

**Illinois Commerce Commission  
Response to Data Request dated August 31, 2007  
Enbridge Pipelines (Illinois) L.L.C.  
Docket No. 07-0446**

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**ICC Staff Data Request**

**ENG 1.1** What is the current demand for crude petroleum in the area served by the proposed pipeline? Provide the source of your estimate (i.e., Company documentation, Federal reports, etc.)

**Response prepared by:**

**Name:** Dale Burgess  
**Title:** Director Southern Access  
**Address:** 10201 Jasper Ave.  
Edmonton, AB T5J 3N7

The *Energy Information Administration* (EIA) divides PADD II into three refining districts for reporting purposes. The refining district labeled Indiana-Illinois-Kentucky includes the states of Indiana, Illinois, Kentucky, Tennessee, Michigan, and Ohio.<sup>1</sup> This refining district processed an average of 2,154 thousand barrels per day (kb/d) of crude during the period of 2000 to 2006,<sup>2</sup> but only produced 78

**Data Sources**

The historical data on crude petroleum supply and demand for the Midwest was compiled from the Energy Information Administration's (EIA) Petroleum Navigator and the 2000 to 2006 Petroleum Supply Annuals.

<sup>1</sup> SOURCE:

[http://www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/current/pdf/volume1\\_appendix\\_a.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/current/pdf/volume1_appendix_a.pdf)

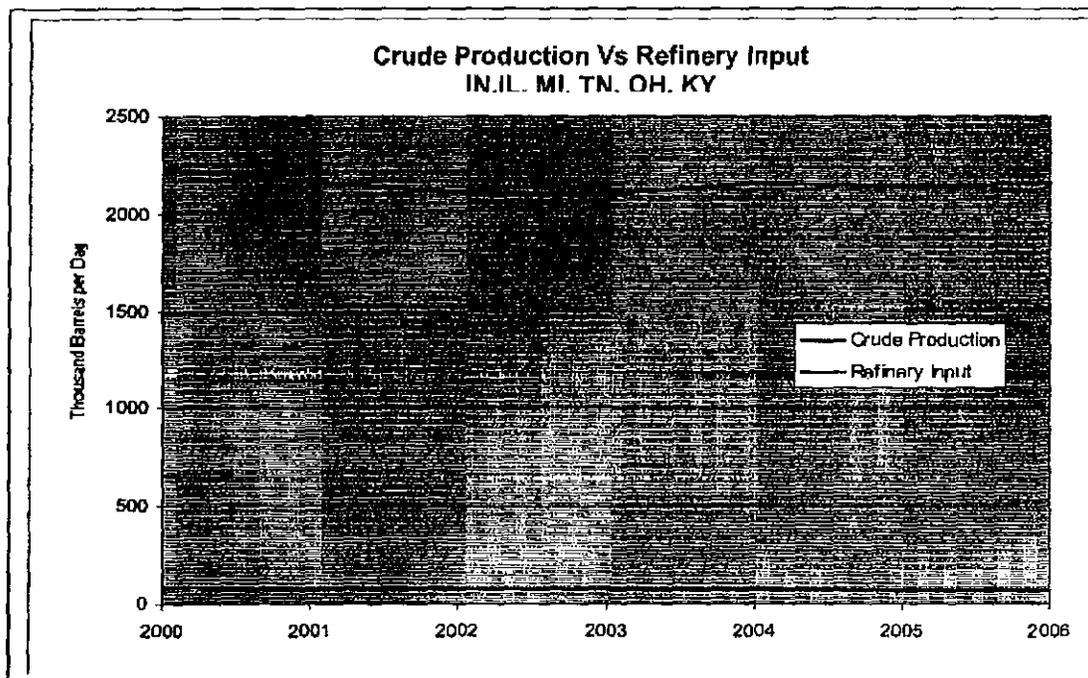
<sup>2</sup> SOURCE:

[http://www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/current/pdf/table\\_16.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/current/pdf/table_16.pdf)  
[http://www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/historical/2003/pdf/table\\_16.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/historical/2003/pdf/table_16.pdf)  
[http://www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/historical/2002/pdf/table\\_16.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/historical/2002/pdf/table_16.pdf)  
[http://www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/historical/2001/pdf/table\\_16.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/historical/2001/pdf/table_16.pdf)  
[http://www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/historical/2000/pdf/table\\_16.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/historical/2000/pdf/table_16.pdf)  
[http://tonto.eia.doe.gov/dnav/pet/pet\\_pnp\\_inpt\\_dc\\_r2a\\_mbb1\\_m.htm](http://tonto.eia.doe.gov/dnav/pet/pet_pnp_inpt_dc_r2a_mbb1_m.htm)  
[http://tonto.eia.doe.gov/dnav/pet/pet\\_crd\\_crpdn\\_adc\\_mbb1\\_m.htm](http://tonto.eia.doe.gov/dnav/pet/pet_crd_crpdn_adc_mbb1_m.htm)

**EXHIBIT 7A**

kb/d, or less than 4 percent of the crude demand.<sup>3</sup> Figure 1 illustrates the historical crude demand for the refining district that encompasses the Chicago area.

Figure 1



**Data Sources**

The historical data on crude petroleum supply and demand for the Midwest was compiled from the Energy Information Administration's (EIA) Petroleum Navigator and the 2000 to 2006 Petroleum Supply Annuals.

<sup>3</sup> SOURCE:

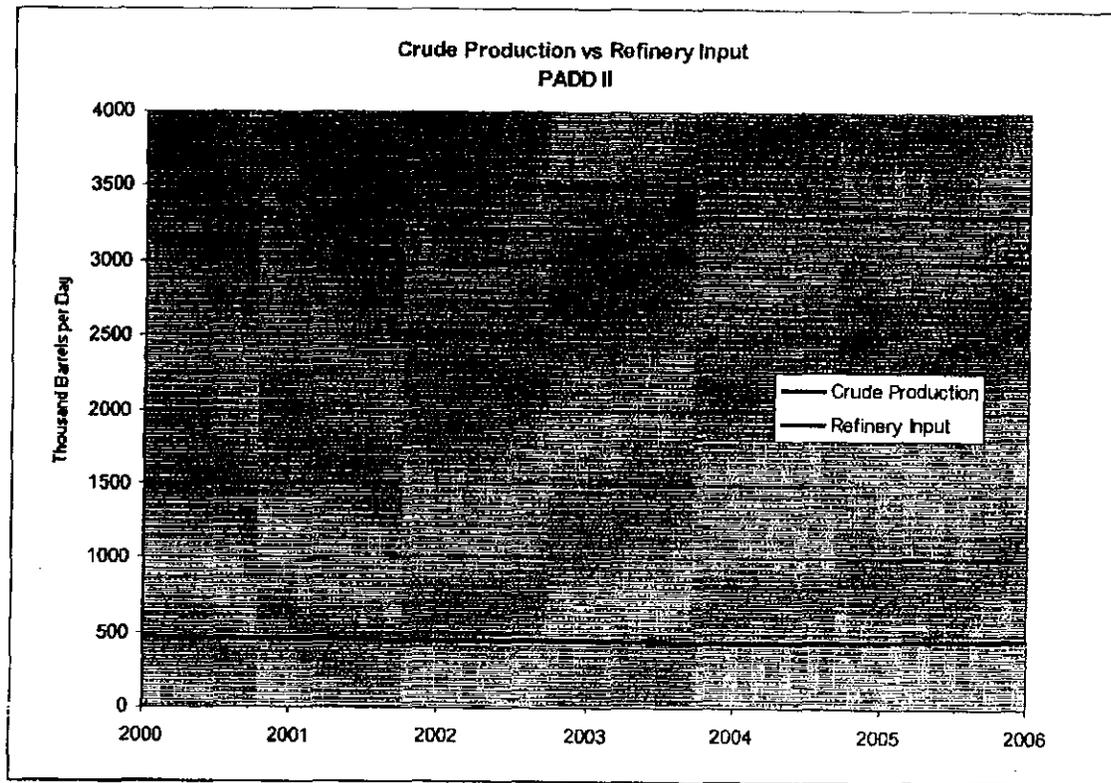
[http://www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/current/pdf/table\\_14.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/current/pdf/table_14.pdf)  
[http://www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/historical/2003/pdf/table\\_14.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/historical/2003/pdf/table_14.pdf)  
[http://www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/historical/2002/pdf/table\\_14.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/historical/2002/pdf/table_14.pdf)  
[http://www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/historical/2001/pdf/table\\_14.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/historical/2001/pdf/table_14.pdf)  
[http://www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/historical/2000/pdf/table\\_14.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/historical/2000/pdf/table_14.pdf)

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On a broader level, crude oil production in PADD II averaged about 452 kb/d from 2000 to 2006. During that same time period, more than 3,283 kb/d was processed by PADD II refineries. Figure 2 displays the historical crude demand for PADD II.

Figure 2



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ENG 1.2 What is the forecasted demand for crude petroleum in the area served by the proposed pipeline in one year, five years and ten years from today? Provide the source of your estimate (i.e., Company documentation, Federal reports, etc.).

**Response prepared by:**

**Name:** Dale Burgess  
**Title:** Director Southern Access  
**Address:** 10201 Jasper Ave.  
Edmonton, AB T5J 3N7

Each year, the Department of Energy's Energy Information Administration ("EIA") presents a forecast and analysis of U.S. energy supply, demand, and prices in its Annual Energy Outlook ("AEO"). The projections are based upon the results of the EIA's National Energy Modeling System. According to the 2006 AEO, PADD II refinery capacity is forecast to be comparatively constant throughout the forecast period. Refinery utilization is forecast to be slightly more volatile, peaking at 96 percent in 2006 and then declining to below 88 percent by 2014. After 2015, utilization rates begin to trend upward reaching 95 percent in 2025 and remaining at that level through 2030.<sup>4</sup> On Page 7, Figure 3 shows the EIA's PADD II refinery capacity and refinery utilization forecast through the year 2030.

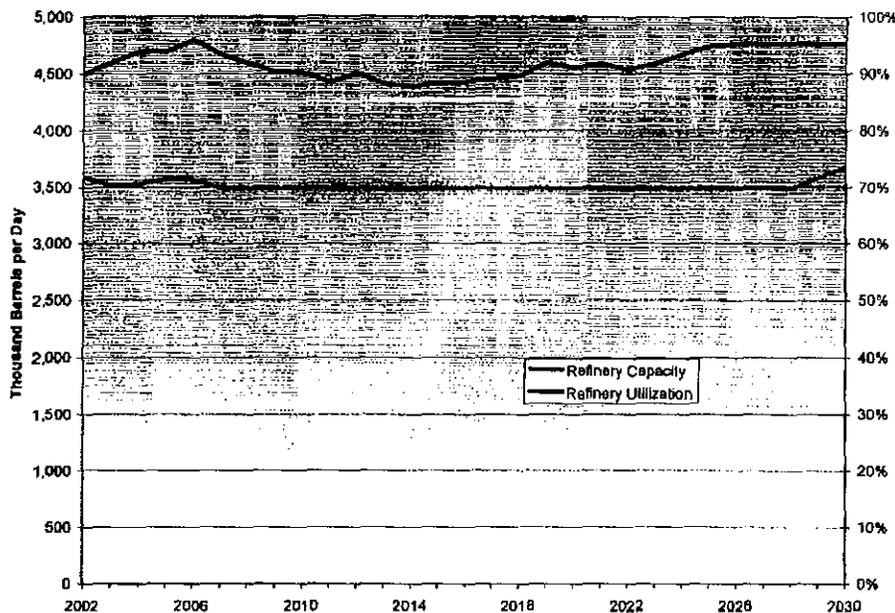
**Data Sources**

The historical data on crude petroleum supply and demand for the Midwest was compiled from the Energy Information Administration's (EIA) Petroleum Navigator and the 2000 to 2006 Petroleum Supply Annuals. The forecasted PADD II refinery capacity and utilization rate came from the 2006 *Annual Energy Outlook* (AEO).

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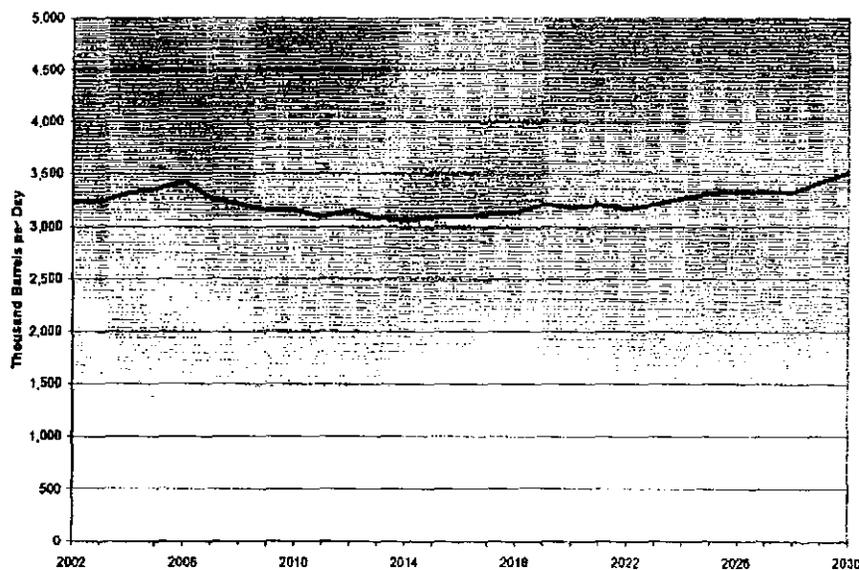
<sup>4</sup> SOURCE: [http://www.eia.doe.gov/oiaf/aeo/supplement/sup\\_ogc.xls](http://www.eia.doe.gov/oiaf/aeo/supplement/sup_ogc.xls)

Figure 3 PADD II Refinery Capacity vs. Utilization



Based on AEO's refinery capacity and utilization forecasts, crude demand forecasts for PADD II also can be calculated. Figure 4 illustrates the EIA's resultant PADD II crude demand outlook through 2030.

Figure 4 PADD II Crude Demand Forecast



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ENG 1.3 What means are currently available to provide the Chicago area with a supply of crude petroleum? Information should include amount of capacity available from each source (i.e., gallons per day available via pipeline, truck, rail, barge etc.) and the source of your estimate.

Response prepared by:

Name: Dale Burgess  
Title: Director Southern Access  
Address: 10201 Jasper Ave.  
Edmonton, AB T5J 3N7

To the best knowledge of Enbridge, there are no data available in the public domain identifying methods for which crude petroleum can be delivered to refineries in the Chicago area. However, the EIA did provide (until 2005) a report that shows the delivery mode (pipeline, barge, and truck) to refineries for crude petroleum supplied to all of PADD II. As reported, the vast majority of crude petroleum is delivered by pipeline. From 2002 to 2004, more than 99 percent of the 3.2 to 3.3 million barrels per day (bbl/d) of crude was delivered by pipeline. Trucks have delivered an average of 13 kb/d and barges about 1 kb/d, and these figures are detailed in the table below.<sup>5</sup>

The Chicago area refineries account for more than 35 percent of PADD II's total crude demand and, even if all of the PADD II barge and truck deliveries were made to just the Chicago area refineries, this would still constitute a small fraction of the pipeline deliveries.<sup>6</sup>

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<sup>5</sup> SOURCE:

[www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/current/pdf/table\\_46.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/current/pdf/table_46.pdf)  
[www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/historical/2003/pdf/table\\_46.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/historical/2003/pdf/table_46.pdf)  
[www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/historical/2002/pdf/table\\_46.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/historical/2002/pdf/table_46.pdf)

<sup>6</sup> SOURCE:

[http://www.eia.doe.gov/pub/oil\\_gas/petroleum/data\\_publications/petroleum\\_supply\\_annual/psa\\_volume1/current/pdf/table\\_38.pdf](http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/current/pdf/table_38.pdf)

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*Table 1*

**PADD II Crude Oil Receipts**  
*(Thousand Barrels per Day)*

	<b>2002</b>	<b>2003</b>	<b>2004</b>
<b>Pipeline</b>	3194	3194	3291
<b>Barge</b>	1	1	1
<b>Trucks</b>	13	16	9

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ENG 1.4 What means, besides those listed in response to Staff data request ENG 1.3, are projected to be available to provide the central Illinois area with a supply of crude petroleum one year, five years and ten years from today? Information should include amount of capacity available from each source (i.e., gallons per day available via pipeline, truck, rail, barge etc.) and the source of your estimate.

