

1 **I. BACKGROUND AND EXPERIENCE**

2 **Q. Please state your full name, position and business address.**

3 A. My name is Thomas H. Wise. I am Vice President at Purvin & Gertz, Inc. (“Purvin &
4 Gertz”) in our Canadian office at Suite 1720, 144 - 4th Avenue S.W., Calgary, Alberta,
5 Canada.

6 **Q. Can you briefly describe your educational and professional background?**

7 A. I graduated with a Bachelor of Science degree in Chemical Engineering at Queen’s
8 University at Kingston, Canada in 1969. After working as a process engineer at the
9 Sarnia refinery of Imperial Oil (an ExxonMobil affiliate) and at an engineering company,
10 I have worked at Purvin & Gertz for over 25 years. Much of this work has involved
11 market-related studies for crude oil, oil sands and refined products in North America. I
12 have provided expert testimony on pipeline needs in Canada before the Canadian
13 National Energy Board (“NEB”) and the Alberta Energy and Utilities Board (“AEUB”),
14 and in the United States (“U.S.”) before the Washington Energy Facility Site Evaluation
15 Council (“EFSEC”). I am a Professional Engineer, registered in Alberta.

16 **Q. Who is Purvin & Gertz?**

17 A. Purvin & Gertz is an international energy consulting firm with headquarters in Houston,
18 Texas and other offices in Calgary, London, Singapore and elsewhere. It was established
19 in 1947 and is privately owned by its employees. Most of the consultants employed by
20 Purvin & Gertz are engineers with experience in industry and consulting. Purvin & Gertz
21 provide professional services regarding the petroleum industries in areas such as market
22 analysis, planning, project development and feasibility studies.

23 **Q. Are you familiar with Keystone Pipeline and its application before the Illinois**
24 **Commerce Commission (“ICC”)?**

25 A. Yes. I have a copy of the Petition to ICC, dated June 19, 2006 by TransCanada Keystone
26 Pipeline, LP (the “Petition”). In addition, related to the project, in Canada I prepared a
27 report on the “Outlook for Crude Oil Exports and Pipeline Capacity from Western
28 Canada”, June 2, 2006, which was filed as Appendix I to an application by TransCanada
29 Keystone Pipeline GP Ltd. to the NEB for approval to transfer an existing natural gas
30 pipeline in Canada for use in crude oil service.

31 **Q. What is the purpose of your testimony?**

32 A. On behalf of Purvin & Gertz, I have been engaged by TransCanada PipeLines Limited
33 (“TCPL”) to provide expert witness testimony addressing the need for the Keystone
34 Pipeline.

35 In this testimony, I will discuss the following:

- 36 • Market Analyses
- 37 • Pipeline alternatives
- 38 • Reliability
- 39 • Public need

40 **II. MARKET ANALYSES**

41 **A. U.S. MARKET**

42 **Q. Will the U.S. need to import more crude?**

43 A. Yes. The U.S. will need to import more crude oil as refinery demand increases and
44 domestic crude production decreases. Canadian crude production will rise due to oil
45 sands developments, so more pipeline capacity will be needed for the U.S. to increase
46 crude imports from Canada.

47 **Q. What is the U.S. refining capacity and what does Purvin and Gertz forecast refinery**
48 **demand to be?**

49 A. The U.S. refining capacity in 2004 was 17.2 million barrels per day (“B/D”). Refinery
50 crude demand was approximately 15.5 million B/D. In addition to using 5.5 million B/D
51 of domestic crude, U.S. refineries imported 10.0 million B/D of crude, including
52 1.6 million B/D of Canadian crude. (The demand data used for this testimony are from
53 2004 (DOE/EIA Petroleum Supply Annual, 2004) since 2005 data are not final.) Purvin
54 & Gertz forecasts that total crude demand by U.S. refineries will increase by 2.7 million
55 B/D over 20 years, representing an average growth rate of 134,000 B/D per year. This
56 crude demand forecast is consistent with its forecast for product demand growth.

57 **Q. Why will crude oil demand increase in the U.S.?**

58 A. U.S. refineries produce most of the refined products consumed in the U.S. In 2004, the
59 U.S. demand for all refined products (excluding LPG from natural gas liquids) was
60 approximately 18.9 million B/D of which 9.2 million B/D was for gasoline and
61 4.2 million B/D was for diesel fuel, the two major refined products. Most of the supply
62 was from U.S. refineries, but 1.8 million B/D of refined products also were imported to
63 meet total demand. This includes 0.3 million B/D of refined products from Canada,
64 mostly along the East Coast.

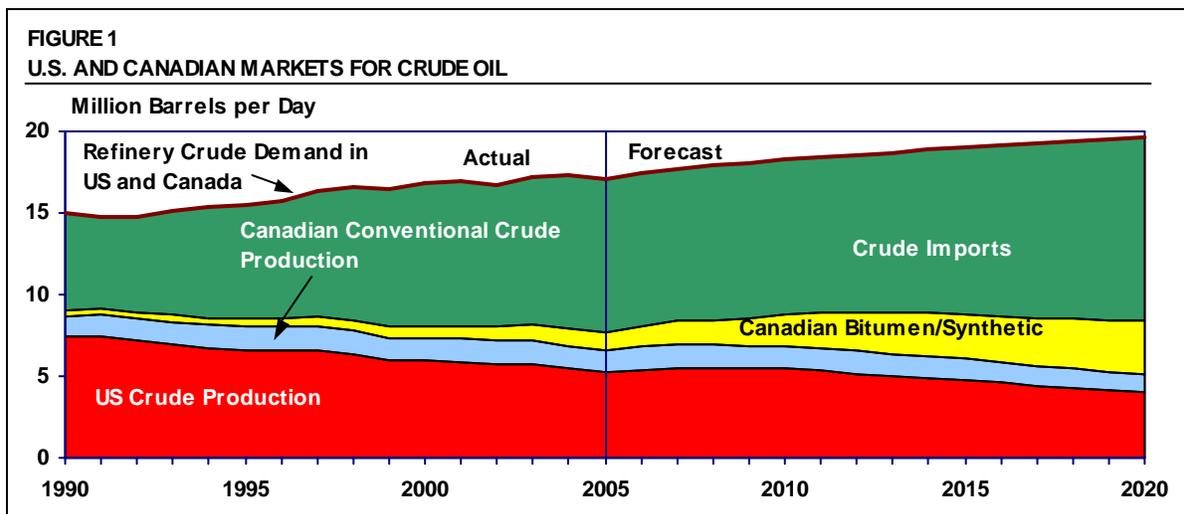
65 The U.S. demand for refined petroleum products has increased by approximately
66 2.6 million B/D over the past 10 years and is expected to increase further. Purvin &
67 Gertz forecasts that total U.S. petroleum consumption will increase by approximately
68 3.2 million B/D over 20 years, representing an average demand growth of about
69 160,000 B/D per year. In its Annual Energy Outlook 2006, the Energy Information

