dissipation and/or filtering device to remove sediment and to reduce the erosive energy of the discharge.

#### B.6.g Measures to Protect Cultural Resources

Enbridge has initiated consultation with the North Dakota SHPO through the COE. Enbridge will comply with the recommendations of the North Dakota SHPO and take appropriate measures to avoid project-related effects to sites eligible for listing on the National Register of Historic Places. If additional cultural resource surveys are recommended by North Dakota SHPO in order to assess project effects, Enbridge will complete those surveys in accordance with state-approved protocols and provide the results of those surveys to the North Dakota SHPO and appropriate lead federal agency.

### **B.7. QUALIFICATIONS OF PERSONS CONTRIBUTING TO THE STUDY**

See section D.6 of the Application for Corridor Certificate.

### **B.8. MAPS**

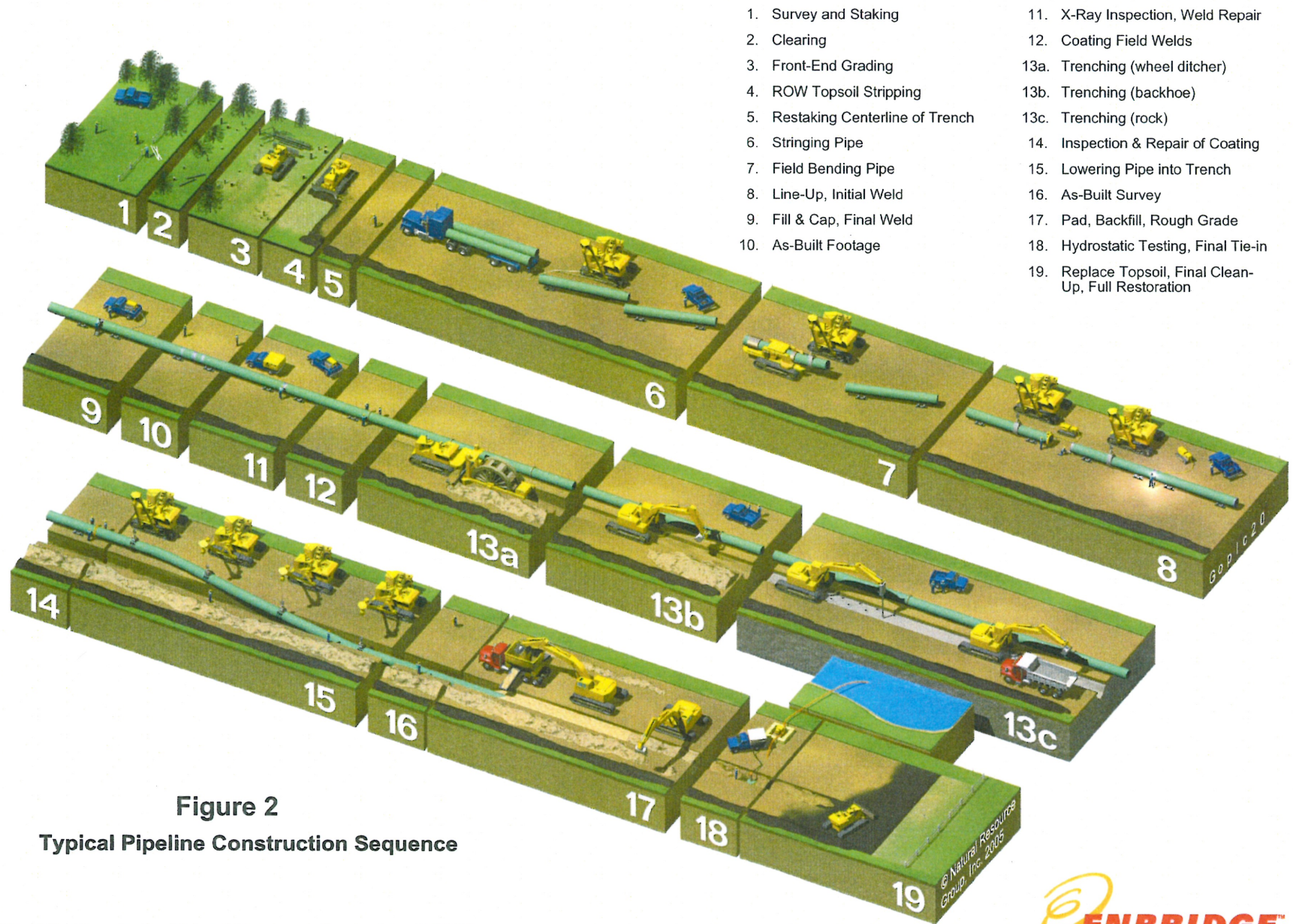
See section D.7 of the Application for Corridor Certificate.