Response prepared by:

Name: Dale Burgess  
Title: Director Southern Access  
Address: 10201 Jasper Avenue  
Edmonton, AB T5J 3N7

As stated in ENG 1.3 above, Enbridge has no knowledge of publicly available data that identifies delivery methods and provides forecasted crude oil volumes for deliveries to refineries located in the Chicago area, especially with regard to truck, rail and/or barge. Enbridge has compiled an overview map that shows the existing petroleum pipelines located in PADD II and their respective pipeline capacities (refer to response to ENG 1.11). This information enables the ICC Staff to view the maximum volumes that could be transported into the PADD II area on a daily basis. Additionally, Enbridge has included on this map, the four (4) proposed projects to build pipeline infrastructure in the immediate PADD II area (Enbridge's Alberta Clipper, LSr, Southern Access Expansion & Extension Projects, TransCanada's Keystone Project and Minnesota Pipe Line's MinnCan Project). Such map is enclosed herewith as Attachment A.

**EXHIBIT 7D**

ICC Staff Data Request

ENG 1.5 Does the Company plan on using any non-industry standard construction practices in the building of the proposed pipeline? If yes, describe the location of all such instances, how it deviates from the industry standard and explain why a non-industry standard construction practice is being used.

Response prepared by:

Name: Dale Burgess  
Title: Director Southern Access  
Address: 10201 Jasper Avenue  
Edmonton, AB T5J 3N7

Enbridge has no plans to use non-industry standard construction practices in the construction of its 36-inch crude line. Enbridge plans to employ proven practices and techniques aimed at minimizing impacts from pipeline construction. This applies to all types of terrain along the proposed pipeline route.

More specifically, Enbridge plans to use conventional construction practices and also plans to employ the following other types of standard construction procedures and practices:

- Use of horizontal directional drills when driven by the crossing, allowed by geology and deemed appropriate by permitting agencies;
- Use of construction techniques to push pipeline sections in longer saturated wetland areas and use of concrete coating when pushes are required;
- Use of weights in wet areas when pipe can be laid; and
- Installation of road bores and drain tile as required.

Additionally, Enbridge recognizes that a vast majority of the proposed pipeline right-of-way will be located in prime agricultural lands, and for that reason, it has been working diligently with the Illinois Department of Agriculture and other interested federal, state and local agencies to develop a quality plan that will ensure protection of future crop productivity in areas disrupted by pipeline construction. As a direct result of this coordinated effort by all involved stakeholders, Enbridge has developed a comprehensive Agriculture Impact Mitigation Agreement (AIMA) that has been accepted and executed by the Illinois Department of Agricultural. In this agreement, Enbridge has agreed to a minimum depth of five (5) feet coverage in cultivated areas

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and additional depth as necessary in areas with drain tiles. The executed AIMA was filed as Exhibit C to Enbridge's Extension application docketed as 07-0446.

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**ICC Staff Data Request**

**ENG 1.6** Provide a list of all international, federal, state and local permits, licenses, and other similar type of documents which Enbridge will be required to obtain in order to construct its proposed pipeline. Include as part of the list the identity of each entity from which a permit, license or other similar type document must be obtained and indicate whether or not the permit, license or other similar type document has already been obtained. For all permits, licenses, and other similar type documents which Enbridge has already obtained, provide a copy of each, or a reference to their location if they have been previously provided. For all permits, licenses, and other similar type documents that have not been obtained, provide the status of Enbridge's efforts to obtain the permit, license or other similar type document, including a history of Enbridge's actions to date to obtain the permit, license or other similar type document to date, and an estimate of when Enbridge believes it will obtain the permit license or other similar type document. This response should be updated with copies of permits as they are obtained.

**Response prepared by:**

**Name:** Dale Burgess  
**Title:** Director Southern Access  
**Address:** 10201 Jasper Avenue  
Edmonton, AB T5J 3N7

As enclosed herewith as Attachment B is a list of the federal, state and local permitting agencies that Enbridge is presently working with to secure the permits required to construct the proposed pipeline.

**EXHIBIT 7F**

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 Attachment B

Federal Permits/Approvals	Agency	Comments	Status
USACOE NWP 12	US Army Corps of Engineers (COE)	Yes - primary permit required. One will be needed each from Rock Island District and St. Louis District. Illinois has joint application process allowing multi-agency review through 40 process	Application submitted September 23, 2007
Section 401 and 402 of the Clean Water Act	US Environmental Protection Agency (EPA)	Essentially automatic with 404 so long as conditions can be met	See above for USACOE NWP 12.
Special Use Permit	Various Counties	Review required for McLean County. Permit required for Macon and Christian Counties. No other project county or municipality appears to require anything	Pipeyards - Christian County approval was received on September 10, 2007. Application to McLean submitted on September 9, 2007 and currently under review by Town of Normal. Planning and Zoning and City Council to vote on rezoning on November 8 and 19 respectively. Pump Station - Macon County application submitted October 1, 2007. Planning and Zoning meetings for rezoning request scheduled November 7, 15, and December 13, 2007.
Section 10 of the Rivers and harbors Act and Section 404 of the Clean Water Act	US Army Corps of Engineers (COE)	Yes - National Environmental Protection (NEPA) compliance through the COE permit. Section 10 is required for the crossing of Traditionally Navigable waters. The Section 404 permit is required to work in wetlands. Tribal consultations are required by the COE to meet NEPA compliance	See above for USACOE NWP 12.
Endangered Species Act Compliance	U.S. Fish and Wildlife Service	Compliance with is a condition to meet COE permit.	See above for USACOE NWP 12.

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Permits/Approval	Agency	Comments	Status
Section 401 Water Certification	Illinois EPA	Federal water quality certification required as part of COE and NPDES permits. If ACOE determines State conditions are met, 401 is automatic.	See above for USACOE NWP 12.
National Historic Preservation Act Consultation	Illinois Historic Preservation Agency	Condition of COE permit to meet NHPA compliance	See above for USACOE NWP 12.
State Threatened and Endangered Species Review	Illinois Department of Natural Resources (DNR)	Required by the IDNR. Identical on of any T & E species in the project area. Will be reviewed through joint permit application process.	See above for USACOE NWP 12.
Agricultural Impact Mitigation Agreement	Illinois Department of Agriculture	Agreement with the Illinois Department of Agriculture	Agreement signed July 23, 2007
Statewide 8 - Underground Pipeline and Utility Crossings	IDNR	Yes but conditions appear to be able to be met	
County Special or Conditional Use Review	McLean County	Review needed by county. After stating no permit was required, Town of Normal decided it needed to have one of the two pipeyard properties rezoned.	Rezoning application submitted September 9, 2007 with votes to be held November 8 and 19, 2007.
County Special or Conditional Use Permit	Macon County	Special Use permit and variance required by Macon for pump station	Application submitted for pump station October 1, 2007. Meetings to be held November 7, 15, and December 13, 2007.
County Special or Conditional Use Permit	Christian County	Special Use Permit required by County for pipeyard	Permit approved September 7, 2007
Conditional Use Review	City of Vandalia	Review of Use requested by City of Vandalia for pipe offload property.	Use approved September 7, 2007.

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Local Permits / Agency	Agency	Comments	Status
Local Environmental Concerns Livingston County	County Farm Bureau Soil and Water Conservation District	None required.	Farm Bureau Meeting held August 30, 2007 to provide landowners opportunity to discuss project.
Local Environmental Concerns McLean County	County Farm Bureau Soil and Water Conservation District	None required.	Farm Bureau Meeting held August 29, 2007 to provide landowners opportunity to discuss project.
Local Environmental Concerns De Witt County	County Farm Bureau Soil and Water Conservation District	None required.	Farm Bureau Meeting held August 23, 2007 to provide landowners opportunity to discuss project.
Local Environmental Concerns Macon County	County Farm Bureau Soil and Water Conservation District	None required.	Farm Bureau Meeting held August 22, 2007 to provide landowners opportunity to discuss project.
Local Environmental Concerns Christian County	County Farm Bureau Soil and Water Conservation District	None required.	Farm Bureau Meeting held August 21, 2007 to provide landowners opportunity to discuss project.
Local Environmental Concerns Shelby County	County Farm Bureau Soil and Water Conservation District	None required.	Farm Bureau Meeting held August 21, 2007 to provide landowners opportunity to discuss project.
Local Environmental Concerns Fayette County	County Farm Bureau Soil and Water Conservation District	None required.	Farm Bureau Meeting held August 20, 2007 to provide landowners opportunity to discuss project.
Local Environmental Concerns Marion County	County Farm Bureau Soil and Water Conservation District	None required.	Farm Bureau Meeting held August 20, 2007 to provide landowners opportunity to discuss project.

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ENG 1.7 Provide a color coded map or maps which shows the existing and any proposed pipelines that provide crude petroleum deliveries to the state of Illinois. Also, list the capacity of each line, the line's owner, the line operator and explain if each is solely used for the transportation of crude petroleum. If not, explain how frequently those pipelines are used for the delivery of crude petroleum.

Response prepared by:

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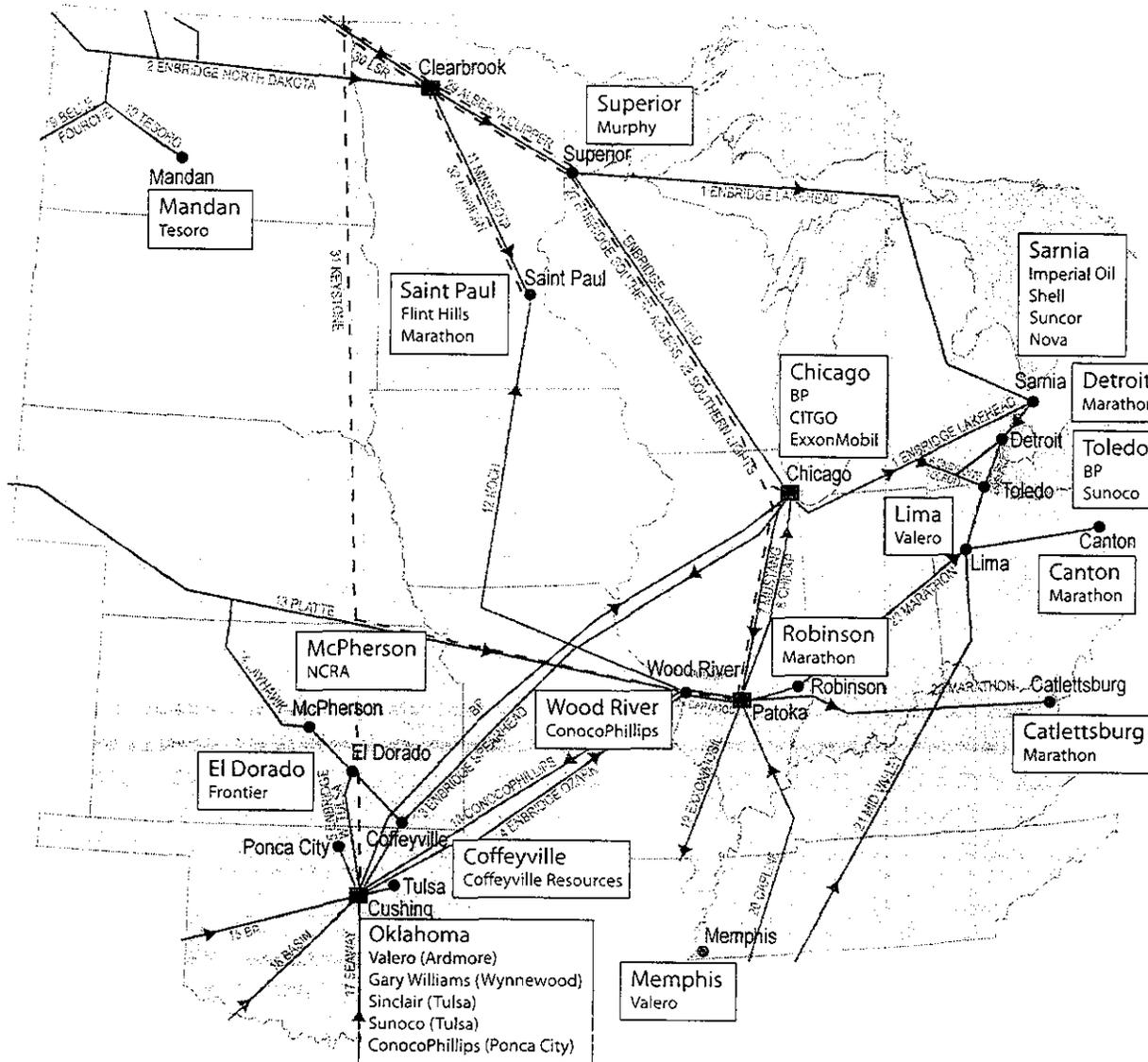
Enclosed herewith as Attachment A is a color map that shows existing and proposed crude petroleum pipelines serving refineries in the PADD II area including Illinois. The legend on the map indicates the name of the system; its owner/operator; and its publicly reported pipeline capacity.

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Attachment A**

## **ATTACHMENT A**

**Map of Liquid Petroleum Pipelines in PADD II**

## Major Crude Petroleum Pipelines and Refineries in PADD II



PIPELINES		
NAME	CAPACITY (bbls/d)	OWNER/OPERATOR*
1 Lakehead	1,430,000	Enbridge
2 North Dakota	75,000	Enbridge
3 Spearhead	125,000	Enbridge
4 Ozark	230,000	Enbridge
5 West Tulsa	68,500	Enbridge
6 Toledo	100,000	Enbridge
7 Mustang	100,000	ExxonMobil*, Enbridge
8 Chicap	360,000	BP*, Chevron, Enbridge
9 Belle Fourche	50,000	True Companies
10 Tesoro	58,000	Tesoro
11 Minnesota	290,000	Koch*, Marathon, Trof Inc.
12 Koch	N/A	Koch
13 Platte	150,000	Kinder Morgan
14 Jayhawk	37,000	Nat'l. CRA
15 BP	177,000	BP
16 Basin	400,000	Plains*, TEPPCO
17 Seaway	350,000	TEPPCO*, ConocoPhillips
18 ConocoPhillips	20,000	ConocoPhillips
19 ExxonMobil	65,000	ExxonMobil
20 Capline	1,140,000	Shell*, Marathon, Plains, BP, Chevron
21 Mid Valley	238,000	Sunoco*, BP
22 Marathon	210,000	Marathon
23 Marathon	300,000	Marathon
24 Woodpat	310,000	Marathon
25 Capwood	277,000	Plains*, Valero
26 Sunoco	190,000†	Sunoco
PROPOSED PIPELINES		
27 Southern Access & Ext.	400,000	Enbridge
28 Southern Lights (diluent)	180,000	Enbridge
29 Alberta Clipper	450,000	Enbridge
30 LSR	186,000	Enbridge
31 Keystone	435,000	TransCanada
32 MinnCan	165,000	Koch*, Marathon, Trof

\*Indicates operator for joint venture pipelines  
†After expansion completion in 2007

LEGEND	
	Major crude oil pipelines
	Proposed crude oil/diluent pipelines
	Local refineries
	Pipeline hubs

Based on publicly available mapping information.  
Not to scale, June 2006.

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ENG 1.8 Provide a detailed description, including any studies completed, which shows all the various alternatives considered, in addition to the proposed pipeline, for delivery of crude oil to the Patoka area.

Response prepared by:

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Edmonton, AB T5J 3N7

Southern Access Extension Route Analysis

Enclosed herewith as Attachment C, is the route alternative analysis and map compiled by Enbridge for its Southern Access Extension Project.