70 Administration (“EIA”) forecasts an even greater increase of approximately 5.3 million
71 B/D by 2025.

72 **Q. Does the U.S. need more crude oil pipeline capacity from Canada?**

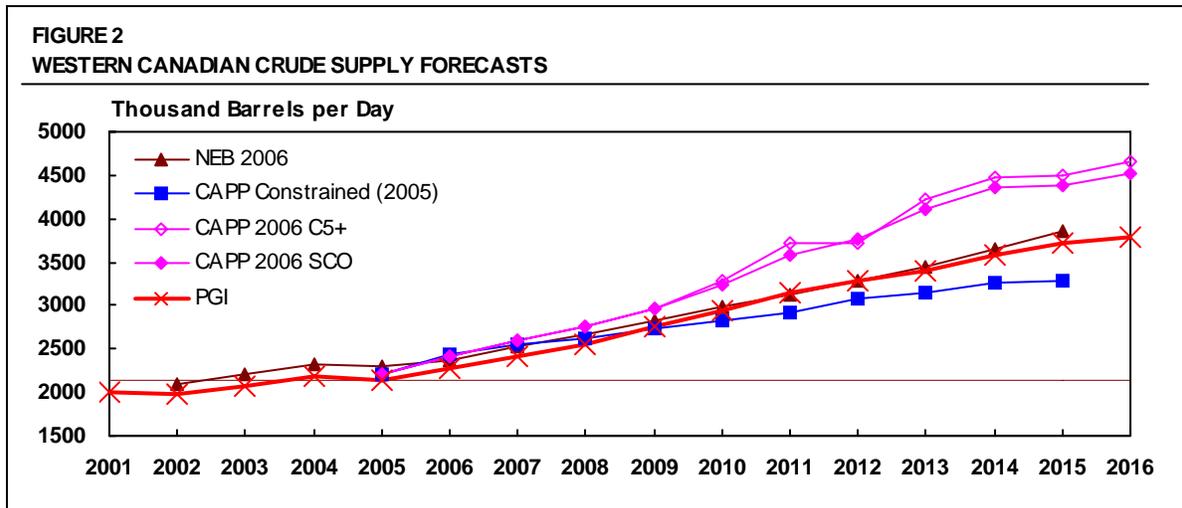
73 A. Yes. The production of crude oil in the U.S. has been declining and is forecast to rise
74 slightly in the Gulf of Mexico but then continue to decline after 2007. Crude demand by
75 refineries is forecast to increase to meet rising product demand, therefore, imports of
76 crude oil will have to increase. Canadian crude oil production and exports are forecast to
77 increase, thus, more crude oil pipeline capacity will be needed to transport the available
78 growing volumes of Canadian crude to U.S. market destinations.

79 Figure 1 shows Purvin & Gertz’ forecast of North American crude supply and demand.
80 The forecast growth in Canadian crude oil production will barely offset the forecast
81 decline in domestic U.S. crude production. As a result, increases in U.S. refinery crude
82 consumption will require increased crude imports from outside of North America.



83 **Q. Why is Canadian crude production forecast to increase?**

84 A. Canadian crude oil production is forecast to increase due to major project developments
 85 in the Alberta oil sands. Purvin & Gertz' forecast of crude oil production in Western
 86 Canada is compared with one forecast from the NEB¹ and three forecasts from the
 87 Canadian Association of Petroleum Producers ("CAPP")² in Figure 2.



88 Production of bitumen and synthetic crude oil from the Alberta oil sands is forecast to
 89 grow over the next decade and beyond. Purvin & Gertz forecasts the total crude oil
 90 supply of light and heavy crude blends available in Western Canada to increase from
 91 approximately 2,135,000 B/D in 2005, by nearly 600,000 B/D in 2010 and by another
 92 850,000 B/D by 2016. Because Canadian refinery crude demand is not rapidly
 93 increasing, nearly all of this volume increase can be exported to the U.S. refining
 94 markets. The May 2006 forecast of total crude oil supply by CAPP is much higher than
 95 the forecasts of Purvin & Gertz or NEB. The Alberta Government reports that the capital
 96 cost of announced oil sands projects is estimated at \$84 billion (Canadian dollars).³

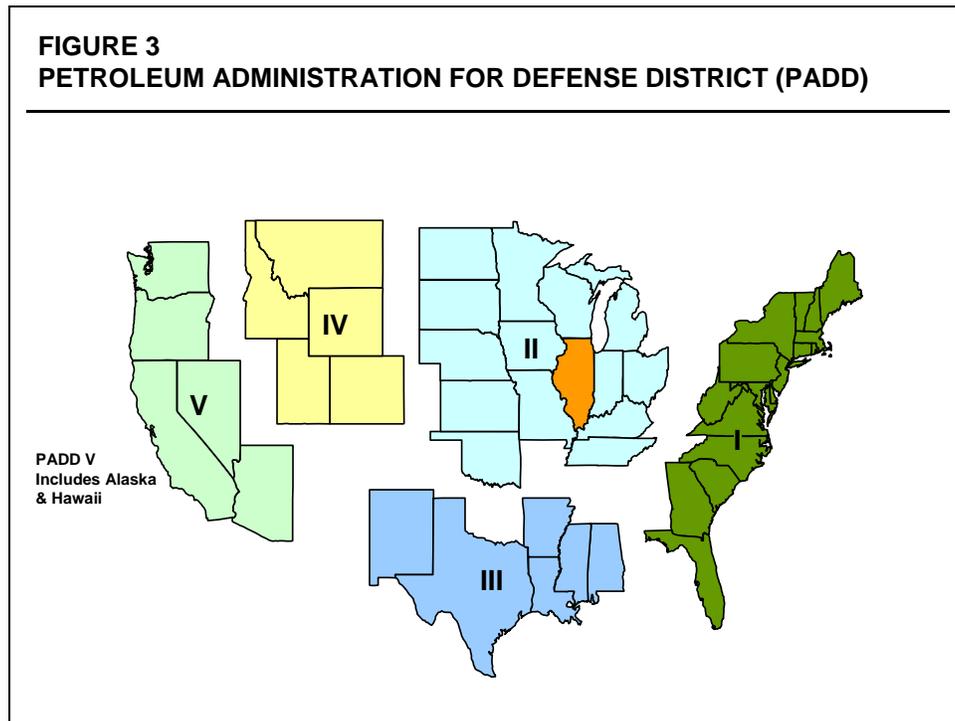
¹ NEB, Canadian Oil Sands Opportunities and Challenges to 2015: An Update, June, 2006

² CAPP, Canadian Crude Oil Production and Supply Forecast, 2006-2020, May 2006

³ Alberta Economic Development, Inventory of Major Alberta Projects, March 2006

97 **Q. How is the U.S. market segmented?**

98 A. The U.S. is divided into five (5) Petroleum Administration for Defense Districts
99 (“PADD(s)”) by the US Department of Energy (DOE) as shown in Figure 3.