**B.9. OTHER MATTERS**

The information provided below is in accordance with North Dakota Century Code 49-22-08.1 Sections 1.e, 1.f, and 1.g.

**B.9.a Right-of-Way Preparation, Construction and Reclamation Procedures**

This section provides a general overview of the typical construction sequence for a pipeline. Figure 2 shows the typical steps of cross-country pipeline construction. Standard pipeline construction proceeds in the manner of an outdoor assembly line composed of specific activities that make up the linear construction sequence.



1. Survey and Staking
2. Clearing
3. Front-End Grading
4. ROW Topsoil Stripping
5. Restaking Centerline of Trench
6. Stringing Pipe
7. Field Bending Pipe
8. Line-Up, Initial Weld
9. Fill & Cap, Final Weld
10. As-Built Footage
11. X-Ray Inspection, Weld Repair
12. Coating Field Welds
- 13a. Trenching (wheel ditcher)
- 13b. Trenching (backhoe)
- 13c. Trenching (rock)
14. Inspection & Repair of Coating
15. Lowering Pipe into Trench
16. As-Built Survey
17. Pad, Backfill, Rough Grade
18. Hydrostatic Testing, Final Tie-in
19. Replace Topsoil, Final Clean-Up, Full Restoration

**Figure 2**

**Typical Pipeline Construction Sequence**

K:\335\2006-0605\TAGES.VP&D

Used By Permission Natural Resource Group, Inc. © 2007



These operations collectively include survey and staking of the right-of-way, clearing and grading, topsoil stripping, pipe stringing and bending, welding and coating, trenching, lowering-in and backfilling, hydrostatic testing, cleanup, and restoration and revegetation.

#### B.9.a.(1) Survey and Staking.

Before construction, Enbridge crews will survey and stake the centerline and exterior boundaries of the construction right-of-way. The exterior boundary stakes will mark the limit of approved disturbance areas, which will be maintained throughout the construction period. The North Dakota One Call system will be contacted to identify and mark the locations of underground utilities. During this period, equipment involved in pipeline construction will be moved onto the right-of-way using existing roads for access wherever practicable.

#### B.9.a.(2) Clearing and Grading.

Enbridge will clear the 100-foot-wide construction right-of-way and additional temporary extra workspaces of shrubs and trees. The clearing crew will typically mow, chip, mulch and/or haul off all non-merchantable timber. Burning of non-merchantable wood may be allowed when the contractor has obtained the necessary permits and approvals. All merchantable timber will be property of the Company.

Following clearing, grading of the ground surface may be done to provide a relatively smooth working surface and a safe working area. Typically, a 10-footwide buffer will be left relatively undisturbed, except where grading is needed for bridge installation, at waterbody crossings until immediately before the pipelines are installed across the waterbody.

Following clearing and grading, temporary bridges will be installed at waterbodies, except for drainage ditches, intermittent waterbodies, and other non-fisheries water, along the pipeline route to provide temporary access for equipment traveling along the construction right-of-way. In addition, temporary erosion control measures will be installed in accordance with Enbridge's EMP (see Appendix A).

#### B.9.a.(3) Topsoil Stripping.

Topsoil will be stripped and segregated in agricultural areas, cropland, hayfields, pasture, residential areas, and other areas as requested by the landowner along the pipeline route in accordance with Enbridge's EMP. In unsaturated wetlands, a maximum of 12 inches of surficial soils will also be stripped from the trench areas. Topsoil will be stripped to a maximum depth of 12 inches in cultivated lands.

#### B.9.a.(4) Stringing and Bending.

Before excavating pipeline trenches, individual joints of pipe will be strung along the construction right-of-way and arranged to be accessible to construction personnel. This operation typically involves specially designed stringing trucks to deliver pipe from pipe yards to the right-of-way. Small portable cranes and/or side-boom tractors are used to unload the stringing trucks and place pipe along the right-of-way. A mechanical pipe-bending machine will bend individual joints of pipe to the desired angle to accommodate

natural ground contours or pipeline alignment. In certain areas, prefabricated fittings will be used where field bending is not practicable.

#### B.9.a.(5) Welding and Coating.

After stringing and bending are complete, pipe sections will be aligned, welded together, and placed on temporary supports along the edge of the proposed trench. Enbridge will inspect the welds, both visually and radiographically. The pipe is typically delivered with a factory coating of fusion-bonded epoxy or similar material to prevent corrosion. Enbridge will apply coating at welded joints and will electronically inspect the pipeline coating before the pipe is lowered into the trench.

#### B.9.a.(8) Trenching.

Backhoes and/or ditching machines will be used to excavate trenches in accordance with the United States Department of Transportation, which stipulates a minimum three feet of cover for normal excavations and 18 to 30 inches of cover in rocky areas. The trench walls will generally be kept vertical to the extent practicable and the trenches will typically be 3 feet wide, but may be wider in less stable soils. In unstable and saturated soils, trenches may be wider.