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## **ATTACHMENT C**

**Route Alternative Analysis & Map for Southern Access Extension Project**

**SOUTHERN ACCESS EXTENSION  
ROUTE ALTERNATIVES ANALYSIS**

Prepared For:

***ENBRIDGE™***

**Enbridge (U.S.) Inc.**  
Superior Center, 2<sup>nd</sup> Floor  
1409 Hammond Avenue  
Superior, WI 54880-5247

Date: July 18, 2006

URS Corporation  
Thresher Square  
700 Third Street South, Suite 700  
Minneapolis, Minnesota 55415  
612 370 0700 Tel  
612 370 1378 Fax



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# SOUTHERN ACCESS EXTENSION ROUTE ALTERNATIVES ANALYSIS



## EXECUTIVE SUMMARY

### OVERVIEW

Enbridge (U.S.) Inc. (Enbridge) is evaluating the feasibility of constructing approximately 170 miles of crude oil pipeline from Enbridge's Flanagan Illinois terminal facility to a proposed terminal near Patoka Illinois (**Figure 1-1**). This proposed project, known as "Southern Access Extension" is a proposed extension of Enbridge's Southern Access project. The current Southern Access project is being developed in two stages (Stages 1 and 2). Stage 1 of Southern Access begins at Enbridge's terminal facility in Superior Wisconsin and traverses to Enbridge's Delavan pump station near Whitewater, in Rock County, Wisconsin. Stage 2 of Southern Access travels in a general southerly direction from the Delavan station, crosses the Wisconsin/Illinois border and terminates/interconnects to Enbridge's Spearhead Pipeline at the Flanagan terminal. The Southern Access Extension (hereto referred to as Stage 3 of Southern Access) would route from the Flanagan terminal to a terminal facility near Patoka, Illinois. Stages 1 and 2 of the project are 42-inch pipeline with Stage 3 currently designed for 36-inch pipeline construction.

Upon completion, Southern Access and Southern Access Extension will have the capacity to transport 400 mb/d to upper and central US markets. A proposed \$1.6 billion investment, the Southern Access project is a portion of Enbridge's overall strategy to enhance Enbridge's position in transporting crude oil from western Canada's oil sands region to the U.S. market. The project, when constructed, will expand Enbridge's U.S. market refining customer base, increase Enbridge's geographic delivery capabilities and assist in decreasing the reliance of the U.S. market on overseas oil supplies.

In accord with Enbridge's corporate mission and high expectations for environmental protection and project efficiency, Enbridge has commissioned the completion of a route alternatives analysis for Stage 3 of the Southern Access project. The route alternatives analysis was conducted during portions of June and July 2006 by URS Corporation (URS) in conjunction with Enbridge personnel and with input from Rooney Engineering, Denver, CO. Through this synergistic process, environmental and engineering considerations were integrated into the development of the route alternatives evaluation process.

The objective of the route alternatives analysis was to identify, evaluate and communicate potential route alternatives which could achieve Enbridge's commercial requirements for the project. Specific focus was placed on routing, to the extent possible, along existing linear corridors such as pipeline right-of-way (ROW), transmission lines and other linear features. In addition, the potential ROW acquisition by Enbridge of an existing pipeline ROW owned by Central Illinois Pipeline Company (CIPC) between the Heyworth and Patoka Illinois segments of Stage 3 was evaluated in concert with other routing opportunities. Through this approach, avoidance of the Illinois Commerce Commission (ICC) Certificate of Need (CON) process and associated potential land condemnations is maximized. In addition, by focusing on routing along existing linear corridors, the need for greenfield ROW construction was minimized; thus supporting Enbridge's goal of minimizing environmental impacts and associated mitigation requirements.

# SOUTHERN ACCESS EXTENSION ROUTE ALTERNATIVES ANALYSIS



The scope of work for the study involved the following key activities:

- General review of project area anthropogenic characteristics;
- Development of a geographic information system (GIS) data set of the project area including natural resource, cultural resource, wetland, stream/river crossing, utility corridor and routing mileage data sets ;
- A route alternatives analysis of 28 potential routes within the project area based on the GIS data set;
- A ranking of the alternative routes using URS' route alternative analysis model;
- Selection of a preliminary preferred route; and,
- Identification of significant environmental permits and approvals required for the construction of the project.

Due to the confidential nature of the proposed project, minimal communications with government regulatory agencies were conducted. As such, key consultations that could further confirm certain aspects of the requirements of the project were not pursued. Published government regulatory agency literature, public domain and third-party databases and the preparer's experience with similar projects were used to evaluate environmental issues and project permitting requirements. To allow for appropriate use of this data, certain assumptions were made and documented in the completion of this study.

## PROJECT AREA DESCRIPTION

The proposed pipeline route corridor area (Project Area) extends from near Flanagan and Pontiac, Illinois to near Patoka, Illinois. Counties traversed in the Project Area include: Livingston, McLean, Ford, Champaign, DeWitt, Piatt, Macon, Moultrie, Shelby, Christian, Fayette, and Marion.

The Project Area is mostly rural with agriculture being the primary land use. Scattered residences are located throughout the area along highways and local roads. Commercial and industrial land uses appear to be limited to pipeline terminals located along existing facilities and near the Decatur, Pontiac, and Bloomington-Normal municipal areas. Several small towns and villages are also located in the Project Area

## ROUTE SELECTION

### Identification of Alternative Pipeline Routes

A comprehensive route evaluation and selection process was utilized in evaluating routing alternatives for Stage 3 of Southern Access. A routing alternatives analysis was completed and consisted of:

- Identification of alternative pipeline routes;
- Evaluation of alternative routes; and,
- Selection and refinement of preferred route(s).

# SOUTHERN ACCESS EXTENSION ROUTE ALTERNATIVES ANALYSIS

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The initial routing analysis effort focused on identifying routing opportunities such as following existing linear facilities (e.g., other pipelines, electric transmission lines, railroads, roads, other similar facilities) and routing constraints such as topography, population centers, water bodies, wetlands, forests, recreation areas, sensitive natural areas and other similar features. The initial routing analysis effort was completed using available information such as maps and aerial photographs.

## **Routing Alternatives Analysis**

Based on further desktop review and preliminary refinements, 28 alternative routes (designated routes 1 through 28) were established and evaluated using a proprietary URS decision analysis model. To develop input to the decision analysis model, an environmental Geographic Information System (GIS) data set was established for the general routing corridor area using various government agency natural resource inventory data bases, National Pipeline Mapping System (NPMS) data and other data sources.

Based on input from Enbridge, the set of key opportunities and constraints data used to evaluate and compare the 28 alternatives included the following:

- Total length;
- Important biological resource areas;
- Wetland areas;
- Sensitive cultural resource areas;
- Important jurisdictional land use areas;
- Stream/river crossings;
- Urban/developed areas;
- Existing linear facilities/utility planning corridors; and,
- Permitting feasibility

Based on the decision analysis procedure, Alternative Route 11 was ranked best and was designated as the preliminary “preferred route”. Alternative Route 10 was ranked second. Both of these routes utilized to some extent the CIPC existing pipeline ROW being evaluated by Enbridge for acquisition. The preferred route consistently ranked high in overall environmental protection and offered one of the lower overall construction mileage distances.

## **Preferred Route General Description**

The preferred route is 172.3 miles-long and extends generally south from Enbridge’s Flanagan terminal facility, located north of the City of Pontiac, to a point just southeast of numerous crude oil terminal facilities (including Enbridge’s proposed Patoka Terminal), located east of the Village of Patoka, Illinois. The route heads west-southwest from the Flanagan terminal parallel to Enbridge’s Spearhead Pipeline for 14 miles. The route turns to the south heading across mostly agricultural land for approximately 30 miles. This north-south greenfield corridor passes east of the Bloomfield-Normal municipal area.

The preferred route turns to the southwest for approximately 10 miles parallel to an existing crude pipeline, avoiding the Village of Downs, to an initiation point of an existing ROW near Heyworth, Illinois. From Heyworth, the route continues generally south along existing CIPC right-of-way. This segment passes west of Clinton, crosses the Village of Harristown, passes just west of the City of Decatur, passes east of Pana, crosses Interstate 40 and terminates near Patoka Illinois. The existing right-of-way incorporated into this preferred route totals approximately 143 miles.

#### **Preferred Route Environmental and Land Use Features**

The preferred route traverses an estimated 0.49 miles of important biological resource areas, 2.8 miles of wetland areas, 41.1 miles of potentially sensitive cultural resource areas, zero miles of important jurisdictional land, 97 stream and river crossings, 0.6 miles of urban/developed area and utilizes 143 miles (83.1 % of the total length) of existing linear corridors. The large majority of land use along the preferred route is agriculture.

#### **ENVIRONMENTAL PERMITS**

Environmental permitting for Southern Access Stage 3 will be multi-jurisdictional with no clearly defined regulatory primacy as in the case of a FERC filing. However, based on our experience with similar projects in Illinois it is our opinion that the COE will be the primary “de-facto” lead agency with significant involvement from Illinois state regulatory agencies. Based on the review of the preferred route, the following significant environmental permitting activities will be required:

- COE Section 404 permitting and NEPA compliance to include interaction and permitting/review by COE Rock Island and St. Louis Districts, IDNR, ISHPO and IEPA;
- State wetland permitting to include interaction and permitting/review by COE and IDNR;
- Section 401 WQC to include interaction and permitting/review by COE and IDNR; and,
- Stream/river crossing permitting to include interaction and permitting/review by COE, IDNR and IEPA.

Based on the data reviewed, no known “fatal flaw” environmental resource issues which would preclude approval of environmental permits are known to exist along the preferred route. It is recommended that emphasis be placed on well timed and phased consultations to streamline permitting processes and to ensure appropriate in-service date schedule. We do not anticipate any significant permitting issues outside of the norm for pipeline routing and construction projects. To maintain the currently projected project schedule, we recommend that agency consultations and field survey preparation activities be initiated as soon as possible.

# SOUTHERN ACCESS EXTENSION ROUTE ALTERNATIVES ANALYSIS



## NOMENCLATURE LIST

ACHIP	Advisory Council on Historic Preservation
BMPs	Best Management Practices
CIPC	Central Illinois Pipeline Company
CERCLIS	Comprehensive Environmental Response, Compensation, and Responsibility Information System
CWA	Clean Water Act
ESA	Endangered Species Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
ERNS	Emergency Response Notification System
FERC	Federal Energy Regulatory Commission
FirstSearch	FirstSearch Technology Corporation
GIS	Geographic Information Systems
GPS	Global Position System
HDD	Horizontal direction drilling
ICC	Illinois Commerce Commission
IDA	Illinois Department of Agriculture
IDNR	Illinois Department of Natural Resources
IEPA	Illinois Environmental Protection Agency
IHPA	Illinois Historic Preservation Act
LUST	Leaking Underground Storage Tank
NRCS	National Resources Conservation Service
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
NFRAP	No Further Remedial Action is Planned
NOI	Notice of Intent
OPS	Office of Pipeline Safety

# SOUTHERN ACCESS EXTENSION ROUTE ALTERNATIVES ANALYSIS



## NOMENCLATURE LIST (CONT.)

RCRA	Resources Conservation and Recovery Act
REC	Recognized Environmental Condition
ROW	Right-Of-Way
SHPO	State Historic Preservation Officer
SWPPP	Stormwater Pollution Prevention Plan
TSD	Treatment, Storage, and Disposal
T&E	Threatened & Endangered Species
COE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tank
WQC	Water Quality Certification

# SOUTHERN ACCESS EXTENSION ROUTE ALTERNATIVES ANALYSIS



## 1.0 INTRODUCTION

### 1.1 Background

Enbridge (U.S.) Inc. (Enbridge) is evaluating the feasibility of constructing approximately 170 miles of crude oil pipeline from Enbridge's Flanagan terminal facility, located near Flanagan, Illinois to a terminal facility near Patoka, Illinois (**Figure 1-1**). This proposed project, known as "Southern Access Extension" is a proposed extension of Enbridge's Southern Access project. The current Southern Access project is being developed in two stages (Stages 1 and 2). Stage 1 of Southern Access begins at Enbridge's terminal facility in Superior Wisconsin and traverses to Enbridge's Delavan pump station near Whitewater in Rock County Wisconsin. Stage 2 of Southern Access routes in a general southerly direction from Delavan station, crosses the Wisconsin/Illinois border and terminates/interconnects to Enbridge's Spearhead Pipeline at the Flanagan terminal. Southern Access Extension (hereto referred to as Stage 3 of Southern Access) would route from Flanagan terminal to a proposed terminal facility near Patoka Illinois. Stages 1 and 2 of the project are 42-inch pipeline, with Stage 3 currently designed for 36-inch pipeline construction.

Upon completion, Southern Access and Southern Access Extension will have the capacity to transport 400 mb/d to upper and central US markets. A proposed \$1.6 billion investment, the Southern Access project is a portion of Enbridge's overall strategy to enhance Enbridge's position in transporting crude oil from western Canada's oil sands region to the U.S. market. The project, when constructed, will expand Enbridge's U.S. market refining customer base, increase Enbridge's geographic delivery capabilities and assist in decreasing the reliance of the U.S. market on overseas oil supplies.

In accord with Enbridge's corporate mission and high expectations for environmental protection and project efficiency, Enbridge has commissioned the completion of a route alternatives analysis for Stage 3 of the Southern Access project. The route alternatives analysis was conducted during portions of June and July 2006 by URS Corporation (URS) in conjunction with Enbridge personnel and with input from Rooney Engineering, Denver, CO. Through this synergistic process, environmental and engineering considerations were integrated into the development of the route alternatives evaluation process.

### 1.2 Purpose and Objectives

The objective of the route alternatives analysis was to identify, evaluate and communicate potential route alternatives which could achieve Enbridge's commercial requirements for the project. Specific focus was placed on routing, to the extent possible, along existing linear corridors such as pipeline right-of-way (ROW), transmission lines and other linear features. In addition, the potential ROW acquisition by Enbridge of an existing pipeline ROW (Central Illinois Pipeline Company (CIPC)) between the Heyworth and Patoka Illinois segments of Stage 3 was evaluated in concert with other routing opportunities. Through this approach, avoidance of the Illinois Commerce Commission (ICC) Certificate of Need (CON) process and associated potential land condemnations was maximized. In addition, by focusing on routing along existing

# SOUTHERN ACCESS EXTENSION ROUTE ALTERNATIVES ANALYSIS



linear corridors, the need for greenfield ROW construction was minimized; thus supporting Enbridge's goal of minimizing environmental impacts and associated mitigation requirements.

The scope of work for the study involved the following key activities:

- General review of project area anthropogenic characteristics;
- Development of a geographic information system (GIS) data set of the project area including natural resource, cultural resource, wetland, stream/river crossing, utility corridor and routing mileage data sets ;
- A route alternatives analysis of 28 potential routes within the project area based on the GIS data set;
- A ranking of the alternative routes using URS' route alternatives analysis model;
- Selection of a preferred route; and,
- Identification of significant environmental permits and approvals required for the construction of the project.