100 Illinois is in PADD II, which is also called the Midwest in this testimony. Besides
101 Illinois, PADD II includes Oklahoma, Kansas, Nebraska, South Dakota, North Dakota,
102 Minnesota, Iowa, Missouri, Wisconsin, Michigan, Indiana, Ohio, Kentucky and
103 Tennessee. PADD I is the East Coast; PADD III is the Gulf Coast; PADD IV is the
104 Rocky Mountain states; and PADD V is the West Coast including Alaska and Hawaii.
105 PADD III has the largest refining capacity in the US and the PADD III refineries supply
106 large volumes of refined products to PADDs I, II and III and smaller volumes to PADDs
107 IV and V.
108 In 2004, the crude oil demand in PADD II was approximately 3.3 million B/D or 21.3%
109 of the national demand. Among the PADD II states, Illinois has the highest crude

110 demand, refining capacity, and product demand. Illinois' refining capacity is
111 approximately 25 percent of total PADD II refining capacity.

112 **Q. Does the Keystone Pipeline help to meet the U.S. need for crude?**

113 A. Yes. The Keystone Pipeline will have an initial capacity of 435,000 B/D and will deliver
114 all of its crude to the U.S. market.

115 **B. MIDWEST MARKET**

116 **1. SUPPLY AND DEMAND**

117 **Q. Please describe the supply and demand for crude oil and refined products in**
118 **PADD II?**

119 A. In 2004, refinery crude demand in PADD II was 3.3 million B/D. In addition to using
120 domestic crude from PADD II and other states, refineries imported 1.6 million B/D.
121 Canadian crude imports were 1.0 million B/D.

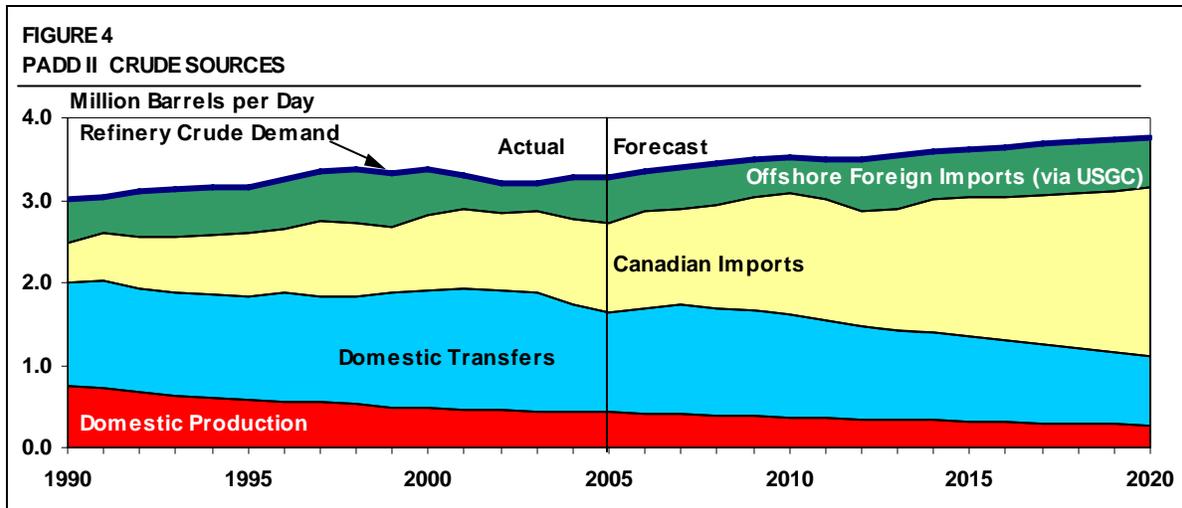
122 In 2004, the PADD II demand for all refined products was 5.0 million B/D of which
123 gasoline and diesel demand was 2.6 million B/D and 1.2 million B/D, respectively. Most
124 of the supply was from the PADD II refineries, but net receipts of refined products from
125 other PADDs, particularly from the Gulf Coast, were 1.1 million B/D. Product imports to
126 PADD II were approximately 0.1 million B/D. By 2010, demand for gasoline and diesel
127 in PADD II is forecast by Purvin & Gertz to increase by over 0.3 million B/D.

128 **2. THE NEED FOR PIPELINE CAPACITY IN THE MIDWEST**

129 **Q. Does the Midwest and Illinois need more crude pipeline capacity from Canada?**

130 A. Yes. Figure 4 shows the historical sources of crude oil in PADD II and Purvin & Gertz'
131 forecast of crude sources. Purvin & Gertz forecasts the imports of Canadian crude to

132 grow by more than 450,000 B/D by 2010 so more pipeline capacity will be needed to
133 deliver Canadian crude to the Midwest.



134 The major export market for Canadian crude has been PADD II. The supplies of
135 Canadian crude to PADD II are forecast to rise if pipeline capacity into PADD II is
136 increased. Whether or not the Illinois refineries expand, there is potential for them to
137 increase their use of Canadian crude.

138 **Q. What crude oil pipelines supply PADD II?**

139 A. The major crude oil pipelines that supply PADD II are listed in Table 1. However, not all
140 the pipeline capacity is fully utilized, especially the lines from the south. Only the
141 Enbridge and Platte pipelines deliver Canadian crude to PADD II. As more Canadian
142 crude becomes available, more pipeline capacity from the north will be needed and the
143 utilization of pipelines from the south will continue to fall. As an example, the Mobil
144 Pipeline which flowed north from Corsicana, Texas to Patoka, Illinois was no longer
145 being used, so it was reversed in early 2006 to deliver Canadian crude south to the Gulf
146 Coast.