Where trench dewatering is needed, water will be discharged directly to the ground if there is adequate vegetation along the right-of-way to filter the water effectively. Where vegetation is sparse or absent, or in environmentally sensitive areas (e.g., adjacent to waterbodies or wetlands), straw bale dewatering structures or suitable filtering alternatives will be used to minimize siltation in adjacent waterbodies.

#### B.9.a.(9) Lowering In, Padding, and Backfilling.

After welding and coating are completed and the trench is excavated, the pipe will be lowered into the trench by side-boom tractors. Bladed equipment or a specially designed backfilling machine will be used to backfill the trench to the approximate ground surface elevation. This generally consists of replacing the material excavated from the trench. In areas where topsoil has been segregated, subsoil will be replaced first, and topsoil will be spread uniformly on top. Directly above the pipeline, an excess of soil or "crown" will be placed to allow for future settling, excluding wetlands. Construction debris, including wooden supports, welding rods, containers, brush, trees, or refuse of any kind, will not be permitted in the backfill. If an excessive amount of rocks are present in the backfill, the pipeline will be protected with rock shield or similar protective coating and/or backfilled with clean padding prior to backfilling with the rocky material.

#### B.9.a.(10) Hydrostatic Testing.

After backfilling, Enbridge will hydrostatically test the pipelines in accordance with the OPS within the DOT's Pipeline and Hazardous Materials Safety Administration regulations to ensure that the system is capable of operating at the design pressure. The testing process will involve filling a segment of the pipeline with water and maintaining a prescribed pressure for a specified amount of time.

The length of individual test segments will be determined by topography and water availability. Water withdrawals used to fill and test the pipelines will be consistent with state regulations and Enbridge's EMP. Enbridge will obtain hydrostatic test water from major waterbodies crossed by the pipeline and/or municipal sources along the pipeline route. Adequate flow will be maintained to protect aquatic life and allow for downstream uses. The test water will be discharged through energy dissipation devices to the ground surface or to a nearby waterbody. These discharges will be done in accordance with Enbridge's EMP and permits issued by the state agencies.

#### B.9.a.(11) Cleanup.

After the backfilling is completed, Enbridge will regrade and restore work areas as nearly as practicable to the original contour of the land. Topsoil will be redistributed over areas from which it was originally removed. Permanent soil stabilization efforts will primarily include revegetation of the right-of-way. Fences that are removed to install the pipelines will be reconstructed across the right-of-way.

#### B.9.a.(12) Restoration and Revegetation.

Following installation and final cleanup of the pipelines, original grade and contours will be restored to the extent practicable and temporary and permanent erosion controls will be installed. Disturbed areas will be revegetated in accordance with Enbridge's Revegetation Plan, other permit requirements, and site-specific landowner requests.

### B.9.b Landowner Issues

#### B.9.b.(1) Procedures for Landowner Relations.

Landowners have already been contacted by mail to advise them that survey crews will be working along the proposed pipeline route. In addition, a brief description of the proposed project has been mailed to landowners. Enbridge is committed to giving landowners complete information about the project and keeping them informed throughout construction. Enbridge will begin to personally contact landowners during the first quarter of 2007 to discuss methods of damage settlements, tenant's rights, and to address any unique property concerns they may have. Additional line payments required under terms of existing multiple line rights easements will be made at this time.

#### B.9.b.(2) List of Landowners.

By use of county records, a current list of landowners was generated and used for required mailings and will also be used for future personal contacts. In addition to landowners, all known tenant farmers in the construction area have been notified on the project. A list of landowners and tenants who have been supplied information regarding the project is attached as Appendix E.

### B.9.c Operations and Safety

#### B.9.c.(1) Pipeline Operation and Control.

The Enbridge pipeline control center is located in Edmonton, Alberta.

The Control Center is manned by pipeline operators 24 hours a day. A computerized pipeline control system allows these operators to remotely monitor and control the pipeline and related facilities. The Control Center also serves as an emergency center to receive calls from employees, the public or public officials reporting unusual conditions or pipeline failures.

The computerized pipeline control system has been designed to control the pipeline within pre-established minimum and maximum operating pressures. Both the computer system and operating practices include procedures for abnormal operating conditions, including emergency shutdown and isolation of the pipeline and notification procedures in the event of suspected emergencies.

#### B.9.c.(2) Communications Capabilities.

Land-lines and satellite communications are used to exchange the necessary computerized data for pipeline monitoring and control. Enbridge maintains a UHF radio system, supplemented by cellular phones as needed, to facilitate personnel communications during operation, maintenance, or emergency activities.