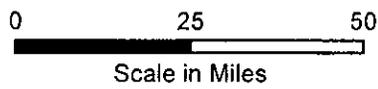
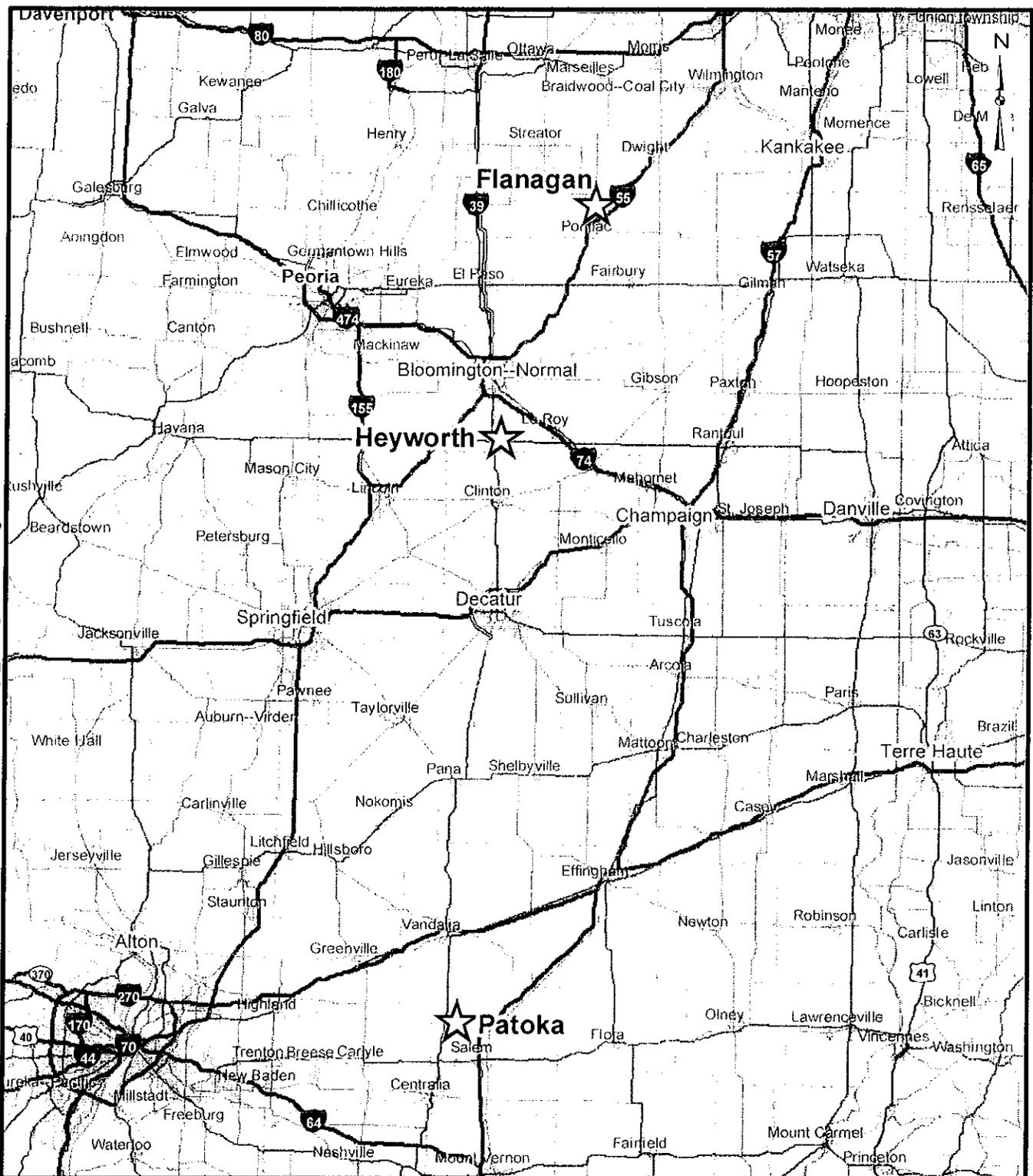
The purpose of this current *Route Alternatives Analysis Report* is to report upon the findings of this effort. The report provides a comprehensive overview of the scope of work commissioned by Enbridge and the findings of the route alternatives analysis. The report addresses the following key areas:

- **Methodology:** Methodologies used in the route selection analysis and development of the environmental permitting overview;
- **Project Area Description:** A general anthropogenic description of the proposed project route area;
- **Route Selection:** A description of the route selection process including the routing alternatives analysis, potential routes reviewed and final preferred route; and
- **Environmental Permits:** A review and description of the environmental permits and projected approvals required for the construction of Stage 3 of Southern Access along the preferred route.

The overall objective of this information and report is to identify the route alternatives reviewed, the preferred route selected and the key environmental permits that would be required for construction of Stage 3 of Southern Access. Text, tables and figures which support the discussion of these key issues are provided throughout this report.

Due to the confidential nature of the proposed project, communications with government regulatory agencies were not conducted. As such, key consultations that could further confirm certain aspects of the requirements of the project were not pursued. Published government regulatory agency literature, public domain and third-party databases and the preparer's experience with similar projects were used to evaluate environmental issues and project permitting requirements. To allow for appropriate use of this data, certain assumptions were made and documented in the completion of this study.

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Southern Access Pipeline Stage 3  
**ENBRIDGE**™ Route Alternatives Analysis

FIGURE 1-1  
 GENERAL PROJECT LOCATION

BASE MAP SOURCE:  
 ESRI Streetmap Data, 2005

JOB NO. 31810124

**URS**

**2.0 METHODOLOGY**

**2.1 Geographic Information System**

The project team which included both Enbridge and URS personnel, participated in the development and evaluation of potential alternative pipeline routes for the project. To engage in the analysis, a detailed geographic information system (GIS) data set was developed specific to the project area. Data sources used in the pipeline routing analysis and other work elements of the project are listed in **Table 2-1**.

**Table 2-1  
Routing Analysis Data Sources**

<b>Data Description</b>	<b>Data Source</b>	<b>Data Utilization</b>
Mapped Wetland Areas	National Wetland Inventory (NWI)	Identification of mapped wetland areas
Municipal Areas	Illinois Department of Natural Resources (IDNR)	Identification of urban and populated areas
Archaeology Resource Potential	IDNR	Estimation of areas with high potential for cultural resources sites
Streams and Rivers	ESRI Geographic Information Systems (GIS) data and USGS 7.5' Topographic Quadrangles	Base mapping and stream crossing locations
Unique and Highly Valued Waterways	IDNR	Biologically sensitive stream crossings
Species of Concern	Illinois Department of Natural Resources Natural Heritage Database	Biologically sensitive areas
Parks, Nature Preserves, Federal Land, Fish and Wildlife Areas, State Forests, Conservation Areas, and Recreational Areas	National Park Service (NPS), IDNR	Locations of parks, nature preserves, and other jurisdictional lands
Road Centerlines	ESRI GIS data	Base mapping
Aerial Photography	National Agricultural Imagery Program	Base mapping and data validation
USGS 7.5' Topographic Quadrangle Maps	US Geological Survey (USGS)	Base mapping and data validation

**2.2 Route Selection Decision Analysis Model**

URS utilized a decision analysis model to interpret the GIS data set and ultimately develop a ranking of the route alternatives in the project area. The decision analysis model is particularly useful when the decision problem involves many alternatives; the overall desirability of each alternative depends on multiple evaluation criteria; and no single alternative is superior to all other alternatives with regard to each evaluation criterion. Applying the decision model to a specific problem requires defining a set of feasible alternatives and relevant evaluation criteria that affect the desirability of each alternative. For each evaluation criterion, a specific measure is defined to assess the impact of each alternative on the criterion. The measure could be either quantitative, which uses a continuous, natural scale; or qualitative, which uses a subjective, discrete scale. For example, for the criteria of cost and important biological resource impact, quantitative measures could be dollars and miles through biologically sensitive area, respectively. An example of a qualitative measure is high, medium, and low permitting

# SOUTHERN ACCESS EXTENSION ROUTE ALTERNATIVES ANALYSIS



feasibility. Each level of a qualitative measure is described in sufficient detail so that the conditions under which a particular level is assessed for a given alternative are clearly identified and consistently applied. Using available data for the alternatives being evaluated, the impact of each alternative on each evaluation criterion is assessed. The results are organized in an impact score matrix, in which each row represents one specific alternative and the columns show the impact of the alternative on each evaluation criterion, expressed on the scale of the associated measure (e.g., dollars, miles of biologically sensitive area, etc.).

Next, both the quantitative and qualitative measures were converted into a common impact score scale (using 1 to 5 with 1 defining the lowest impact and 5 defining the highest impact). This is followed by an assessment of value tradeoffs between different pairs of evaluation criteria. A typical tradeoff question is: How much impact on one evaluation criterion would you be willing to accept in order to avoid a specified magnitude of impact on another evaluation criterion. These value tradeoffs are used to derive relative weights of the different criteria on a scale such as 0 to 10, with 10 being the most important.

The final step in the decision analysis is to integrate the information from the previous steps and calculate the total weighted impact score of each alternative (on a scale such as 1 to 5 with 1 being the lowest impact and 5 being the highest impact). The computational process involves multiplying the impact score on each evaluation criterion by its relative weight and summing the product over all criteria. Because higher (adverse) impacts would be less desirable, the alternatives are ranked in an ascending order of the total weighted impact score.

The proprietary URS software provides an efficient computational tool to perform the necessary calculations. The tool also provides the ability to perform comprehensive sensitivity analysis to address "what if" questions. The results of the URS decision analysis model are reproducible, and the entire process is fully documented.

Through the use of this model, a preferred route was identified from the alternatives evaluated. Additional information addressing the route alternatives analysis process used for evaluation of Southern Access Stage 3 are contained in Section 4.0.

## **2.3 Environmental Permits**

URS developed a listing of projected environmental permits and approvals required for the construction of the Stage 3 project using our industry experience, publicly available data and through hypothetical scenario discussions with certain agency representatives. As previously noted in this report, official agency consultations will be required to identify with certainty all permits and approvals required for the construction of this project. However, the most significant agency permits/approvals have been identified and are contained in latter sections of this report.

# SOUTHERN ACCESS EXTENSION ROUTE ALTERNATIVES ANALYSIS

## 3.0 PROJECT AREA DESCRIPTION

### 3.1 Location and General Land Use

The proposed pipeline route corridor area (Project Area) extends from near Flanagan and Pontiac, Illinois to near Patoka, Illinois as shown on **Figure 3-1**. Counties traversed in the Project Area include: Livingston, McLean, Ford, Champaign, DeWitt, Piatt, Macon, Moultrie, Shelby, Christian, Fayette, and Marion.

The Project Area is mostly rural with agriculture being the primary land use. Scattered residences are located throughout the area along highways and local roads. Commercial and industrial land uses appear to be limited to pipeline terminals located along existing facilities and near the Decatur, Pontiac, and Bloomington-Normal municipal areas. Several small towns and villages are also located in the Project Area.

### 3.2 Natural Resources

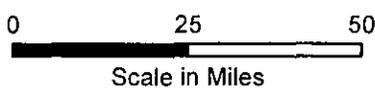
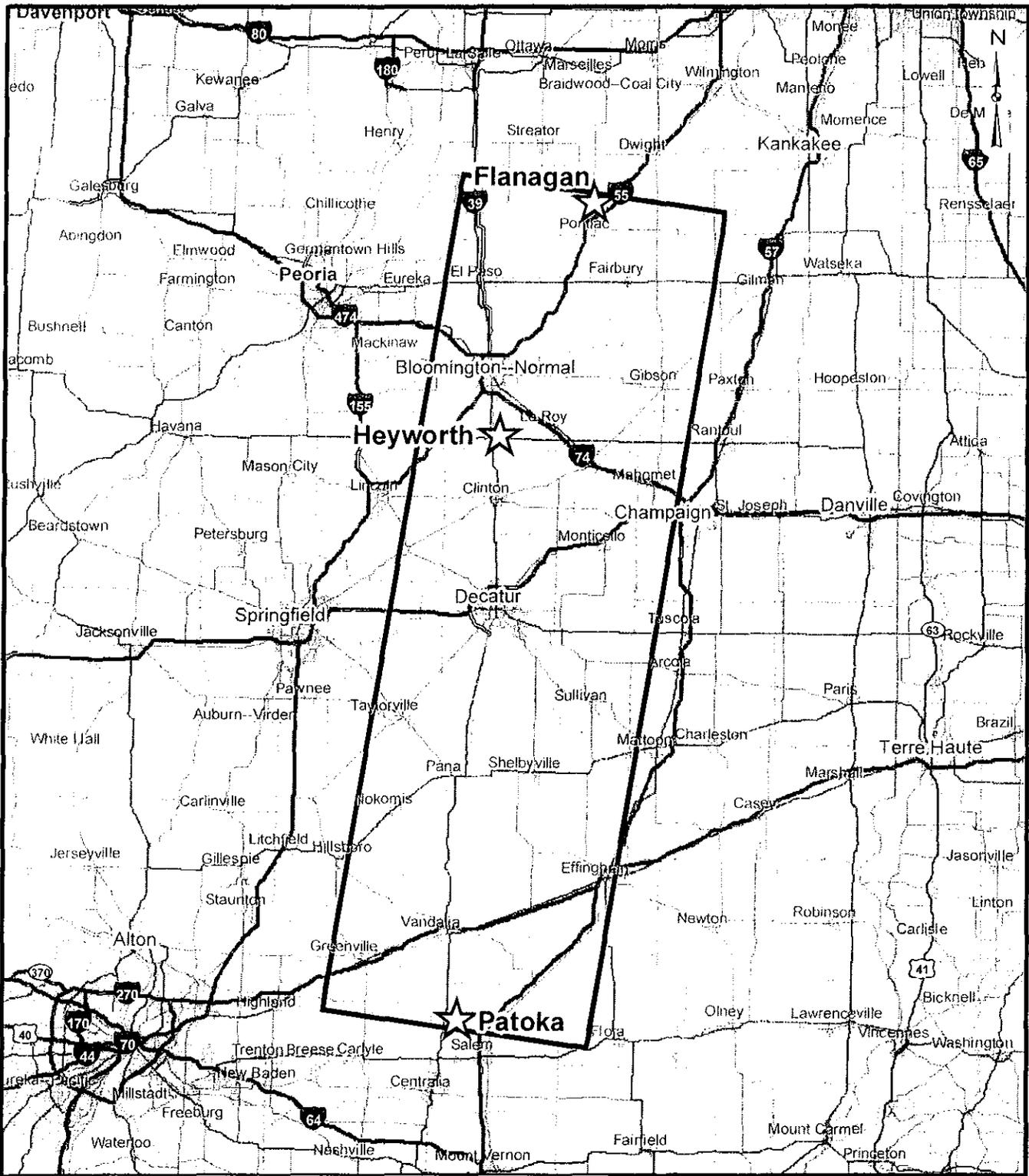
The Project Area is situated in Central Illinois and includes two ecosystems as defined by the U.S. EPA Level III Ecosystems classification system. The southern portion of the Project Area is within the Interior River Valleys and Hills ecosystem. This ecosystem is made up of many wide, flat-bottomed terraced valleys, forested valley slopes, and dissected glacial till plains. In contrast to the generally rolling to slightly irregular plains in adjacent ecological regions to the north, east, and west, where most of the land is cultivated for corn and soybeans, a little less than half of this area is in cropland, about 30 percent is in pasture, and the remainder is in forest. Bottomland deciduous forests and swamp forests were common on wet lowland sites, with mixed oak and oak-hickory forests on uplands. Paleozoic sedimentary rock is typical and coal mining occurs in several areas.

The northern portion of the Project Area is within the Central Corn Belt Plains ecosystem. Extensive prairie communities intermixed with oak-hickory forests are native to the glaciated plains of the Central Corn Belt Plains. They are a stark contrast to the hardwood forests that grow on the drift plains of ecoregions to the east. Ecoregions to the west are mostly treeless except along larger streams. Beginning in the nineteenth century, the natural vegetation was gradually replaced by agriculture. Farms are now extensive on the dark, fertile soils of the Central Corn Belt Plains and mainly produce corn and soybeans; cattle, sheep, poultry, and especially hogs are also raised, but they are not as dominant as in the drier Western Corn Belt Plains to the west. Agriculture has affected stream chemistry, turbidity, and habitat.

### 3.3 Population Centers

No major metropolitan areas are crossed by the project corridors. Short portions of the Cities of Decatur, Monticello, Shelbyville, Pontiac and the Villages of Harristown and Downs are crossed by the alternatives considered. Other incorporated places not crossed, but identified within 1,000 feet of the various alternatives included the Villages of Argento, Bethany, and Cooksville.

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Southern Access Pipeline Stage 3  
**ENBRIDGE** Route Alternatives Analysis

FIGURE 3-1  
 GENERAL PROJECT CORRIDOR LOCATION

BASE MAP SOURCE:  
 ESRI Streetmap Data, 2005

JOB NO. 31810124



## 4.0 ROUTE SELECTION

### 4.1 Approach Summary

A comprehensive route evaluation and selection process was utilized in evaluating the potential routes for Stage 3 of Southern Access. The overall pipeline routing approach consisted of the following:

- Identification of alternative pipeline routes;
- Evaluation of alternative routes; and,
- Selection and refinement of the preferred route.

The following sections present descriptions of the approach used and work completed in each of these areas.