TABLE 1
CRUDE PIPELINE CAPACITY ENTERING PADD II
(Thousand Barrels per Day)

Pipeline	From	To	Capacity ⁽¹⁾
Capline	St. James, LA	Patoka, IL	1,140
Seaway	USGC, TX	Cushing, OK	350
Basin	West Texas	Cushing, OK	350
BP	West Texas	Cushing, OK	177
Mid Valley	Longview, TX	Toledo, OH	238
Enbridge (Lakehead) ⁽²⁾	Canadian Border	Clearbrook, MN	1,391
Platte	Guernsey, WY	Wood River, IL	140
Total Capacity			3,776

Notes: (1) Source: Purvin & Gertz data
(2) Lakehead crude capacity excludes 100,000 B/D of NGL capacity and 300,000 B/D of crude deliveries to Ontario and New York.

147 The main crude oil pipelines serving PADD II are shown in Figure 5 on the following
148 page. Figure 5 also highlights the Patoka hub, a major hub for incoming and outgoing
149 crude oil pipelines.

150 The proposed Keystone Pipeline would deliver crude to Wood River and Patoka in
151 southern Illinois. There is one refinery at Wood River owned by ConocoPhillips.
152 ConocoPhillips also operates a crude oil pipeline from Wood River to its Ponca City,
153 Oklahoma refinery. Further, crude oil also can be delivered from Patoka to four other
154 refineries in southern Illinois, Indiana, Ohio, Kentucky.

155 In addition, the Mobil Pipeline, owned by ExxonMobil, has been reversed to ship
156 Canadian crude south from Patoka to Beaumont, Texas at the Gulf Coast. From
157 Beaumont, Canadian crude can access the largest refining market in the US. However,
158 the current pipeline capacity is limited to approximately 66,000 B/D of heavy crude.

159 The Patoka/Wood River region also has outgoing pipelines to the Chicago area, including
160 Whiting, and to St. Paul, Minnesota. In addition, refineries at Toledo and Detroit can use
161 their affiliated pipelines to receive crude from Patoka.

162 **3. MIDWEST REFINING**

163 **Q. What refineries and refining capacity will be supplied by Keystone Pipeline?**

164 A. The total crude capacity at refineries which are expected to be supplied from the Patoka
165 hub is 1,145,400 B/D including Wood River. The refineries in this primary market are
166 listed in Table 2. The two refineries in southern Illinois are the 306,000 B/D
167 ConocoPhillips refinery at Wood River and the 192,000 B/D Marathon refinery at
168 Robinson, east of Patoka.

**TABLE 2
MAJOR REFINERY HUBS ACCESSIBLE FROM PROPOSED KEYSTONE PIPELINE**

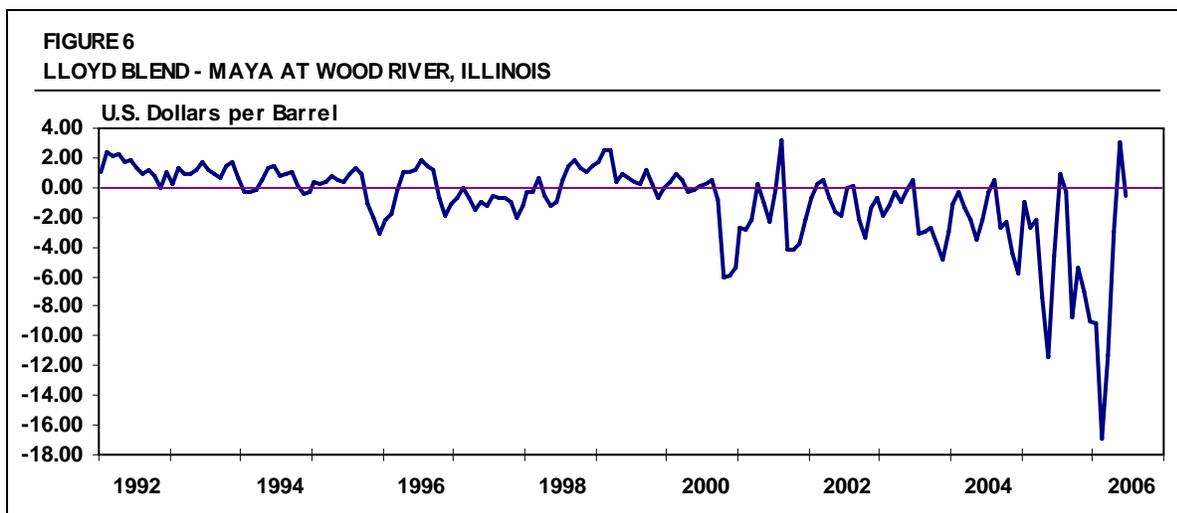
Refinery Owner	Location	Pipeline Access	Crude ⁽¹⁾ Capacity (B/D)
<u>Patoka Hub</u>			
ConocoPhillips	Wood River, IL	Keystone (direct)	306,000
ConocoPhillips	Ponca City, OK	ConocoPhillips	194,000
Marathon	Robinson, IL	Marathon	192,000
Marathon	Catlettsburg, KY	Marathon	222,000
Marathon	Canton, OH	Marathon	73,000
Valero	Lima, OH	BP & Marathon	<u>158,400</u>
Subtotal	Southern Midwest		1,145,400
USGC ⁽²⁾	Beaumont, TX	Mobil	<u>66,000</u>
Subtotal			1,211,400
<u>Patoka Hub to North</u>			
Flint Hills	Pine Bend, MN	Wood River	279,300
Marathon	St. Paul, MN	Wood River	70,000
BP	Whiting, IN	Chicap or BP ⁽³⁾	410,000
Citgo	Lemont, IL	Chicap	167,000
ExxonMobil	Joliet, IL	Chicap	238,500
Marathon	Detroit, MI	Marathon/MidValley	100,000
BP	Toledo, OH	BP/MidValley	131,000
Sunoco	Toledo, OH	BP/MidValley	<u>160,000</u>
Subtotal			1,555,800
Total			2,767,200
Notes: (1) Sources: DOE/EIA Petroleum Supply Annual 2004, and EIA Refinery Capacity, 2006.			
(2) US Gulf Coast access limited to approximately 66,000 B/D by Mobil pipeline capacity. Pipeline interconnects from Beaumont, TX to Houston area and Lake Charles, LA provide access to the largest U.S. refining market.			
(3) BP pipeline to Whiting from Salisbury, MO assumes interconnect.			

