Negative Price Differential Pressure on the Midwest Region Crude Oil Market
Contributing Factors and Potential Solutions

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EXECUTIVE SUMMARY

In mid-2006, significant crude oil pricing differentials began to negatively impact producers operating in the Midwest region at the Cushing, OK market. These price differentials have continued through early 2009. The driving factors behind the price differential are numerous, but most importantly include a finite regional refining capacity; limited pipeline export capacity, particularly at the Cushing, OK market; near-term increasing crude production within the Midwest region; longer-term increasing production and importation of heavy Canadian oil sands crude (referred to hereafter as Canadian oil sands crude); the reversal of historic pipeline transport directions to facilitate the transport of Canadian oil sands crude to Midwest and Gulf Coast refineries; and rules governing the nomination and apportionment of crude oil in pipelines. Potential solutions are also numerous, but can be summarized as increasing regional refining capacity, increasing export pipeline capacity, and revision of pipeline nomination and apportionment protocols. The first two solutions would require potentially significant capital expenditure and lead-time for implementation, the efficacy of which may be limited as Canadian oil sands crude imports are projected to increase, so addressing US Federal Energy Regulatory Commission rules for the nomination of crude volumes and pipeline apportionment protocols may well offer the greatest benefit to Midwest producers over the near-term with increasing export pipeline capacity and refinery capacity providing a benefit over the long-term. It should be noted that increasing regional export capacity would only be successful in alleviating current price differentials if the markets that currently receive exports from the Midwest region, primarily the Gulf Coast, have the capacity to receive the oil exported. Currently, there are plans for adding pipelines to provide increased export capacity for Canadian oil sands crude directly to Cushing, OK as well as Gulf Coast refineries (CAPP, 2009) (**Table 2**). While the general trend is an increase in the transport of Canadian oil sands crude south to the Midwest and Gulf Coast, it should be noted that a significant amount of both foreign and domestically produced oil continues to be transported north into the Midwest region (**Table 1**) from the Gulf Coast via the Capline Pipeline system to Wood River – Patoka, IL and the Seaway Pipeline to Cushing, OK making these markets a potential bottlenecks to the flow of crude oil to other markets and refineries.

INTRODUCTION

The Petroleum Administration for Defense District (PADD) system divides the US into five geographic districts established during World War II to facilitate regional allocation of oil. At that time, the first use of long distance, high volume pipelines was established as a countermeasure to pre-empt marine tanker sinkings by German submarines along the Atlantic and Gulf Coast. Ultimately, the pipeline systems and PADDs largely shaped the petroleum industry and post-war economic boom within the US (Trench, 2001). The pipeline system that the Cushing, OK market is controlled by is typical of the US PADD system of pipeline based crude and product distribution. The Midwest region is within PADD II which is further divided into the Northern, Eastern, and Southern PADD II states. The primary market hubs within PADD II are Clearbrook, Minnesota (Northern PADD II states), Wood River – Patoka, Illinois (Eastern PADD II states), and Cushing, Oklahoma (Southern PADD II states).

Crude oil production within the Midwest region averaged 534 thousand barrels per day (M bpd) for 2008 and 556 M bpd through January, 2009 (EIA, 2009). This crude is transported to refineries within the Midwest region states or it is exported out of the region to refineries within the East Coast region (PADD I), Gulf Coast region (PADD III), and the Rocky Mountain region (PADD IV) with a small amount of crude oil exported to Canada (EIA, 2009). Compared to imports into the Midwest region, the amount of crude oil exported is relatively small; 148 M bpd exported vs 3,341 M bpd imported in 2008. A significant amount of domestic and foreign crude oil enters the Midwest region to be processed by refineries located within the region. Domestic crude comes in from the Rocky Mountain and Gulf Coast Regions. Foreign crude oil originating in OPEC or non-OPEC (excluding Canada) countries enters the Midwest region through access from the Gulf Coast. A significant amount of foreign crude oil is also imported into the Midwest region from Canada along existing pipelines which enter the US at Clearbrook, MN and western Montana. Crude oil imports into the Midwest region combined with crude oil production within the Midwest region exceed the region's crude oil refining capacity (**Table 1)**. Crude oil imports into the Midwest region averaged 3,341 M bpd in 2008. Historically, the Midwest region has operated as a centralized region for oil imports and refining with very little need for exporting oil due to the large refining capacity within the region. This situation has changed with both the increase in regional production and import of Canadian oil sands crude. Within the Midwest region Cushing, OK serves as a major distribution and delivery point for crude oil in the central US (AOPL, 2005) and therefore is a central focus for the oversupply the region is experiencing. Cushing, as a major distribution and delivery point for crude within the region, serves as the New York Mercantile Exchange (NYMEX) contract pricing point for crude oil deliveries and as the market spot pricing point for benchmark West Texas Intermediate (WTI) crude.