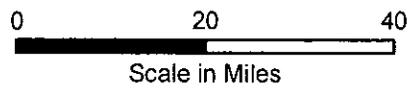
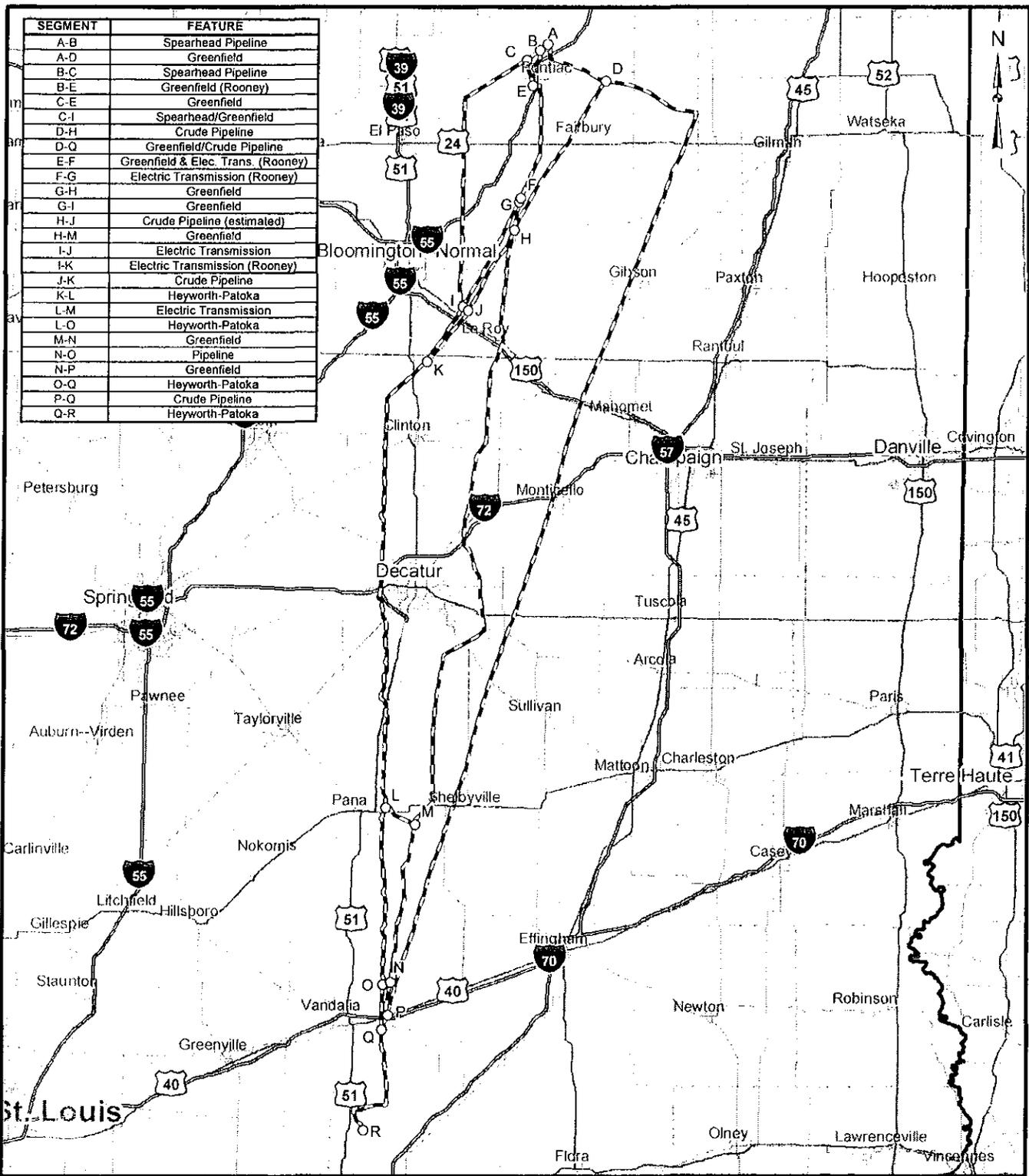
### 4.2 Identification of Alternative Pipeline Routes

The initial routing effort focused on identifying routing opportunities such as following existing linear facilities (e.g., other pipelines, electric transmission lines, railroads, roads, other similar facilities) and routing constraints such as topography, population centers, water bodies, wetlands, forests, recreation areas, sensitive natural areas and other similar features. The initial routing effort was completed using available information such as maps and aerial photographs and other data sources. **Figure 4-1** shows the locations of the preliminary alternatives routes considered using a letter-based (e.g., A) alternative pipeline links/nodes system.

Three major north-south corridors were identified in the Project Area. The western-most corridor utilizes existing right-of-way of a former fertilizer pipeline currently owned by Central Illinois Pipeline Company (K-L-O-Q-R). This pipeline is currently out of use and extends generally north to south from a point near Heyworth, Illinois to a point southeast of Patoka, Illinois. The eastern-most corridor generally parallels an existing crude oil pipeline (most of Segment D-P and all of Segment P-Q). A central corridor was developed across generally greenfield areas based on a straight line between the northern and southern end points. The straight line was adjusted based on review of aerial photography and the identification of land use constraints.

Corridor segments were then identified in the Project Area that provided connections between Enbridge's Flanagan terminal (Node A) and an initiation point of the Central Illinois Pipeline Company existing right-of-way near Heyworth, Illinois (Node K). Enbridge's Spearhead pipeline heads generally west from the Flanagan terminal. Segments A-B, B-C, and the northern portion of C-I follow this corridor. Primarily greenfield corridors were identified along Segments A-D, B-E, C-E, the southern portion of C-I, and the northern portion of E-F. Segments F-G, G-I, and I-K parallel an existing electric transmission line to the Heyworth Node K. Segments H-J and J-K follow an existing crude oil pipeline to the Heyworth Node. Additional corridor segments, L-N and N-O, were identified in the southern portion of the Project Area to provide combinations of the main corridor and to increase the number of overall alternatives considered.

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**ENBRIDGE** Southern Access Pipeline Stage 3  
Route Alternatives Analysis

**FIGURE 4-1**  
**ALTERNATIVE PIPELINE**  
**ROUTES CONSIDERED**

BASE MAP SOURCE:  
ESRI Streetmap Data, 2005

JOB NO. 31810124



### 4.3 Evaluation of Alternative Routes and Selection of Preferred Route

The results of the initial route alternatives work included identifying a series of alternative pipeline links/nodes with a total of 28 alternative pipeline routes identified on the basis of the combinations of links/nodes (**Figure 4-1**). The 28 alternative pipeline routes considered were described on the basis of the links/nodes (e.g., A-B-C). The 28 alternative pipeline routes were evaluated and compared using the formal decision analysis model developed by URS to evaluate and rank alternatives.

Using the decision analysis model, the Southern Access Stage 3 proposed Project Area was evaluated. The data used in this evaluation are summarized in **Table 4-1**. The set of key criteria that were used to evaluate and compare the alternatives include the following:

- Total length;
- Important biological resource areas;
- Wetland areas;
- Sensitive cultural resource areas;
- Important jurisdictional land use areas;
- Stream/river crossings;
- Urban/developed areas;
- Existing linear facilities/utility planning corridors; and,
- Permitting feasibility

Each of these criteria was evaluated for each of the 28 alternative pipeline routes. For each criteria, a value was established, for example, the miles of the resource area crossed or the number of resource features crossed by the route. Then, in order to normalize the data, each value was converted to a consistent 1-5 rating (with 1 being best) by assessing the distribution of the range of actual values. Weighting factors were then applied to each rating in order to take into account the overall significance or weighting of the factor. A 1-10 weighting scale was used, with the most important criterion assigned the top value of 10 and other criteria weightings established in relation to the most important criterion. A total weighted rating was then calculated for each criterion for each alternative route by multiplying the rating times the weighting. Totals were then developed for each alternative by adding the weighted ratings, including an un-normalized total and a normalized total. The un-normalized total was the sum of the weighted ratings for each criterion and the normalized total was the sum of the weighted ratings divided by the sum of the weightings for each evaluation criterion. The overall ranking of each alternative was established based on the un-normalized and normalized totals. The footnotes in **Table 4-1** present more detailed information on these aspects of the methodology.

The results of the pipeline route alternatives analysis are presented in **Table 4-1**. Alternative Route 11 (Nodes A-B-C-I-J-K-L-O-Q-R) was ranked best, with Alternative Route 10 (Nodes A-B-C-I-J-K-L-M-N-P-Q-R) ranked as the second best route. Based on the analysis, Alternative Route 11 was designated as the preliminary “preferred route”.

SOUTHERN ACCESS STAGE 3  
ROUTE ALTERNATIVES ANALYSIS

Table 4-1  
Southern Access Extension Project - Stage 3  
Flanagan to Patoka Segment - Route Alternatives Evaluation Matrix<sup>a</sup>

Alternative Pipeline Route (Route - Segments)	Total Length <sup>b</sup>				Important Biological Resource Areas <sup>c</sup>				Wetland Areas <sup>d</sup>				Sensitive Cultural Resource Areas <sup>e</sup>				Important Jurisdictional Land Use Areas <sup>f</sup>			
	V	R <sup>g</sup>	W	T	V	R <sup>g</sup>	W	T	V	R <sup>g</sup>	W	T	V	R <sup>g</sup>	W	T	V	R <sup>g</sup>	W	T
1 - A-B-C-E-F-G-H-J-K-L-M-N-O-Q-R	173.7	3.29	10	32,92254	2,1309	4.92	5	24,61727	2.9	4.61	7	32,28485	34.6	1.20	5	6,011352	0	1.00	8	8
2 - A-B-C-E-F-G-H-J-K-L-M-N-P-Q-R	173.2	3.10	10	31,02113	2,1309	4.92	5	24,61727	2.6	3.93	7	27,53333	35.9	1.73	5	8,673891	0	1.00	8	8
3 - A-B-C-E-F-G-H-J-K-L-O-Q-R	170.9	2.29	10	22,85211	2,1688	5.00	5	25	2.8	4.27	7	29,90909	40.5	3.62	5	18,1063	0	1.00	8	8
4 - A-B-C-E-F-G-H-M-N-O-Q-R	168.1	1.29	10	12,92254	0,2273	1.08	5	5,382731	3.0	4.83	7	33,81212	35.6	1.59	5	7,972136	1.01	5.00	8	40
5 - A-B-C-E-F-G-H-M-N-P-Q-R	167.5	1.10	10	11,02113	0,2273	1.08	5	5,382731	2.7	4.15	7	29,06061	36.8	2.13	5	10,63467	1.01	5.00	8	40
6 - A-B-C-E-F-G-I-K-L-M-N-O-Q-R	173.9	3.33	10	33,34507	0,5009	1.63	5	8,147581	2.9	4.56	7	31,94545	34.9	1.34	5	6,692466	0	1.00	8	8
7 - A-B-C-E-F-G-I-K-L-M-N-P-Q-R	173.3	3.14	10	31,44366	0,5009	1.63	5	8,147581	2.6	3.88	7	27,19394	36.2	1.87	5	9,355005	0	1.00	8	8
8 - A-B-C-E-F-G-I-K-L-O-Q-R	171.0	2.33	10	23,27465	0,5388	1.71	5	8,530312	2.7	4.22	7	29,5697	40.8	3.76	5	18,78741	0	1.00	8	8
9 - A-B-C-I-J-K-L-M-N-O-Q-R	175.1	3.79	10	37,85211	0,4545	1.54	5	7,679118	2.9	4.66	7	32,62424	35.2	1.47	5	7,332301	0	1.00	8	8
10 - A-B-C-I-J-K-L-M-N-P-Q-R	174.6	3.60	10	35,9507	0,4545	1.54	5	7,679118	2.6	3.98	7	27,87273	36.5	2.00	5	9,99484	0	1.00	8	8
11 - A-B-C-I-J-K-L-O-Q-R	172.3	2.78	10	27,78169	0,4924	1.61	5	8,061849	2.8	4.32	7	30,24848	41.1	3.69	5	19,42724	0	1.00	8	8
12 - A-B-C-I-K-L-M-N-O-Q-R	174.3	3.48	10	34,75352	0,4545	1.54	5	7,679118	2.9	4.66	7	32,62424	35.4	1.54	5	7,03818	0	1.00	8	8
13 - A-B-C-I-K-L-M-N-P-Q-R	173.7	3.29	10	32,85211	0,4545	1.54	5	7,679118	2.6	3.98	7	27,87273	36.7	2.07	5	10,36636	0	1.00	8	8
14 - A-B-C-I-K-L-O-Q-R	171.4	2.47	10	24,8831	0,4924	1.61	5	8,061849	2.8	4.32	7	30,24848	41.3	3.96	5	19,79876	0	1.00	8	8
15 - A-B-EE-F-G-H-J-K-L-M-N-P-Q-R	172.9	3.00	10	30	2,1309	4.92	5	24,61727	2.6	3.96	7	27,70303	36.2	1.88	5	9,396285	0	1.00	8	8
16 - A-B-E-F-G-H-J-K-L-M-N-O-Q-R	173.4	3.19	10	31,90141	2,1309	4.92	5	24,61727	2.9	4.64	7	32,45455	35.0	1.35	5	6,733746	0	1.00	8	8
17 - A-B-E-F-G-H-J-K-L-O-Q-R	170.6	2.18	10	21,83099	2,1688	5.00	5	25	2.8	4.30	7	30,07879	40.8	3.77	5	18,82869	0	1.00	8	8
18 - A-B-E-F-G-H-M-N-O-Q-R	167.8	1.19	10	11,90141	0,2273	1.08	5	5,382731	3.0	4.85	7	33,98182	35.9	1.74	5	8,69453	1.01	5.00	8	40
19 - A-B-E-F-G-H-M-N-P-Q-R	167.2	1.00	10	10	0,2273	1.08	5	5,382731	2.7	4.18	7	29,2303	37.2	2.27	5	11,35707	1.01	5.00	8	40
20 - A-B-E-F-G-I-K-L-M-N-O-Q-R	173.6	3.23	10	32,32394	0,5009	1.63	5	8,147581	2.9	4.59	7	32,11515	35.3	1.48	5	7,414861	0	1.00	8	8
21 - A-B-E-F-G-I-K-L-M-N-P-Q-R	173.0	3.04	10	30,42254	0,5009	1.63	5	8,147581	2.6	3.91	7	27,36364	36.6	2.02	5	10,0774	0	1.00	8	8
22 - A-B-E-F-G-I-K-L-O-Q-R	170.7	2.23	10	22,25352	0,5388	1.71	5	8,530312	2.7	4.25	7	29,73939	41.1	3.90	5	19,5098	0	1.00	8	8
23 - A-D-H-J-K-L-M-N-O-Q-R	178.4	4.94	10	49,40141	2,0930	4.85	5	24,23454	3.0	4.78	7	33,47273	34.1	1.00	5	5	0	1.00	8	8
24 - A-D-H-J-K-L-M-N-P-Q-R	177.9	4.75	10	47.5	2,0930	4.85	5	24,23454	2.7	4.10	7	28,72121	35.4	1.53	5	7,962539	0	1.00	8	8
25 - A-D-H-J-K-L-O-Q-R	175.6	3.93	10	39,33099	2,1309	4.92	5	24,61727	2.8	4.44	7	31,09697	40.0	3.42	5	17,09494	0	1.00	8	8
26 - A-D-H-M-N-O-Q-R	172.7	2.94	10	29,40141	0,1894	1.00	5	5	3.1	5.00	7	35	35.1	1.39	5	6,960784	1.01	5.00	8	40
27 - A-D-H-M-N-P-Q-R	172.2	2.75	10	27.5	0,1894	1.00	5	5	2.8	4.32	7	30,24848	36.4	1.92	5	9,623323	1.01	5.00	8	40
28 - A-D-P-Q-R	178.6	5.00	10	50	0,6739	1.98	5	9,895897	1.4	1.00	7	7	43.8	5.00	5	25	0	1.00	8	8
Vmin	167.2			Vmin	0,1894			Vmin	1,4000			Vmin	34,11			Vmin	0,00			Vmin
Vmax	178.6			Vmax	2,1688			Vmax	3,0500			Vmax	43,80			Vmax	1,01			Vmax

Notes:

- <sup>a</sup> V = Value (e.g., miles, acres)
- <sup>b</sup> R = Rating (e.g., 1-5 on a continuous scale, based on range of values) (1 is best)
- <sup>c</sup> W = Weighting (1-10; 10 = highest - most important criterion; weighting scores for other criteria established relative to the highest score of 10)
- <sup>d</sup> T = Total Weighted Rating (rating x weighting)
- <sup>e</sup> Total number of miles of pipeline route.
- <sup>f</sup> Number of miles of IDNR Natural Heritage Database-confirmed special status species habitat and high quality designation stream areas crossed by route centerline.
- <sup>g</sup> Number of miles of NWI wetlands crossed by route centerline.
- <sup>h</sup> Number of miles of sensitive cultural (archaeological) resource areas crossed by route centerline.
- <sup>i</sup> Number of miles of important jurisdictional land use areas (e.g., parks, refuges, reserves) crossed by route centerline.
- <sup>j</sup> Number of streams and rivers crossed.
- <sup>k</sup> Number of miles of urban/developed areas crossed by route centerline.
- <sup>l</sup> Percent of route centerline that closely follows existing linear facilities (e.g., railroads, electric transmission lines, pipelines, roads or designated utility planning corridors).
- <sup>m</sup> Overall assessment of permitting feasibility for the entire alternative route, based on probable permitting requirements, issues, and constraints.