169 The eight northern refineries listed in Table 2 have a total crude capacity of 1,555,800
170 B/D. These refineries would not likely be primary markets for crude delivered on
171 Keystone Pipeline, but they are accessible from Patoka if they cannot receive sufficient
172 Canadian crude via Lakehead Pipeline.

173 **Q. Why is more Canadian crude needed in PADD II?**

174 A. Prices of many Canadian crudes have become more attractive than other crudes at
175 refineries in PADD II. The price of Canadian heavy crude has generally been below the
176 price of other heavy imports since mid-2000. The historical difference between the
177 Lloydminster Blend (“Lloyd Blend”) price and the estimated price of Mexican Maya

178 heavy crude delivered to Wood River is shown in Figure 6. The Lloyd Blend price
179 increased slightly in 1998 and 1999 after the Express Pipeline started up but then fell
180 against alternative imports, especially in 2005 and early 2006. Volatility has been
181 extreme since 2004. The Canadian heavy crudes are undervalued against competition
182 because of oversupply in the markets to which they have access. With Canadian crudes
183 moving further south to refineries around Cushing, Oklahoma and the Gulf Coast, they
184 should be less expensive at Wood River and Patoka compared with delivered prices at
185 those southern refineries and so more attractive to refiners supplied from Wood River and
186 Patoka.



- 187 **Q. Are Midwest refiners using more Canadian crude?**
- 188 A. Yes. PADD II refineries north of Wood River/Patoka have adapted to use more
189 Canadian crude. In 2005, Canadian crude deliveries to the Upper Midwest refineries
190 (Minnesota, Wisconsin and North Dakota) were approximately 305,000 B/D, or
191 72 percent of refinery crude capacity. Canadian crude deliveries to the Chicago area
192 were approximately 438,000 B/D, or 54 percent of refinery crude capacity. Canadian
193 crude deliveries to Keystone's potential primary market of Wood River and the Patoka

194 hub were approximately 90,000 B/D, or just 7.7 percent of refinery crude capacity.
195 Canadian supplies to this market have grown from 29,000 B/D in 1996 before the
196 Express Pipeline was in operation. Potential shippers have committed to use at least
197 340,000 B/D of the crude capacity of the Keystone Pipeline. (Jones Dir., Keystone Ex.
198 1.0, ln. 77). Up to 125,000 B/D is now moving further south to Cushing from Chicago on
199 the reversed Spearhead Pipeline and up to 66,000 B/D is moving south to the Gulf Coast
200 on the reversed Mobil Pipeline from Patoka.

201 The PADD II refineries have increased their use of Canadian crude as shown in Figure 4.
202 The majority of the increase in Canadian supply has been heavy crude. The PADD II
203 refineries have adjusted and adapted to use more heavy crude. A major heavy crude oil
204 project was BP's coker at the Toledo, Ohio refinery in 2000. That project allowed the
205 refinery to use more Canadian heavy crude. As discussed later, more heavy crude
206 refinery projects are planning to use the growing supplies of Canadian heavy crude.

207 **Q. What refinery projects are planned?**

208 A. The refineries supplied from Wood River and the Patoka hub use more light crude than
209 heavy crude. Purvin & Gertz estimates that total crude runs in the southern Midwest
210 region in 2004 were approximately 964,000 B/D of light crude and 103,000 B/D of heavy
211 crude. Light crudes were mostly from U.S. domestic sources and imports delivered via
212 the Gulf Coast with a small amount of Canadian light crude (approximately 8,000 B/D).
213 More than 90 percent of the heavy crudes were Canadian.

214 The refineries in this area have increased their use of Canadian heavy crude over the last
215 decade. ConocoPhillips has increased heavy crude runs at its Wood River refinery and is

216 expanding both crude and coking capacity to run more Canadian heavy crude.⁴ The
217 estimated capital cost for this expansion is more than \$1 billion. (Simpson/Askounis
218 Dir., Keystone Ex. 4.0, ln. 180). A major source of feedstock for this will be Canadian
219 heavy crude.

220 At its Robinson, Illinois refinery, Marathon is carrying out conceptual studies for an
221 expansion project to use 150,000 B/D of Canadian heavy crude. Marathon is also
222 studying a conversion project to use up to 170,000 B/D of Canadian medium crudes at its
223 Catlettsburg, Kentucky refinery.⁵ In 2005, Marathon expanded its Detroit, Michigan
224 refinery from 74,000 B/D to 100,000 B/D at a cost of \$300 million and is now studying
225 full conversion to Canadian heavy crude.

226 Refineries elsewhere are also constructing or planning to add facilities to use more
227 Canadian crude. In the mid-continent area which is supplied from Cushing,
228 ConocoPhillips is adding a coker at its 146,000 B/D Borger, Texas refinery to use
229 Canadian heavy crude.⁶ Frontier is modifying its 110,000 B/D refinery at El Dorado,
230 Kansas to use more heavy crude by expanding its crude unit and vacuum tower.⁷
231 Coffeyville Resources is expanding and revamping its crude and vacuum units and
232 making improvements at its coker to allow the 112,000 B/D refinery at Coffeyville,
233 Kansas to process heavier crude oils by late 2006.⁸

⁴ ConocoPhillips 2005 Annual Report

⁵ Marathon website, Stanford C. Bernstein Strategic Decisions Conference, June 2, 2006, C.P. Cazalot Jr.,
President and CEO

⁶ ConocoPhillips 2005 Annual Report

⁷ Frontier Oil 2005 Annual report.

⁸ Coffeyville Resources Press Release January 3, 2006

234 Some of the growth in crude production for the oil sands will be light synthetic crude oil
235 produced by upgrading heavy bitumen at facilities in Alberta. As the synthetic crude
236 production grows, more of it is expected to move further south like heavy crude. As it
237 moves south, the light synthetic crude will have to be priced to compete with domestic
238 and other foreign crudes which could be delivered from the south. Synthetic crude does
239 not have the same characteristics as many conventional light crudes, so refineries will
240 have to adapt to use synthetic crude. The Sunoco refinery at Toledo has used synthetic
241 crude for many years and is now expanding its crude and conversion capacity⁹ to use
242 more synthetic crude. Some refineries may use a mix of synthetic crude and heavy crude
243 blends.