#### B.9.c.(3) Protection of the Pipe from Damage.

Enbridge has an aggressive program in educating excavators and the public about the presence of the pipeline and preventing damage to the pipeline from excavating equipment. Enbridge has joined and supports the North Dakota One-Call system and other one-call systems in the states where they exist.

The pipeline is protected from corrosion in a number of ways. Pipelines are covered with a protective coating. In addition, all buried or submerged metallic structures (pipeline systems) are under a cathodic protection system, as required by Pipeline Safety Regulations.

#### B.9.c.(4) Inspections.

The Company conducts routine inspections of the pipeline and facilities to determine that the system is operating properly, in compliance with CFR 49 Part 195.

Each calendar year (not to exceed a 15-month interval), the cathodic protection system is monitored by taking pipe/structure-to-soil and line current (where possible) readings. Additionally, each rectifier and anode groundbed used to impose cathodic protection on the pipeline is inspected to ensure proper operation. Repairs and adjustments to the cathodic protection system are either made during the annual survey or during later maintenance activities. At least six times per year, each rectifier and critical cathodic protection interference bond to foreign structures is inspected and corrective measures taken, if needed.

In addition, Enbridge periodically evaluates the effectiveness of its cathodic protection system by conducting supplemental close interval surveys (e.g., close interval pipe to soil, etc.) of the system.

In addition, Enbridge regularly evaluates the effectiveness of its cathodic protection system by conducting close internal surveys of the system. Although not required by regulation, this method allows Enbridge to assess overall effectiveness of the system.

The pipeline route is patrolled by air at least 26 times per year to inspect the surface conditions of land on or adjacent to the pipeline right-of-way. If weather and other conditions permit, this aerial inspection is conducted weekly. Linewalking inspection of the right-of-way is sometimes used to supplement aerial inspections in congested areas. This inspection also assists in identifying unknown construction or other unsafe activity on the pipeline right-of-way.

Isolating valves are checked at least twice per year to ensure proper operation. In the event of a leak, it is important for valves to close properly to isolate the section of pipeline and minimize the amount of petroleum that may escape. Other components of the pipeline, such as tanks and pump stations are also routinely inspected.

The Company began a program in the 1970s of periodically inspecting the pipeline internally with an electronic inspection tool – called “instrument pigs.” These devices travel through the inside of the pipeline and either mechanically, ultrasonically, or magnetically examine the condition (dents, gouges, corrosion, or cracks) of the pipe by on-board computers. Results of the inspection are then analyzed, and the pipe inspected to verify preliminary findings and then repaired as required.

All overpressure safety devices capable of limiting, regulating, controlling, and/or relieving operating pressures are inspected and tested to ensure the device is in good mechanical condition and functioning properly.

Periodically, government officials inspect the Company’s compliance with applicable government regulations. Inspections of the Company’s written procedures, records, and facilities are routinely conducted by the OPS.

#### B.9.c.(5) Maintenance.

Many other maintenance activities are performed on the pipeline and related facilities. Enbridge has a comprehensive preventative maintenance program that meets and, in many cases exceeds, minimum federal safety standards set forth in 49 CFR Part 195. When facilities are added or replaced, there are comprehensive standards for their design and installation in both Enbridge procedure manuals and contract specifications. Repair pipe is pre-tested and other components used to repair the pipeline meet national standards and regulatory requirements. Other procedures, such as welding procedures, movement of the pipe, coating repair, corrosion control, and tank maintenance are all guided by written procedures which have been reviewed by the OPS inspectors.

#### B.9.c.(6) Training of Personnel.

The Company has established a comprehensive orientation, technical, safety, emergency, and on-the-job training program that is in compliance with the Operator Qualification rules issued by the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration under 49 CFR Part 195. As personnel progress in pipeline operation and maintenance positions, they receive hundreds of hours of formal and on-the-job training. Demonstrations of competence are shown through review of job

performance, periodic pipeline control system simulators, emergency exercises, welding certification tests, and other functions required to continue safe pipeline operation and maintenance.

**B.9.c.(7) Public Awareness Program.**

Enbridge conducts a comprehensive public education program to ensure that the affected public (those who work and live along the pipeline), excavators, local public officials, and emergency units of government are aware of how to recognize and avoid or respond to a pipeline emergency. Enbridge has also been active at the local, county, and state level in emergency response planning and joint training/exercises to prepare all potential responders to deal with emergencies.

The pipeline route is marked at all public road and railway crossings (at a minimum) to increase the public's awareness of the underground pipeline. Additional markings are posted at valves, other pipeline facilities, and stations along the pipeline route.

**B.9.c.(8) Emergency Preparedness.**

Enbridge's operating and maintenance practices are aimed at preventing emergencies on the pipeline. However, it is imperative that Enbridge be prepared to respond to an emergency should one occur. In addition to preventative activities described above, Enbridge's emergency response program includes pre-planning, equipment staging, notifications, and emergency and leak containment procedures.