SOUTHERN ACCESS STAGE 3  
ROUTE ALTERNATIVES ANALYSIS



Table 4-1 (Cont.)  
Southern Access Extension Project - Stage 3  
Flanagan to Patoka Segment - Route Alternatives Evaluation Matrix<sup>a</sup>

Alternative Pipeline Route (Route - Segments)	Stream/River Crossings <sup>9</sup>				Urban/Developed Areas <sup>h</sup>				Existing Linear Facilities/Utility Planning Corridors <sup>i</sup>				Permitting Feasibility <sup>j</sup>			Lnormalized Total <sup>k</sup>	Normalized Total <sup>l</sup>	Rank <sup>m</sup>
	V	R <sup>n</sup>	W	T	V	R <sup>n</sup>	W	T	V	R <sup>n</sup>	W	T	R <sup>n</sup>	W	T			
1 - A-B-C-E-F-G-H-J-K-L-M-N-O-Q-R	95	1.69	7	11.8	0.9	4.04	9	36.36	76.3	1.94	9	17.4238	4.00	10	40	209.42	2.99	20
2 - A-B-C-E-F-G-H-J-K-L-M-N-P-Q-R	94	1.57	7	11	0.9	4.04	9	36.36	73.5	2.08	9	18.7517	4.00	10	40	205.96	2.94	18
3 - A-B-C-E-F-G-H-J-K-L-O-Q-R	94	1.57	7	11	0.9	4.04	9	36.36	89.1	1.26	9	11.3285	3.00	10	30	192.56	2.75	12
4 - A-B-C-E-F-G-H-M-N-O-Q-R	90	1.11	7	7.8	0.7	3.24	9	29.16	22.6	4.77	9	42.9244	2.00	10	20	199.97	2.86	16
5 - A-B-C-E-F-G-H-M-N-P-Q-R	89	1.00	7	7	0.7	3.24	9	29.16	19.6	4.93	9	44.3794	2.00	10	20	196.64	2.81	15
6 - A-B-C-E-F-G-I-K-L-M-N-O-Q-R	98	2.03	7	14.2	1.1	5.00	9	45	78.6	1.81	9	16.3115	3.00	10	30	193.64	2.77	13
7 - A-B-C-E-F-G-I-K-L-M-N-P-Q-R	97	1.91	7	13.4	1.1	5.00	9	45	75.8	1.96	9	17.6349	3.00	10	30	190.18	2.72	9
8 - A-B-C-E-F-G-I-K-L-O-Q-R	97	1.91	7	13.4	1.1	5.00	9	45	91.5	1.13	9	10.2019	2.00	10	20	176.76	2.53	4
9 - A-B-C-I-J-K-L-M-N-O-Q-R	98	2.03	7	14.2	0.6	2.92	9	26.28	70.5	2.24	9	20.1645	2.00	10	20	174.13	2.49	3
10 - A-B-C-I-J-K-L-M-N-P-Q-R	97	1.91	7	13.4	0.6	2.92	9	26.28	67.7	2.39	9	21.4902	2.00	10	20	170.67	2.44	2
11 - A-B-C-I-J-K-L-O-Q-R	97	1.91	7	13.4	0.6	2.92	9	26.28	83.1	1.57	9	14.1643	2.00	10	20	167.36	2.39	1
12 - A-B-C-I-K-L-M-N-O-Q-R	101	2.37	7	16.6	0.8	3.88	9	34.92	70.4	2.25	9	20.2353	3.00	10	30	192.52	2.75	11
13 - A-B-C-I-K-L-M-N-P-Q-R	100	2.26	7	15.8	0.8	3.88	9	34.92	67.6	2.40	9	21.5679	3.00	10	30	189.06	2.70	8
14 - A-B-C-I-K-L-O-Q-R	100	2.26	7	15.8	0.8	3.88	9	34.92	83.1	1.58	9	14.2054	3.00	10	30	185.72	2.65	5
15 - A-B-E-F-G-H-J-K-L-M-N-P-Q-R	95	1.59	7	11.8	0.9	4.04	9	36.36	72.3	2.15	9	19.3089	4.00	10	40	207.19	2.96	19
16 - A-B-E-F-G-H-J-K-L-M-N-O-Q-R	96	1.80	7	12.6	0.9	4.04	9	36.36	75.1	2.00	9	17.9771	4.00	10	40	210.64	3.01	21
17 - A-B-E-F-G-H-J-K-L-O-Q-R	95	1.69	7	11.8	0.9	4.04	9	36.36	87.9	1.32	9	11.8807	3.00	10	30	193.78	2.77	14
18 - A-B-E-F-G-H-M-N-O-Q-R	91	1.23	7	8.6	0.7	3.24	9	29.16	21.3	4.84	9	43.5404	4.00	10	40	221.26	3.16	26
19 - A-B-E-F-G-H-M-N-P-Q-R	90	1.11	7	7.8	0.7	3.24	9	29.16	18.3	5.00	9	45	4.00	10	40	217.93	3.11	24
20 - A-B-E-F-G-I-K-L-M-N-O-Q-R	99	2.14	7	15	1.1	5.00	9	45	77.5	1.87	9	16.8625	4.00	10	40	204.86	2.93	17
21 - A-B-E-F-G-I-K-L-M-N-P-Q-R	98	2.03	7	14.2	1.1	5.00	9	45	74.7	2.02	9	18.1899	3.00	10	30	191.40	2.73	10
22 - A-B-E-F-G-I-K-L-O-Q-R	98	2.03	7	14.2	1.1	5.00	9	45	90.3	1.19	9	10.7517	3.00	10	30	187.98	2.69	7
23 - A-D-H-J-K-L-M-N-O-Q-R	101	2.37	7	16.6	0.6	2.92	9	26.28	81.4	1.66	9	14.9727	4.00	10	40	217.96	3.11	25
24 - A-D-H-J-K-L-M-N-P-Q-R	100	2.26	7	15.8	0.6	2.92	9	26.28	78.7	1.81	9	16.2582	4.00	10	40	214.46	3.05	23
25 - A-D-H-J-K-L-O-Q-R	100	2.26	7	15.8	0.6	2.92	9	26.28	94.0	1.00	9	9	4.00	10	40	211.22	3.02	22
26 - A-D-H-M-N-O-Q-R	96	1.80	7	12.6	0.4	2.12	9	19.08	29.4	4.41	9	39.7017	4.00	10	40	227.74	3.25	28
27 - A-D-H-M-N-P-Q-R	95	1.69	7	11.8	0.4	2.12	9	19.08	26.5	4.57	9	41.1071	4.00	10	40	224.36	3.21	27
28 - A-D-P-Q-R	124	5.00	7	35	0.1	1.00	9	9	86.5	1.40	9	12.5848	3.00	10	30	186.48	2.66	6
Vmin	89.0				Vmin	0.09			Vmin	18.26								
Vmax	124.0				Vmax	1.09			Vmax	94.00								

Notes:

- <sup>a</sup> V = Value (e.g., miles, acres)
- <sup>b</sup> R = Rating (e.g., 1-5 on a continuous scale, based on range of values) (1 is best)
- <sup>c</sup> W = Weighting (1-10; 10 = highest - most important criterion; weighting scores for other criteria established relative to the highest score of 10)
- <sup>d</sup> T = Total Weighted Rating (rating x weighting)
- <sup>e</sup> Total number of miles of pipeline route
- <sup>f</sup> Number of miles of IDNR Natural Heritage Database-confirmed special status species habitat and high quality designation stream areas crossed by route centerline.
- <sup>g</sup> Number of miles of NWI wetlands crossed by route centerline.
- <sup>h</sup> Number of miles of sensitive cultural (archaeological) resource areas crossed by route centerline.
- <sup>i</sup> Number of miles of important jurisdictional land use areas (e.g., parks, refuges, reserves) crossed by route centerline.
- <sup>j</sup> Number of streams and rivers crossed.
- <sup>k</sup> Number of miles of urban/developed areas crossed by route centerline.
- <sup>l</sup> Percent of route centerline that closely follows existing linear facilities (e.g., railroads, electric transmission lines, pipelines, roads or designated utility planning corridors).
- <sup>m</sup> Overall assessment of permitting feasibility for the entire alternative route, based on probable permitting requirements, issues, and constraints.

# SOUTHERN ACCESS STAGE 3 ROUTE ALTERNATIVES ANALYSIS



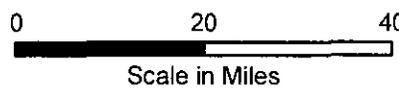
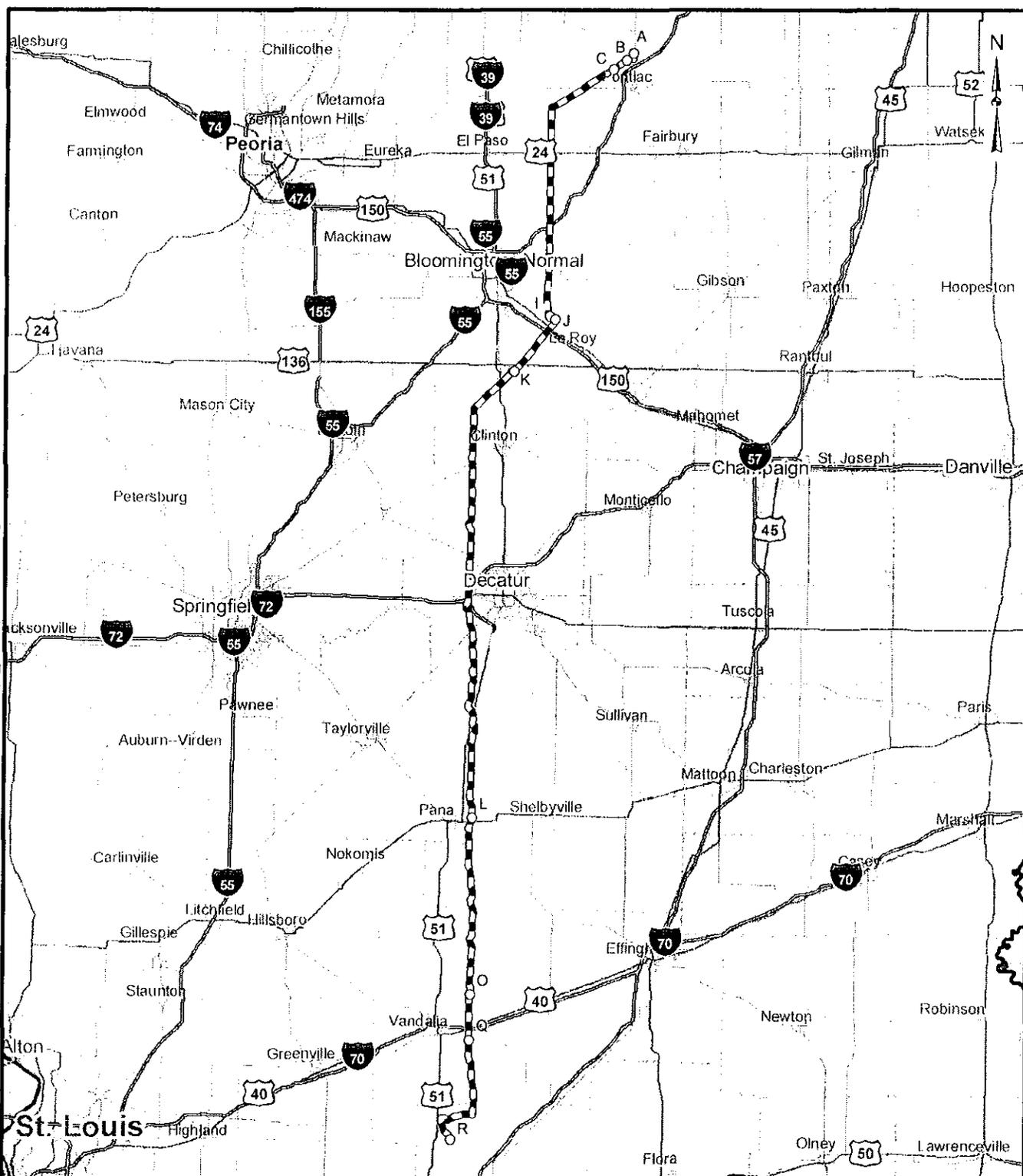
## 4.4 Description of Preferred Route

The preferred route (Route 11 Nodes A-B-C-I-J-K-L-O-Q-R) is 172.3 miles-long and extends generally south from Flanagan Station (Node A), located north of the City of Pontiac, to a point just southeast of Patoka Station, located east of the Village of Patoka (**Figure 4-2**). The route heads west-southwest from Flanagan Station parallel to Enbridge's Spearhead pipeline for 14 miles. The route turns to the south heading across mostly agricultural land for approximately 30 miles to Node I and on to Node J. This north-south greenfield corridor passes east of the Bloomfield-Normal municipal area.

The preferred route turns to the southwest for approximately 10 miles parallel to an existing crude pipeline, avoiding the Village of Downs, to Heyworth (Node K). From Heyworth Station, the route continues generally south along existing right-of-way associated with a former fertilizer pipeline. Segment K-L crosses the Village of Harristown and passes just west of the City of Decatur. The existing right-of-way (K-L-O-Q-R) totals approximately 118 miles and ends near a proposed terminal facility near Patoka, Illinois.

The preferred route traverses an estimated 0.49 miles of important biological resource areas, 2.8 miles of wetland areas, 41.1 miles of potentially sensitive cultural resource areas, zero miles of important jurisdictional land, 97 stream and river crossings, 0.6 miles of urban/developed area and utilizes 143 miles (83.1 % of the total length) of existing linear corridors. Based on the data reviewed, no known "fatal flaw" environmental-based resource issues which would preclude environmental permitting of the preferred route are known to exist.

X:\projects\Enbridge\_Flanagan-Patoka\Fig4-2.mxd



**ENBRIDGE** Southern Access Pipeline Stage 3  
Route Alternatives Analysis

FIGURE 4-2  
PREFERRED PIPELINE ROUTE

BASE MAP SOURCE:  
ESRI Streetmap Data, 2005

JOB NO. 31810124

**URS**

## 5.0 ENVIRONMENTAL PERMITS

In support of the route alternatives analysis, a summary of significant Federal, State and local environmental permits, reviews and approvals that are considered likely to be required for the construction of Stage 3 of Southern Access were identified. This information is provided in **Table 5-1**. Further detail and analysis of these permits has been previously provided to Enbridge in the recent *Right-of-Way Environmental Evaluation – CIPC Heyworth to Patoka, IL Report* dated June 23, 2006 as prepared by URS.

Key agencies involved in the permitting of the project will include:

- US Army Corps of Engineers (COE) – Rock Island and St. Louis Districts;
- Illinois Department of Natural Resources (IDNR);
- Illinois Environmental Protection Agency; and,
- Illinois State Historic Preservation Office.

Based on the review of the preferred route, the following significant environmental permitting activities will be required:

- COE Section 404 permitting and NEPA compliance to include interaction and permitting/review by COE Rock Island and St. Louis Districts, IDNR, ISHPO and IEPA;
- State wetland permitting to include interaction and permitting/review by COE and IDNR;
- Section 401 WQC to include interaction and permitting/review by COE and IDNR; and,
- Stream/river crossing permitting to include interaction and permitting/review by COE, IDNR and IEPA.

The review of environmental information for the project does not indicate any “fatal flaw” scenarios for the routing and construction of the preferred route for Stage 3. However, it is noted that based on environmental related field survey requirements and the proposed construction start date of Quarter 2 2008, it is recommended that agency consultations, field survey planning and preliminary field surveys should be initiated as soon as practicable to achieve the in-service date for Stage 3 (tentatively scheduled for Quarter 1 2009).