244 Current project activities suggest growth in the refineries' capabilities for Canadian
245 crudes. Before investing, refiners need to be confident in the availability of crude supply
246 which requires both the production of crude and the pipeline capacity to receive it. With
247 both the Platte and Mustang pipelines at full capacity, the refineries supplied from Wood
248 River and the Patoka hub will need more pipeline capacity to receive additional Canadian
249 crudes.

250 C. ILLINOIS MARKET

251 **Q. What is the current demand for crude oil in Illinois?**

252 A. Total refining capacity in Illinois is 895,000 B/D. There are four refineries in Illinois,
253 two around Chicago and two in the south. Refinery crude demand is not known exactly
254 but is estimated at 832,000 B/D, assuming a service factor of 93% of capacity. In
255 addition to using domestic crude from Illinois and other states, Illinois refineries

⁹ Sunoco 10-K, 2005

256 imported 574,000 B/D in 2004. Most of the imports and more than half the crudes used
257 in Illinois (454,000 B/D) were Canadian crudes.

258 In 2004, the Illinois demand for the major refined products, gasoline and diesel, was
259 approximately 346,000 B/D and 125,000 B/D, respectively. Most of the supply was from
260 the Illinois refineries and BP's refinery at Whiting, Indiana east of Chicago, but refined
261 products were also received on product pipelines from other states, particularly Texas.
262 Product imports from other countries to Illinois were negligible. The Illinois refineries
263 also supply refined products by product pipelines to other states including Minnesota,
264 Iowa, Missouri, Wisconsin, Indiana, Michigan, Ohio, and Kentucky.

265 **Q. Approximately what percentage of refined products consumed in Illinois is**
266 **produced by those facilities to be served by the Keystone Pipeline?**

267 A. The two refineries at Wood River and Robinson, Illinois supply refined products to the
268 Illinois market as well as Missouri, Indiana, Ohio, Kentucky, and others. The exact
269 percentage of production consumed in Illinois is unknown. ConocoPhillips estimated
270 that 40% to 50% of its Wood River refinery output is consumed in Illinois.
271 (Simpson/Askounis Dir., Keystone Ex. 4.0, ln. 119-24). For the Marathon refinery at
272 Robinson, based on its location and Marathon's product pipeline infrastructure and retail
273 network, its output which is consumed in Illinois is probably in the 20% to 35% range.
274 On this basis, 30% to 45% of product from the two refineries is likely consumed in
275 Illinois.

276 **Q. What are the future projections for pipeline capacity and demand for crude oil in**
277 **Illinois?**

278 A. Over the past 10 years refinery crude capacity in PADD II has increased from
279 3.40 million B/D to 3.55 million B/D. This minor increase is equivalent to 15,000 B/D
280 each year or 0.4% per year. In Illinois, the refinery crude capacity fell 12,000 B/D since
281 1995 due to the closure of two refineries at Blue Island and Hartford with a combined
282 capacity of 122,000 B/D. The four remaining refineries increased crude capacity by
283 112,000 B/D equivalent to 1.4% per year of growth. Even without major expansion,
284 minor growth in capacity can be expected. Purvin & Gertz forecast for PADD II growth
285 in crude runs is 1% per year to 2015. By applying this growth rate to Illinois refinery
286 capacity would increase by approximately 94,000 B/D by 2015. This projected increase
287 does not consider the possible expansions at Wood River or Robinson, as discussed
288 elsewhere in this testimony.

289 **Q. Is there sufficient pipeline capacity in Illinois to meet future demand for crude oil?**

290 A. There is not sufficient pipeline capacity to deliver the Canadian crude which is expected
291 to be available and more economical for the Illinois refineries than many other crudes
292 which could be delivered to them on other pipelines from the south. Based on total crude
293 pipeline capacity from the north and the south, pipeline capacity to meet Illinois crude
294 demand would appear to be sufficient but the capacity from the south would provide
295 crude which is more costly for the Illinois refineries.

296 **Q. What is the current capacity and the current demand for refineries in the Wood**
297 **River / Patoka region?**

298 A. There are two refineries in southern Illinois. The ConocoPhillips refinery at Wood River,
299 west of Patoka, has a crude capacity of 306,000 B/D. The Marathon refinery at
300 Robinson, east of Patoka, has a crude capacity of 192,000 B/D. Patoka is a hub and
301 terminal for incoming and outgoing crude pipelines but there are no refineries at Patoka.
302 Exact crude demand is not known but it is estimated at approximately 476,000 B/D,
303 assuming a 95.6% service factor, based on company utilization data.

304 **Q. How is crude oil supplied to Wood River and Robinson?**

305 A. Crude is supplied to those refineries almost exclusively by pipelines from out-of-state.
306 Purvin & Gertz believes that rail and marine deliveries of crude are essentially non-
307 existent. ConocoPhillips states “the Wood River Refinery receives crude from a wide
308 variety of sources including the Gulf of Mexico, Canada and domestic crude oils by
309 pipeline.” (Simpson/Askounis Dir., Keystone Ex. 4.0, ln. 96-97). Evidently none of its
310 crude is supplied by other means such as barge, rail or truck. Even though the refinery is
311 located on the Mississippi River there are no marine movements reported into PADD II
312 by the U.S. Department of Energy.

313 Marathon’s Robinson refinery is located inland in southeastern Illinois in the area where
314 most of the Illinois crude is produced. Total crude production in Illinois was 30,000 B/D
315 in 2004. Much of this is gathered on small pipelines owned by Marathon and others.
316 Although precise trucking data are not available, some crude is likely trucked to the
317 gathering pipelines or to the Robinson refinery and delivered to the Robinson refinery or
318 interstate crude pipelines.

319 **Q. What crude pipelines serve the Wood River / Patoka region?**

320 A. There are four main pipelines which supply crude oil to the Wood River / Patoka region,
321 as shown in Table 3. However there are also seven pipelines which carry crude beyond
322 this region. If all the outgoing pipelines were operating at capacity, there would be
323 insufficient capacity on the incoming lines to meet the total crude supply needs of the two
324 refineries. While not all of the outgoing lines are full, the incoming lines appear to be
325 near capacity. Both the Mustang and the Platte pipelines which are the only two lines
326 that normally carry Canadian crudes have recently been at capacity and on
327 apportionment. If the refineries expand and use more crude, more incoming pipeline
328 capacity will be needed, particularly for Canadian crudes since their availability is
329 expected to rise.