Since mid-2006 the factors of increased crude oil imports, particularly increased imports to Cushing, OK, combined with increased domestic production and limited refining capacity have resulted in a net excess of crude oil within the Midwest region which in turn exerted significant downward pressure on the first purchase price of regionally produced crude (West Texas Intermediate) at the Cushing, OK market. From January 2004 through July 2006, the first purchase price of West Texas Intermediate (WTI) averaged $0.50 above Louisiana Light Sweet (LLS). From August 2006 through mid-2009, the first purchase price of WTI has averaged $2.50 less than LLS (EIA, 2009). An average differential of $2.50 below 2004 prices represents a loss of approximately $ 1,400,000 daily to Midwest regional producers as well as significant losses in state and local tax revenues. In addition to the first purchase price of WTI trading below the first purchase price of LLS, the first purchase price of WTI also fell significantly below the NYMEX spot price beginning in December of 2008. Historically, from January 2004 through November 2008, the first purchase price of WTI has averaged approximately $2.17 below the NYMEX spot price. In December of 2008 the monthly average first purchase price of WTI fell to a little over $3.00 less than the NYMEX spot price with this differential increasing to approximately $6.25 in February of 2009. While this differential has lessened somewhat, the first purchase price of WTI was still averaging approximately $2.80 less than the NYMEX spot price in April 2009 (EIA, 2009). This below market crude pricing potentially threatens future investments geared towards:

1) Continuing to produce marginal wells.
2) Exploring for new opportunities.
3) Engaging in significant enhanced oil recovery (EOR) projects.

The purpose of this paper is to examine the contributing factors and to discuss potential strategies to mitigate future price differential within the Midwest region. The contributing factors considered include:

1) Growth and decline of domestic production.
2) Imports of Canadian oil sands crude.
3) Limitations on refining within the Midwest region.

4) Pipeline export capacity and pipeline reversals within the Midwest region.
5) Related administrative/regulatory issues.
6) Softness in the consumer market.

BACKGROUND

A material balance for the Midwest region has been prepared and is provided as **Table 1**. The material balance includes imports into the region, regional crude oil production, refining within the region, and crude oil exports out of the region. Refined product exports from the region are not included because the primary factors which affect regional crude oil pricing differentials is the capacity at regional refineries to process crude oil produced or imported into the region combined with regional pipeline capacity to export excess crude oil supplies.

Crude oil production within the Midwest region has increased significantly from a low in 2004 to present volumes which approach production levels from the mid-1990's (EIA, 2009). Current production trends indicate that production within the Midwest region will continue to increase for the next couple of years (**Table 1**).

Table 1
Midwest Region Oil Balance
in thousand barrels per day (M bpd)