SOUTHERN ACCESS STAGE 3  
ROUTE ALTERNATIVES ANALYSIS

**Table 5-1  
Summary of Environmental Permitting Requirements**

Agency	Permit/Approval	Applicable Project Action
<b>Federal</b>		
U.S. Army Corps of Engineers	CWA Section 404 permit (Individual) for discharge of dredged or fill materials in jurisdictional water bodies and wetlands	Disturbance of more than .5 acre of wetland or 500 linear feet of stream
	NEPA compliance –preparation of EA to support decision on Individual Section 404 permit application	Disturbance of more than .5 acre of wetland or 500 linear feet of stream
	CWA Section 10 permit for placement of structures in navigable waterways	Impacts to historical navigable waterways
	Compliance with Federal Endangered Species Act (ESA)	Potential impacts to sensitive habitat areas
	Compliance with Federal National Historic Preservation Act (NHPA)	Potential impacts to historic structures or archaeological sites
United States Fish and Wildlife Service	Review of Federal Listed Species and Sensitive Habitat.	Potential impacts to sensitive habitat areas
Bureau of Indian Affairs / Local Tribal Authorities	Cultural Resource Review and Clearance	Potential impacts to historic structures, archaeological sites or areas of cultural or religious significance.
<b>State – Illinois</b>		
Illinois Department of Natural Resources – Division of Natural Resource Review and Coordination	Review for State Listed Species and Sensitive Habitat	Potential impacts to sensitive habitat areas
Illinois Department of Natural Resources	Construction Permit (for construction in floodways of streams, rivers; navigable waterways; public freshwater lakes; ditch reconstruction). Joint application with COE and IEPA.	Disturbance of more than 0.5 acre of wetland or impact to floodway
Illinois Historic Preservation Agency	Cultural Resources Review and Clearance	Potential impacts to historic structures or archaeological sites
Illinois Environmental Protection Agency	Storm Water Discharge – General NPDES Construction Permit/Notice of Intent	Disturbance of more than 1 acre of land
Illinois Department of Natural Resources	CWA 401 Water Quality Certification	Construction related water discharges
Illinois Environmental Protection Agency	Hydrostatic Test Water Discharge Permit for Commercial Pipeline	Discharge of hydraulic test waters to receiving water body
	Permit for Discharge of Dredged or Fill Material to Waters of the State or State Isolated Wetlands. Joint application with COE and IDNR.	Construction in and around water bodies and isolated wetlands.
<b>Local</b>		
Development/Construction/Zoning Permits	Construction or change in zoning permits specific to local municipalities, townships, and counties	Construction of pipeline, pump stations and ancillary facilities

## **6.0 SUMMARY AND CONCLUSIONS**

Enbridge commissioned the completion of a confidential Route Alternatives Analysis for a proposed 36-inch crude oil pipeline from near Flanagan to Patoka, Illinois for Stage 3 of Enbridge's Southern Access project also known as "Southern Access Extension". The route alternatives analysis was completed during late June and early July 2006. A summary of the findings and conclusions derived from this study are reported in this section.

### **6.1 Route Selection**

A comprehensive route evaluation and selection process was utilized in evaluating the route alternatives for Southern Access Stage 3. Using a proprietary decision analysis model, 28 alternative routes were intensely evaluated using environmental and other routing data collected for the project. Criteria used in the routing alternatives evaluation included: total length, important biological resource areas, wetland areas, sensitive cultural resource areas, important jurisdictional land use areas, stream/river crossings, urban/developed areas, existing linear facilities/utility planning corridors, and permitting feasibility

Environmental data utilized for the route evaluation was largely acquired from public domain data bases reviewed and evaluated by URS. Based on the decision analysis model, Alternative Route 11 received the best ranking and was selected as the preliminary "preferred route". The preferred route consistently ranked high in overall environmental protection and offered one of the lower total distances required for construction.

The preferred route is 172.3 miles in length and extends from near Flanagan, Illinois to near Patoka, Illinois. It significantly follows existing linear corridors and avoids, to the greatest extent possible, significant environmental resource areas. The Project Area and the preferred route have been remotely reviewed; an on the ground reconnaissance of the preferred route has not as yet been completed. No environmental field studies have been completed and limited contacts/consultations with government regulatory agencies have been made to-date.

### **6.2 Environmental Resource and Permit Issues**

A preliminary review of key environmental resources and issues along the preferred route did not indicate any fatal flaw issues which would preclude approval of environmental permits and applications necessary for construction and operation of a crude oil pipeline. Land use across the preferred route corridor is primarily agriculture with little to no urban development

The preferred route traverses an estimated 0.49 miles of important biological resource areas, 2.8 miles of wetland areas, 41.1 miles of potentially sensitive cultural resource areas, zero miles of important jurisdictional land, 97 stream and river crossings, 0.6 miles of urban/developed area and utilizes 143 miles (83.1 % of the total length) of existing linear corridors.

Environmental permitting for Southern Access Stage 3 will be multi-jurisdictional with no clearly defined regulatory primacy as in the case of a FERC filing. However, based on our experience with similar projects in Illinois it is our opinion that the COE will be the primary "de-facto" lead agency with significant involvement from Illinois state regulatory agencies.

## SOUTHERN ACCESS STAGE 3 ROUTE ALTERNATIVES ANALYSIS



Based on the review of the preferred route, the following significant environmental permitting activities will be required:

- COE Section 404 permitting and NEPA compliance to include interaction and permitting/review by COE Rock Island and St. Louis Districts, IDNR, ISHPO and IEPA;
- State wetland permitting to include interaction and permitting/review by COE and IDNR;
- Section 401 WQC to include interaction and permitting/review by COE and IDNR; and,
- Stream/river crossing permitting to include interaction and permitting/review by COE, IDNR and IEPA.

Based on our experience in Illinois and the region, we recommend that emphasis be placed on well timed and phased consultations to streamline permitting processes and to ensure appropriate in-service date schedule. We do not anticipate any significant permitting issues outside of the norm for pipeline routing and construction projects. To maintain the currently projected project in-service date of Quarter 1 2009, we strongly recommend that agency consultations and field survey preparation activities be initiated as soon as possible.

# SOUTHERN ACCESS STAGE 3 ROUTE ALTERNATIVES ANALYSIS

**ENBRIDGE™**

## 7.0 REFERENCES

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ICC Staff Data Request

ENG 1.10 Will Enbridge be hiring out any of the construction of the proposed pipeline? If so, list:

- a. all companies which will be involved in the construction;
- b. all prior projects or experience that each company has had constructing similar projects; and
- c. any other information that is relevant to showing the expertise of each company.

Response prepared by:

Name: Dale Burgess  
Title: Director Southern Access  
Address: 10201 Jasper Avenue  
Edmonton, AB T5J 3N7

Enbridge plans to staff its construction work force with qualified third-party contractors including all necessary construction crews, survey workers and pipeline inspectors. Presently, Enbridge is in the process of evaluating contractors for the construction work, therefore no definitive selection has been made at this time. Evaluation of various Proposals will determine who will perform the construction work for the proposed 36-inch liquid petroleum pipeline.

- a. As stated above, since Enbridge has not completed its selection process, Enbridge is unable to provide, at this time, a list of companies that will be involved in the construction of the proposed pipeline facilities. Enbridge will provide the requested information when the selection process has been completed and the information becomes available.
- b. This information is not available for the reasons stated above. However, Enbridge is very diligent in its selection process and views prior experience as one of the measures used to qualify contractors during the bidding process. Moreover, contractors bidding on Enbridge projects are pre-qualified in a number of areas including but not limited to, overall experience, safety performance, safety programs in place, drug and alcohol programs, construction experience with the pipe size being installed and

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constructed, construction conditions expected for this project i.e. winter, wetland, agriculture drain tile, etc. All of the aforementioned attributes are weighted as applicable and used in the qualification and project award evaluation.

- c. Within the bid package, Enbridge requires that all contractors submit their work plan to accomplish the timely and compliant construction of the proposed pipeline facilities. Those applicants who effectively communicate their work plan by:
  1. Identifying construction procedures to perform all work activities within established pipeline right-of-ways and temporary work space areas, and
  2. Describing contractor company policy on work ethics and practices for complying with all issued permits and any mandated requirements under federal, state and local laws and regulations; will generally score high on evaluation. These factors, along with quoted pricing, are all considered. Enbridge does not necessarily award the project to the lowest bidder.

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ICC Staff Data Request

ENG 1.11 Answer the question listed in ENG 1.10 as they pertain to the company or companies that were chosen to construct the pipeline authorized in ICC Docket 07-0446.

Response prepared by:

Name: Dale Burgess  
Title: Director Southern Access  
Address: 10201 Jasper Avenue  
Edmonton, AB T5J 3N7

As stated in 1.10 above, Enbridge has not made its selection of a construction contractor and is therefore unable to provide the requested information at this time.

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ICC Staff Data Request

ENG 1.11 Answer the question listed in ENG 1.10 as they pertain to the company or companies that were chosen to construct the pipeline authorized in ICC Docket 06-0470

Response prepared by:

Name: Dale Burgess  
Title: Director Southern Access  
Address: 10201 Jasper Avenue  
Edmonton, AB T5J 3N7

For the convenience of the ICC Staff in responding to the above referenced question, Enbridge is hereby restating the question listed as ENG 1.10 in ICC Data Request dated August 31, 2007.

- ENG 1.10 Will Enbridge be hiring out any of the construction of the proposed pipeline? If so, list:
- a. all companies which will be involved in the construction;
  - b. all prior projects or experience that each company has had constructing similar projects; and
  - c. any other information that is relevant to showing the expertise of each company.

Response to ENG 1.11:

With respect to the construction of the pipeline authorized in ICC Docket No. 06-0470, Enbridge plans to staff its construction work force with qualified third-party contractors including all necessary construction crews, survey workers and pipeline inspectors. However, at this time, Enbridge has not selected the construction contractors, but will provide the requested information to the ICC Staff once the contract awards have been granted.

**EXHIBIT 7K**

**Illinois Commerce Commission  
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ICC Staff Data Request

ENG 1.12 For each project listed in response to Staff data requests ENG 1.10 b. and 1.11 b., provide the dates of construction of those pipelines, indicate whether the project was completed within budget, the number of complaints received regarding the construction of each pipeline and the safety record (number of leaks, etc.) for each pipeline project.

Response prepared by:

Name: Dale Burgess  
Title: Director Southern Access  
Address: 10201 Jasper Avenue  
Edmonton, AB T5J 3N7

As stated in ENG 1.11, Enbridge has not selected its third-party contractors and is therefore unable to provide the information requested in the data request. However, even if Enbridge had selected its contractors, such information would not be publicly available to Enbridge. Most contractors and their clients consider information relative to cost performance and number of complaints received on an individual project as propriety information and not information that could be readily retrieved from a public domain.

No information is available within the public domain that shows, by contractor, subsequent leaks on pipeline segments that a contractor was involved in constructing. Moreover, most pipeline leaks are caused by operating conditions, such as subsequent excavation damage, or environmental conditions, such as internal or external corrosion, that are not related to installation.

Complaint Process Will be Established for Enbridge Extension

Enbridge has established a toll-free number for affected landowners and an expansion project website to facilitate communications with the affected public. Complaints that arise during construction will be addressed at the time they arise according to permit and easement agreement conditions and in compliance with the Illinois Commission's Statement under Chapter 300, Appendix A, of 83 Illinois Administrative Code.

Safety Record

The safety performance of a contractor is public record. Thus, Enbridge requires third-party contractors electing to submit a bid for a proposed construction project to include their safety record as part of their bid package. Their safety record is reviewed by Enbridge as part of the pre-qualifying conditions for which an applicant will be further considered as a potential candidate in the bidding process. Additionally, Enbridge further requires its third-party contractors to submit its safety program to a third-party manager for evaluation and monitoring. Enbridge also reviews and monitors the safety record of its third-party contractors through the Occupational Safety & Health Administration's Accident Frequency Reports, the regulating agency for which occupational accidents are reported to become public record.

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ICC Staff Data Request

ENG 1.13 Provide evidence that Enbridge Pipelines (Illinois) L.L.C. and any other parent or affiliate company involved in this project, is a legitimate business concern (copy of Certificate of Incorporation, etc.).

Response prepared by:

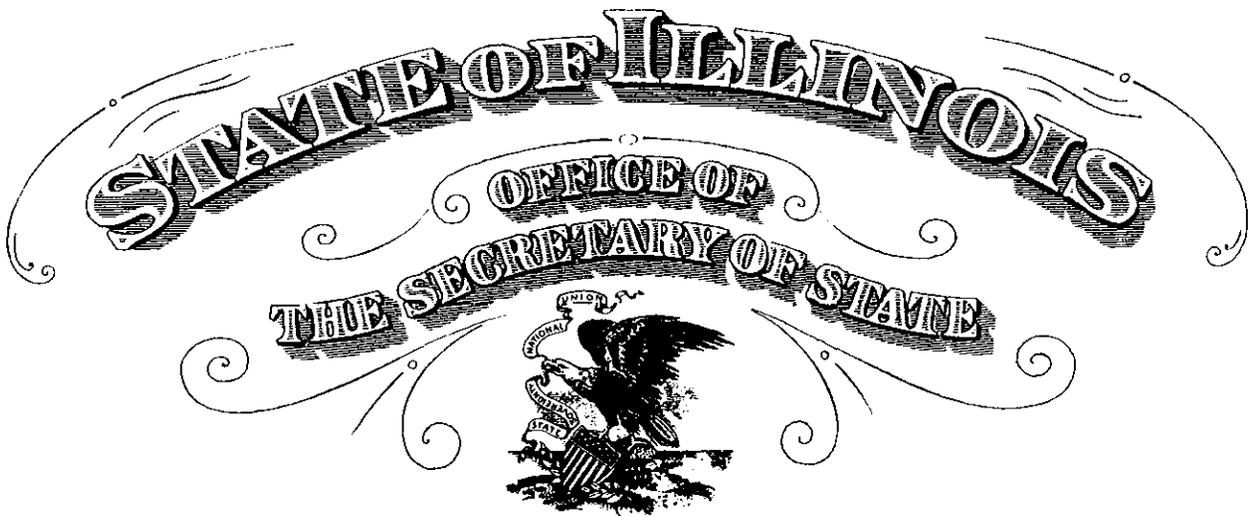
Name: Dale Burgess  
Title: Director Southern Access  
Address: 10201 Jasper Avenue  
Edmonton, AB T5J 3N7

The Certificates of Good Standing in Delaware for all Enbridge entities involved in this Application are attached hereto as Attachment D.

**Illinois Commerce Commission**  
**Response to Data Request dated August 31, 2007**  
**Enbridge Pipelines (Illinois) L.L.C.**  
**Docket 07-0446**  
**Attachment D**

## **ATTACHMENT D**

**Certificate of Good Standing**



*To all to whom these Presents Shall Come, Greeting:*

*I, Jesse White, Secretary of State of the State of Illinois, do hereby certify that*

ENBRIDGE PIPELINES (ILLINOIS) L.L.C., A DELAWARE LIMITED LIABILITY COMPANY HAVING OBTAINED ADMISSION TO TRANSACT BUSINESS IN ILLINOIS ON JANUARY 31, 2007, APPEARS TO HAVE COMPLIED WITH ALL PROVISIONS OF THE LIMITED LIABILITY COMPANY ACT OF THIS STATE, AND AS OF THIS DATE IS IN GOOD STANDING AS A FOREIGN LIMITED LIABILITY COMPANY ADMITTED TO TRANSACT BUSINESS IN THE STATE OF ILLINOIS.

*In Testimony Whereof, I hereto set my hand and cause to be affixed the Great Seal of the State of Illinois, this 19TH day of SEPTEMBER A.D. 2007 .*



*Jesse White*

Authentication #: 0726202930

Authenticate at: <http://www.cyberdriveillinois.com>

SECRETARY OF STATE

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ICC Staff Data Request

ENG 1.14 Provide evidence that Enbridge Pipelines (Illinois) L.L.C. and any other parent or affiliate company involved in this project, is registered to do business in the State of Illinois.

Response prepared by:

Name: Dale Burgess  
Title: Director Southern Access  
Address: 10201 Jasper Avenue  
Edmonton, AB T5J 3N7

The Certificates of Registration in Illinois for all Enbridge entities involved in this Application are attached hereto as Attachment E.

**Illinois Commerce Commission  
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Enbridge Pipelines (Illinois) L.L.C.  
Docket 07-0446  
Attachment E**

## **ATTACHMENT E**

**Certificate of Registration**

# Delaware

PAGE 1

*The First State*

I, HARRIET SMITH WINDSOR, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THE ATTACHED IS A TRUE AND CORRECT COPY OF THE CERTIFICATE OF FORMATION OF "ENBRIDGE PIPELINES (ILLINOIS) L.L.C.", FILED IN THIS OFFICE ON THE TWELFTH DAY OF DECEMBER, A.D. 2006, AT 6:53 O'CLOCK P.M.