TABLE 3
CRUDE PIPELINE CAPACITIES AND RECEIPTS FOR SOUTHERN ILLINOIS
(Thousand Barrels per Day)

<u>Pipeline into Region</u>	<u>From</u>	<u>To</u>	<u>Capacity ⁽¹⁾</u>
Capline ⁽²⁾	St. James, LA	Patoka, IL	960
Ozark	Cushing, OK	Wood River, IL	325
Platte ⁽³⁾	Guernsey, WY	Wood River, IL	130
Mustang	Chicago, IL	Patoka, IL	<u>100</u>
Total Capacity			1,515
<u>Pipeline out of Region</u>			
Chicap	Patoka, IL	Chicago, IL	400
Marathon	Patoka, IL	Lima, OH	275
Marathon	Patoka, IL	Cattlesburg, KY	219
BP	Patoka, IL	Lima, OH	37
Mobil	Patoka, IL	Beaumont, TX	66
Wood River	Wood River, IL	St. Paul, MN	105
Conoco Phillips ⁽⁴⁾	Wood River, IL	Ponca City, OK	<u>50</u>
Total Capacity			1,152
Net Pipeline Capacity Into Region			363
<u>Refinery Capacity</u>	<u>Location</u>		
Conoco Phillips	Wood River, IL		306
Marathon	Robinson, IL		<u>192</u>
Total Capacity			498
Crude Production (2004)	Illinois		<u>30</u>
Spare Pipeline Capacity Into Region			(105)
Notes: (1) Source: Purvin & Gertz pipeline data.			
(2) Capline capacity reduced by 180,000 B/D for Memphis refinery.			
(3) Platte capacity reduced by 10,000 B/D for Nebraska take-off.			
(4) ConocoPhillips pipeline capacity is estimated.			

330 **Q. What are the future projections of demand for crude oil into the Wood River /**
331 **Patoka region?**

332 A. The combined crude capacity of the two refineries in southern Illinois is 895,000 B/D.

333 ConocoPhillips indicated in its 2005 Annual Report that crude capacity could increase by

334 10% to 15% or 30,000 to 46,000 B/D at Wood River.¹⁰ Marathon is considering a
335 150,000 B/D refinery expansion for Canadian heavy crude at Robinson. Together these
336 projects would add up to 196,000 B/D of crude capacity.

337 **Q. Can existing pipeline capacity meet the anticipated demand for transportation**
338 **service to Wood River / Patoka?**

339 A. No. Increased transportation service for crude oil into the Wood River/Patoka hub will
340 be needed to deliver increasing volumes of Canadian crude oil resulting from growth in
341 crude supply from the Alberta oil sands. Existing delivery lines for Canadian crude
342 include the Platte Pipeline from Wyoming with a capacity to Wood River around 130,000
343 B/D and the Mustang Pipeline from Chicago to Patoka with a capacity around 100,000
344 B/D, both depending on crude types. Neither line appears to be expandable without
345 major looping projects.

346 **Q. Why are refiners planning refinery changes to use more Canadian crude?**

347 A. The supply of Canadian crude is increasing and the prices of Canadian crudes should be
348 attractive at refineries around the Patoka hub as Canadian crude oils move further south
349 of Patoka to refining markets around Cushing and the Gulf Coast. Compared with
350 international crudes for the Midwest, the historical pricing of Lloyds Blend presented
351 earlier in Figure 6 shows that Canadian heavy crude generally has had a price advantage
352 over Mexican Maya crude at Wood River.

353 The commitments of several potential shippers to the Keystone Pipeline, which is based
354 on an agreed tariff structure, indicates that the Keystone Pipeline is considered to be

¹⁰ ConocoPhillips 2005 Annual Report

355 competitive relative to the other possible routes able to transport Canadian crudes to
356 Wood River to Patoka.

357 **III. PIPELINE ALTERNATIVES**

358 **Q. What are the alternatives to the Keystone Pipeline for southern Illinois?**

359 A. The alternatives to delivering Canadian crude via the Keystone Pipeline to refineries in
360 southern Illinois are:

- 361 • increased dependence on offshore crudes delivered from the Gulf of Mexico, both
362 domestic offshore and imports from other countries;
- 363 • other pipelines for Canadian crudes; or
- 364 • an increase in the shipment of refined petroleum products to Illinois from Gulf
365 Coast refineries which use other foreign crudes.

366 **A. INCREASED DEPENDENCE ON OFFSHORE CRUDES**

367 **Q. Will Gulf of Mexico crude satisfy refiners in southern Illinois?**

368 A. No. While the Gulf of Mexico production is rising, it is expected to be temporary with a
369 decline resuming by 2007. Much of the Gulf of Mexico production is connected by
370 pipeline to Gulf Coast refineries in Louisiana, Texas and Mississippi, as such it is not
371 available for PADD II. Furthermore, Gulf of Mexico crude is not heavy so it does not
372 meet the specifications for the heavy crude that the Wood River area refineries are
373 designing to use. The lighter crude from the Gulf of Mexico would be more costly to the
374 southern Illinois refiners than heavy crude.

375 Additionally, for crude oil which is delivered from the Gulf Coast, the delivered cost at
376 the PADD II refineries is equivalent to the Gulf Coast price plus the pipeline tariffs to
377 ship to PADD II. This sets a ceiling price for Canadian crudes which must compete in

378 PADD II because other market outlets are not large enough to absorb the Canadian
379 production. As discussed earlier, Canadian heavy crudes have been priced below other
380 heavy imports delivered via the Gulf Coast to Wood River. Purvin & Gertz expects
381 Canadian heavy crude prices to remain weak relative to other heavy imports at Wood
382 River. Similarly, light synthetic crude oil production is expected to grow, causing export
383 volumes to move further south, so the Canadian synthetic crude price will also be
384 attractive at PADD II refineries which are supplied for the Patoka hub.

385 **B. OTHER EXISTING PIPELINES**

386 **Q. Are there other existing pipelines which can supply more Canadian crude to**
387 **southern Illinois?**

388 A. No. There are two pipelines, the Mustang and Platte lines, that can deliver Canadian
389 crude to southern Illinois. Both have recently been at capacity and on apportionment, so
390 they cannot supply more crude.

391 I am not aware of other regulatory applications in place at this time to increase crude
392 pipeline capacity for Canadian crude to the Wood River / Patoka region. The Lakehead
393 Pipeline system has a project underway to increase crude capacity into the Chicago area
394 from the north. Also, Lakehead is proposing an extension from the Chicago area to
395 Patoka, although this project does not yet have contracted shipper support or regulatory
396 approval.