Category	**2005 Actual [1]**	**2006 Actual [1]**	**2007 Actual [1]**	**2008 Actual [1]**	**2009 Actual [2]**	**2010 Predicted [3]**	**2011 Predicted [3]**
Regional Imports by Origin (M bpd)							
Gulf Coast Region (PADD III)	1,848	1,628	1,549	1,487	1,183	1,183	1,183
Rocky Mountain Region (PADD IV)	114	154	164	166	158	158	158
OPEC Countries	323	300	346	307	178	178	178
Non-OPEC Countries (Excluding Canada)	154	64	27	43	29	29	29
Canada	1,039	1,150	1,125	1,162	1,164	1,453	1,658
Import Total	**3,478**	**3,296**	**3,211**	**3,165**	**2,712**	**3,001**	**3,206**
Regional Production by State (M bpd)							
	2005 Actual [1]	**2006 Actual [1]**	**2007 Actual [1]**	**2008 Actual [1]**	**2009 Actual [4]**	**2010 Predicted [5]**	**2011 Predicted [5]**
Northern PADD II States							
North Dakota	98	109	124	169	190	215	243
South Dakota	4	4	5	5	5	5	5
Minnesota	0	0	0	0	0	0	0
Wisconsin	0	0	0	0	0	0	0
Eastern PADD II States							
Illinois	28	28	26	26	22	26	26
Indiana	5	5	5	5	4	5	5
Kentucky	7	6	7	8	10	10	11
Michigan	15	14	14	16	17	18	18
Missouri	0	0	0	0	0	0	0
Nebraska	7	6	6	6	6	6	6
Ohio	15	15	15	16	15	16	16
Tennessee	1	1	1	1	1	1	1
Southern PADD II States							
Kansas	93	98	100	108	109	113	117
Oklahoma	170	172	167	174	177	179	181
Production Total	**443**	**458**	**470**	**534**	**556**	**594**	**628**

Regional Refinery Capacity (M bpd)

Refinery	*Refinery Capacity 2005*	*Refinery Capacity 2006*	*Refinery Capacity 2007*	*Refinery Capacity 2008*	*Refinery Capacity Predicted 2009* [6]	*Refinery Capacity Predicted 2010* [6]	*Refinery Capacity Predicted 2011* [6]
Northern PADD II States							
North Dakota	58	58	58	58	58	58	58
South Dakota	0	0	0	0	0	0	0
Minnesota	335	349	349	362	362	362	362
Wisconsin	33	34	34	34	34	34	34
Eastern PADD II States							
Illinois	896	904	904	916	916	916	966
Indiana	433	433	433	433	433	433	433
Kentucky	228	228	228	232	232	232	232
Michigan	74	100	100	102	102	102	102
Missouri	0	0	0	0	0	0	0
Nebraska	0	0	0	0	0	0	0
Ohio	551	511	510	515	515	515	515
Tennessee	180	180	180	180	180	180	180
Southern PADD II States							
Kansas	296	299	301	306	306	306	306
Oklahoma	485	487	491	520	520	520	520
Refinery Operable Capacity	**3,569**	**3,583**	**3,588**	**3,658**	**3,658**	**3,658**	**3,708**
Refining Inputs Total	**3,300**	**3,286**	**3,243**	**3,202**	**3,202**	**3,202**	**3,252**
Refinery Utilization	**92%**	**92%**	**90%**	**88%**	**88%**	**88%**	**88%**

Regional Exports by Destination (M bpd)

	2005 Actual [1]	**2006 Actual** [1]	**2007 Actual** [1]	**2008 Actual** [1]	**2009 Actual** [2]	**2009 Predicted**	**2009 Predicted**
East Coast (PADD I)	15	15	16	16	15	16	16
Gulf Coast Region (PADD III)	37	63	43	65	68	65	65
Rocky Mountain Region (PADD IV)	40	46	46	45	43	45	45
Canada	20	16	17	22	29	22	22
Export Total	**112**	**140**	**122**	**148**	**155**	**148**	**148**
Balance	**509**	**328**	**316**	**349**	**-89**	**245**	**434**

Notes:
1 = Actual data from EIA website 2009.
2 = Import and Export Actuals for 2009 are based on data through March 2009.
3 = Canadian Import predictions based on CAPP, 2009. Other imports held constant at 2009 volumes.
4 = Production Actuals for 2009 are based on data through January 2009.
5 = Predicted production data based on current production trends for each state with the exception of North Dakota (See below):

- Illinois, Indiana, Nebraska, Ohio, South Dakota and Tennessee remain constant at 2008 production levels.
- Kansas, Kentucky and Michigan increase at 4% per year.
- North Dakota increases at 13% based on production data from Jan. 2004 through Dec. 2007. Current trend from Jan. 2008 for N. Dakota shows an increase of 45%, however to be conservative, the 13% determined for Jan. 2004 through Dec. 2007 was used for predicted years.
- Oklahoma increases at 1 % per year.