4266545 8100

061137570

*Harriet Smith Windsor*

Harriet Smith Windsor, Secretary of State

AUTHENTICATION: 5274145

DATE: 12-13-06

**CERTIFICATE OF FORMATION  
OF  
ENBRIDGE PIPELINES (ILLINOIS) L.L.C.**

This Certificate of Formation, dated December 12, 2006, has been duly executed and is filed pursuant to Sections 18-201 and 18-204 of the Delaware Limited Liability Company Act (the "Act") to form a limited liability company (the "Company") under the Act.

1. **Name.** The name of the Company is "Enbridge Pipelines (Illinois) L.L.C."
2. **Registered Office; Registered Agent.** The address of the registered office required to be maintained by Section 18-104 of the Act is:

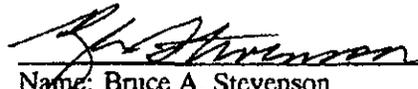
The Corporation Trust Center  
1209 Orange Street  
Wilmington, Delaware 19801  
County of New Castle

The name and address of the registered agent for service of process required to be maintained by Section 18-104 of the Act are:

The Corporation Trust Company  
The Corporation Trust Center  
1209 Orange Street  
Wilmington, Delaware 19801  
County of New Castle

3. **Effective Time.** The effective time of the formation of the Company contemplated hereby is immediately upon the filing of this Certificate of Formation with the Secretary of State of Delaware.

**EXECUTED** as of the date first written above.

  
Name: Bruce A. Stevenson  
Title: Authorized Person

ICC Staff Data Request

ENG 1.15 Describe the benefits that the proposed pipeline will provide to the landowners whose property is being used for the construction of this line?

Response prepared by:

Name: Dale Burgess  
Title: Director Southern Access  
Address: 10201 Jasper Avenue  
Edmonton, AB T5J 3N7

Landowners receive compensation comparable to market value of the length and width of the permanent easement. As most of the route for the portion of the project in Illinois crosses agricultural land, farming will resume soon after construction is completed, thus the landowner of cultivated lands receives compensation but experiences little, if any, impact to the current use of the land. While not an incremental "benefit", landowners are also compensated for temporary or other damages that cannot be avoided, including compensation for the temporary use of working space next to the permanent easement, loss of marketable trees, and compensation for crops along the work and easement area.

As part of the wider consuming public, landowners will receive the benefits that are described in Enbridge's filing, data request ENG 1.19<sup>1</sup>, and afforded by refinery access to continuing and growing supplies of their raw feed stock, that in turn supplies consumers and regional farmers with petro-chemical products such as transportation fuels, fertilizers, and asphalt roads.

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<sup>1</sup> Applicant's response to Eng 1.19 will be submitted on Oct 4, 2007.

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ICC Staff Data Request

ENG 1.16 Will the proposed pipelines include the necessary equipment or facilities to allow for the withdrawal or injection of crude petroleum from interested parties at various points along the route? If not, explain why not and describe what steps would have to be taken to allow for an entity to interconnect with the proposed line. If yes, provide the location and describe the nature of the interconnection(s).

Response prepared by:

Name: Dale Burgess  
Title: Director Southern Access  
Address: 10201 Jasper Avenue  
Edmonton, AB T5J 3N7

The eventual receipt and delivery points on the proposed pipeline will be determined through consultation with the prospective shippers that will be placing nominations on that system.

The Southern Access Extension pipeline is an interstate liquid pipeline system that will be operated as a common carrier under the rules and authority of the Interstate Commerce Act and the Federal Energy Regulatory Commission ("FERC"). The transportation rates charged, and the terms and conditions for which liquid transportation service (tariff) will be provided as a common carrier pipeline will be regulated by FERC. As an interstate liquid petroleum pipeline, the construction, operation, and maintenance of the pipeline is exclusively regulated by the United States Department of Transportation (DOT), Pipeline and Hazardous Materials Safety Administration (PHMSA) under 49 CFR Subtitle B, Chapter I, Part 191, 194, 195 and 199 of PHMSA, DOT Regulations.

At this time, the design allows for crude to be injected at Flanagan and delivered at Patoka. Specific delivery points are being determined based on the needs of the shippers that will utilize these facilities. As that information becomes available, Enbridge will provide such data to the ICC Staff.

**EXHIBIT 7P**

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ICC Staff Data Request

ENG 1.17 Describe the type of equipment (safety equipment, pigs, etc.) that will be needed in conjunction with the proposed pipeline that will allow the Company to meet the long term needs of its customers, while also maintaining compliance with applicable statutes and regulations.

Response prepared by:

Name: Dale Burgess  
Title: Director Southern Access  
Address: 10201 Jasper Avenue  
Edmonton, AB T5J 3N7

The construction of the pipeline includes the installation of necessary equipment to monitor and control the pipeline flow. Once construction is completed and the proposed pipeline facilities are ready to be placed in service, Enbridge will connect its state-of-the-art "Supervisory Control and Data Acquisition" (SCADA) system to the new pipeline facilities. This pipeline control system will be used to continuously monitor and control the efficient and safe operations of the new pipeline facilities, and thus provide customers with long-term dependability in the operation of these systems. This type of equipment includes but is not limited to pressure control and monitoring, flow monitoring for leak detection, remote valve control, and start and stop operation of pumping stations.

The majority of valves along the pipeline will be electrified, allowing remote operation from Enbridge's 24-hour pipeline control center to provide quick isolation of the pipeline segments if abnormal conditions or a leak is suspected.

As part of Enbridge's Integrity Management Program, Enbridge plans to run internal inspection tools such as smart pigs, etc., through the pipelines at intervals as required under 49 CFR Part 195 PHMSA Regulations or at more frequent intervals that Enbridge's System Integrity Department deems necessary to effectively maintain the integrity of the pipeline.

ICC Staff Data Request

ENG 1.18 Does the Company currently have the equipment listed in its response to Staff data request ENG 1.17? If no, when does the Company foresee obtaining this equipment?

Response prepared by:

Name: Dale Burgess  
Title: Director Southern Access  
Address: 10201 Jasper Avenue  
Edmonton, AB T5J 3N7

Enbridge will utilize its state-of-the-art SCADA system that is currently used on its existing liquid petroleum pipelines.

Prior to placing the proposed pipeline facilities in-service, Enbridge will make certain modifications to its SCADA equipment to incorporate the subject facilities into this operational management system.

Enbridge is in the process of procuring the necessary valves, internal inspection launching equipment, and systems control and monitoring equipment as part of the overall procurement of materials and equipment for construction. The design of such equipment must meet the operating parameters of the pipeline and PHMSA regulatory requirements.

Enbridge does not currently own extensive internal inspection devices, but rather contracts with specialized contractors for the type of internal inspection tool or tools that are appropriate for the size, inspection type and technology needed at the time of our periodic internal inspections.

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ICC Staff Data Request

ENG 1.19 Assuming the proposed pipelines are approved and constructed, will there be any impact upon the economy (breakout Illinois and national separately) as a result, for example, additional jobs, new businesses locating along the proposed routes, etc. If yes, then detail out the impact, explain how this impact was determined and include any studies, reports, etc. which support the Company's claims.

Response prepared by:

Name: Dale Burgess  
Title: Director Southern Access  
Address: 10201 Jasper Avenue  
Edmonton, AB T5J 3N7

The primary purpose and benefit of Enbridge's crude oil pipeline construction is to assure that regional refineries have continued and economical access to the crude oil they use as raw feedstock. As put forth in Enbridge's initial filing, these refineries, such as those in the greater Chicago area, Illinois and the Midwest (that are or plan to upgrade to be equipped to process heavy crude oil) benefit through the discounted costs of heavy crude compared to the cost of light or sweet crude. Secondly, refineries will have access to a secure and growing supply of crude oil from western Canada as U.S. domestic supplies are declining and the world competes for supplies from countries outside North America. Enbridge will provide testimony from refinery representatives and petroleum industry experts to expand on these energy supply benefits.

There are two secondary benefits associated with Enbridge's expansion. First, regional refineries that stay competitive contribute to the local economy, as they retain access to supplies and enjoy the economic benefit of discounted heavy crude supply. The economic benefits of access to heavy crude oil has prompted Chicago area and Midwest refineries to invest in equipment to process heavy crude oil in the past and this spread between heavy and light continues to prompt further such investments.

Enbridge employed Dr. Ronald Promboin from the University of Virginia to estimate the economic impact of refinery investments and the regional benefit realized by the Enbridge investment in constructing the 36-inch crude line pipeline. Dr. Promboin's analysis assumed the diluent line size

**EXHIBIT 7S**

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was 16-inch. While the direct benefit of ensuring continued access to growing supplies of crude oil from North America provide the primary and most important benefit to the region, the additional economic infusion of investments by refineries and Enbridge also contribute to the region's economic well-being. Dr. Promboin used the Regional Input-Output Modeling System (RIMS II) as developed and maintained by the U.S. Department of Commerce, Bureau of Economic Analysis. The analysis, detailed in Attachment I concluded that:

- for every \$1 million of investment made in regional refineries, the total output - - or multiplier of this investment - - is 1.72<sup>1</sup> for Illinois. In other words, there is a direct public and regional economic benefit realized by any investment made by refineries and only financially healthy refineries that have economical access to their raw feed stock are in a position to make these investments.
- for every \$1 million invested in construction of the proposed pipeline and associated facilities, the Illinois output multiplier is 2.57 for the time period of equipment supply and construction activity. Using early cost estimates for the pipeline construction and basing the analysis on the RIM II model (which requires discounting investments to 2003 dollars), constructing the Southern Access Extension pipeline is estimated to create nearly 7,000 person-years of jobs in Illinois, primarily in 2008. Total economic impacts are over \$1.2 billion in Illinois (2008).

As pipelines are a very capital-intensive business and Enbridge already has a large U.S. and Midwest based workforce, projects of this nature do not add a significant number of new staff. Once the pipeline systems are operational, Enbridge expects to add 2 regular employees to its current workforce in Illinois. Liquid pipelines, however, have significant annual operating costs, including electric power, maintenance and state taxes.

Dr. Promboin's summary and work papers supporting these conclusions are attached hereto as Attachment I.

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<sup>1</sup> In ICC Docket No. 06-0470, see Attachment H to ICC Data Request dated July 20, 2006

# RONALD L. PROMBOIN, PH.D.

October 31, 2007

## State Economic Impacts of the Southern Access Extension Project

### Executive Summary

On June 28, 2006, Enbridge Energy Limited Partnership (Enbridge) submitted its plans for the Southern Access Expansion Project, which was approved by the Illinois Commerce Commission (ICC) on April 4, 2007. The Southern Access Extension Project is part of a larger program to export crude oil from the northern Alberta oil sands to refineries in the U.S. Midwest.

Last year, we prepared the economic impact study which Enbridge incorporated in its submission to the ICC. That study was included as Attachment H in the ICC Data Request dated July 20, 2006.

Enbridge would now like to extend the proposed pipeline an additional 170 miles within Illinois, from Flanagan to Patoka. Throughput is projected to start around 100,000 barrels per day in and rise to 800,000 barrels per day by year 2017.

This brief report is in response to the company's request that we apply the approach of the previous study to their estimates of construction costs and operating revenues.

Table I, below, summarizes the economic impacts in terms of jobs and total output. With the substitution of 2007 dollars for 2006 dollars in expressing Total Output, the results follow directly from the methods in that study.

Phase	Years	Jobs	Total Output (\$2007)
<b>Construction</b>	2008	6,964	\$1,226,978,453
<b>Operations</b>	<b>Annual Averages</b>		
	2009-2012	373	\$82,253,913
	2013-2015	1,657	\$365,135,183
	2016-2018	2,214	\$487,913,389
	2009-2018	1,310	\$288,816,137

**RONALD L. PROMBOIN, PH.D.**

**Summary -- Southern Access Extension**

**Construction Phase (2008)**

**Southern Access Extension**

<b>Total Cost Excluding Land</b>	<b>Deflated (2003 \$)</b>	<b>Total Jobs</b>	<b>Total Output (2007:Q2 \$)</b>
\$476,533,499	\$346,103,351	6,964	\$1,226,978,453

**Operations Phase (2009-2018)**

<b>Year</b>	<b>Receipts</b>	<b>Deflated (2003 \$)</b>	<b>Total Jobs</b>	<b>Total Output (2007:Q2 \$)</b>
2009	\$23,839,000	\$19,783,003	261	\$57,621,247
2010	\$21,136,000	\$17,539,895	232	\$51,087,826
2011	\$23,325,000	\$19,356,456	256	\$56,378,858
2012	\$67,820,000	\$56,281,022	744	\$163,927,722
2013	\$155,778,000	\$129,273,740	1,708	\$376,531,004
2014	\$151,694,000	\$125,884,597	1,664	\$366,659,567
2015	\$145,718,000	\$120,925,361	1,598	\$352,214,978
2016	\$196,416,000	\$162,997,541	2,154	\$474,757,114
2017	\$205,395,000	\$170,448,843	2,252	\$496,460,255
2018	\$203,766,000	\$169,097,003	2,235	\$492,522,799

**Averages**

2009-2012	\$34,030,000	\$28,240,094	373	\$82,253,913
2013-2015	\$151,063,333	\$125,361,233	1,657	\$365,135,183
2016-2018	\$201,859,000	\$167,514,463	2,214	\$487,913,389
2009-2018	\$119,488,700	\$99,158,746	1,310	\$288,816,137

**RONALD L. PROMBOIN, PH.D.**

**Southern Access Extension (2008 Construction)**

Total Cost	Deflator (PPI)	2003 \$ Annual Revenue	
		Requirements	Total Employment Total Output (2007 Q2 \$)
\$476,533,499	1.3769	\$346,103,351	6,964 \$1,226,978,453

**Employment multipliers (jobs per SMM, 2003 \$)**

**Table 1.4**

**Total**

20.1222

**Output multipliers (\$ per \$ of Final Demand 2003 \$)**

**Table 1.4**

**Total**

2.5748

**PPI values**

	2003	2007: Q2	Ratio	Memo: 2006: Q1
<b>Other Heavy Construction</b>	139.4	191.9	1.3769	176.4
<b>Highway and Street Construction</b>	136.6	196.5	1.4383	177.2
<b>Non-residential Construction</b>	139.7	186.4	1.3340	173.3
<b>Maintenance and Repair Construction</b>	139.6	185.0	1.3252	172.4
<b>Finished Goods (not seasonally adj.)</b>	143.3	166.8	1.1642	159.2

**Construction Cost (ex. Land):**

<b>Labor</b>	\$232,745,678
<b>Material</b>	\$133,175,972
<b>Other</b>	\$110,611,849
<b>Total</b>	\$476,533,499

**RONALD L. PROMBOIN PH.D.**

**Southern Access Extension**

Line	Averaging Period	Annual Receipts	Deflator (PPI)	2003 \$ Annual Revenue Requirements	Total Employment	Total Output (2007 Q2 \$)
Southern Access Extension	2009-2018	\$119,488,700	1.2050	\$99,158,746	1,310	\$288,816,137

**Employment multipliers (jobs per \$MM, 2003 \$)**

Table 1.4

Total

13.2148

**Output multipliers**

Table 1.4

Total

2.4171

**PPI values**

2003

2007: Q2

Ratio

Memo: 2006: Q1

Pipeline transportation of crude oil  
(except Alaska TAPS)

123.4

148.7

1.2050

146.0

**Projected receipts (per Enbridge)**

Year

Throughput (B/d)

\$ (2007 Q II)

Annual Jobs

Annual \$ Output

2009	136,792	\$23,839,000	261	\$57,621,247
2010	91,809	\$21,136,000	232	\$51,087,826
2011	98,358	\$23,325,000	256	\$56,378,858
2012	271,422	\$67,820,000	744	\$163,927,722
2013	628,904	\$155,778,000	1,708	\$376,531,004
2014	619,233	\$151,694,000	1,664	\$366,659,567
2015	584,453	\$145,718,000	1,598	\$352,214,978
2016	757,860	\$196,416,000	2,154	\$474,757,114
2017	800,000	\$205,395,000	2,252	\$496,460,255
2018	800,000	\$203,766,000	2,235	\$492,522,799
Averages	478,883	\$119,488,700	1,310	\$288,816,137