397 **C. INCREASE SHIPMENTS OF REFINED PRODUCTS**

398 **Q. Can more refined products be delivered to southern Illinois by pipeline?**

399 A. There are several pipeline systems that currently transport refined products from the Gulf
400 Coast to PADD II. These pipelines have been expanded when more capacity was needed.

401 For instance, the Explorer Pipeline expanded by 130,000 B/D in early 2004. The
402 Centennial Pipeline which is partly owned by Marathon was put in service in 2002 to
403 deliver refined products to central Illinois. I am not aware of products pipeline expansion
404 plans to supply PADD II from PADD III.

405 Historically, growth in demand for refined products in PADD II has been satisfied by a
406 combination of growth in PADD II refinery production and growth in pipeline deliveries
407 for PADD II. For the refineries in the Wood River / Patoka region to increase crude
408 throughput and product output for the Illinois market, more crude oil pipeline capacity
409 will be needed.

410 **IV. RELIABILITY**

411 **Q. Is there any reason to believe that Canadian crude oil supply is any more reliable**
412 **than offshore supplies?**

413 A. Yes. Market fundamentals make Canadian crude oil as secure as U.S. domestic crude
414 supplies for PADD II. Canadian refineries use all the Canadian crude that they need. As
415 Canadian crude production grows, nearly all of the extra crude production will be
416 exported. To date, nearly all of the Canadian crude exports have been to the U.S. and
417 nearly all of the Western Canadian crude has been exported by pipeline. As noted earlier,
418 Canadian crude exports to the U.S. were 1.6 million B/D in 2004. Purvin & Gertz
419 forecasts the production to grow by approximately 1.4 million B/D by 2015 with most of
420 this volume exported. There are proposals for new pipelines to the Canadian west coast
421 for marine exports to Asia or California. Even if one of these projects proceeds and
422 exports 400,000 B/D to Asia, Canadian crude exports to the U.S. would still rise by
423 nearly 1.0 million B/D.

424 Historically, Canadian crude exports to PADD II have grown as Canadian crude
425 production has grown. Within PADD II, the Canadian crude market share is highest in
426 the north in Minnesota and around the Great Lakes. As production has grown, pipeline
427 capacity has increased and pipeline routes were extended to allow penetration to markets
428 further south. These pipeline changes include the Mustang Pipeline reversal to Patoka,
429 the construction of the Express Pipeline with ongoing service via Platte Pipeline to Wood
430 River, the Spearhead Pipeline reversal to Cushing and the Mobil Pipeline reversal to
431 Beaumont, Texas. As Canadian crude production continues to grow, pipeline capacity to
432 markets south of Chicago will also have to grow to facilitate greater receipts by refiners
433 further south, including those in southern Illinois.

434 Major pipeline project developments are normally supported by shippers by some
435 mechanism. As an example, the Keystone Pipeline received support for 340,000 B/D of
436 throughput after conducting its Open Season. By the nature of their fixed routes and
437 facilities, pipelines can only deliver to certain destinations along their routes. Shippers
438 generally are committed to pay for future use of the pipeline projects so they will not
439 likely overcommit volumes. Once the pipeline project is operational, most of the
440 committed volumes will be delivered. In the case of Keystone, ConocoPhillips is a
441 committed shipper. This pipeline will provide a facility to ship a heavy crude blend from
442 Alberta to ConocoPhillips' refinery at Wood River.

443 With more pipelines and pipeline capacity available to supply crudes to Midwest and
444 Illinois refineries, the refiners will have more flexibility in their crude selection.
445 Planning for ConocoPhillips and Marathon appears to require Canadian crude supply, so
446 projects such as Keystone Pipeline would provide a reliable means of receiving crude.

447 **Q. What is the outlook for international crude pricing and what impact might this have**
448 **on Canadian crude production?**

449 A. Purvin & Gertz expects world prices for light crudes to fall below \$50 per barrel over the
450 next few years, and then to rise more rapidly than inflation in the long term. This price
451 level should be sufficient to support and encourage oil sands developments in Alberta so
452 Canadian crude oil production is forecast to grow. Canadian crude imports by PADD II
453 refiners should also grow if more pipeline capacity becomes available.

454 **V. PUBLIC NEED**

455 **Q. Would you discuss the effects on price of end user products if supply is increased?**

456 A. The prices of end user products such as gasoline and diesel are established by many
457 market factors such as supply and demand, refinery/transportation costs of supply, and
458 the costs of alternative supplies. In the Midwest, product prices are generally in line with
459 Gulf Coast prices since the Gulf Coast refineries supply incremental products by product
460 pipelines, but there are regional market factors which sometimes cause price premiums or
461 discounts. Strong supply and performance of regional refineries should tend to keep a cap
462 on end user prices in the region.

463 In recent years, Canadian heavy crudes delivered to Wood River and Patoka have had
464 lower prices than similar heavy crudes imported via the Gulf Coast and delivered to this
465 market. In the future, the price of Canadian synthetic crude oil from the oil sands may
466 also fall below other light crudes which will be available at Patoka. If more Canadian
467 crudes are supplied at attractive prices, the refineries in Illinois should be able to improve
468 their competitiveness against other refineries located to the south. This may or may not
469 translate into lower prices for refined products, but it should contribute to sustainability

470 of operations which benefits refinery employees, providers of services and supplies as
471 well as the state through taxes.

472 **Q. How will the construction and operation of the keystone pipeline benefit the public**
473 **need in Illinois.**

474 A. The Keystone Pipeline will facilitate the continued availability of an adequate supply of
475 crude petroleum to refineries in Illinois. Additionally, the Keystone Pipeline will
476 enhance access for Illinois refiners, and their customers, to stable, secure North American
477 sources of crude petroleum.

478 To the extent that the Keystone Pipeline allows or encourages Illinois refiners to increase
479 their production of refined products, this would increase the local supply of refined
480 products. A significant amount of refined product is delivered to Illinois by product
481 pipeline from refineries at the Gulf Coast. The Gulf Coast refineries also supply their
482 local market (PADD III) and the East Coast (PADD I) and other states in PADDs II, IV
483 and V. In recent years, hurricanes at the Gulf Coast have disrupted refinery operations
484 and product supply. Increased local supply of product would be more secure since it has
485 few market outlets. By increasing refiners' access to low cost, inland crudes, Keystone
486 Pipeline will help Illinois refineries to sustain or increase local production of refined
487 products for consumers in Illinois amongst others.

488 **Q. Does this conclude your testimony?**

489 A. Yes.