6 = predicted refinery capacity is based on the stated capacity for 2008 (EIA, 2009) and remaining constant (2009 Annual Energy Outlook and EIA, 2009) with the exception of Illinois which is increased 50 M bpd based on planned expansion of the WRB refinery at Wood River, IL. Predicted refinery inputs and utilization rates are held constant at 2008 rates.

Balance: Negative Balance = combined refining and export pipelines have available capacity to accept more crude oil.
Positive Balance = combined refining and export pipeline capacity is exceeded creating a net surplus of crude oil.

The majority of the crude produced within the Midwest region is refined locally. In fact, regional refinery capacity exceeds regional production by approximately 3,000 M bpd (**Table 1**). As such, substantial volumes of both domestic oil from other PAD regions and foreign oil, particularly Canadian crude oil, are imported into and refined in the Midwest region. In 2008, the Midwest region received 1,164 M bpd of Canadian crude oil, 350 M bpd of crude oil from other foreign countries, and 1,653 M bpd from other PAD districts.

Compared to oil imports, a relatively small amount of oil is exported from the Midwest region. In 2008, the Midwest region exported a total of 126 M bpd to the Gulf Coast, Rocky Mountain and East Coast regions with an additional 22 M bpd also being exported to Canada (**Table 1**).

CONTRIBUTING FACTORS

As shown on **Table 1**, the import of crude oil into the Midwest region combined with crude oil produced within the region exceeds the refining capacity and crude oil exported from the region. This gives a positive balance for 2005 through 2008 indicating an over abundance of crude oil in the Midwest regional market resulting in pipeline proration and downward pressure on spot market crude prices. This oversupply of crude oil combined with the reversal of oil flows within the region from the historic south to north direction has resulted in a negative price differential on West Texas Intermediate (WTI) vs Louisiana Light Sweet at Cushing, OK (**Figure 1**) as well as a higher than normal negative price differential between the first purchase price and the NYMEX spot market price for WTI at Cushing, OK for December 2008 and early 2009 (**Figure 2**). Predicted values for 2009 show a negative balance due primarily to a decrease in imports from OPEC countries through March of 2009 (EIA, 2009). The decrease in imports from OPEC countries was due to a curb in oil production by OPEC due to surplus oil supplies (MarketWatch, 2009a and b). This negative balance returns to a positive crude oil surplus in predicted years 2010 and 2011 due to increased projections for Canadian oil sands crude imports and domestic production.

Domestic Imports

Domestic imports into the Midwest region consist of crude oil from the Gulf Coast region (1,487 M bpd in 2008) and the Rocky Mountain region (166 M bpd in 2008).

Crude oil that enters the Midwest region from the Gulf Coast consists of oil that is transported from New Mexico, north-Texas and the Permian Basin in Texas via the TEPPCO Red River or Basin pipelines to Cushing, OK (TEPPCO, 2009); oil that is transported from the Louisiana Offshore Port via the Capline Pipeline system to Wood River – Patoka, IL; and oil that is produced in the gulf or imported to the gulf via the 350 M bpd Seaway Crude Pipeline to Cushing, OK (AOPL, 2005). It should be noted that current oil transports via the Seaway Crude Pipeline have been reduced, possibly as a result of high storage levels at Cushing, OK (Reuters, 2009). Shipments were 30% less in June than the average for the first quarter and July nominations also remain reduced. Discussions have been ongoing for the last few years as to whether the Seaway Pipeline Company (a joint venture between TEPPCO and Conoco/Philips) might reverse the flow of the Seaway Crude Pipeline to carry excess oil from Cushing to the Texas Gulf Coast. An additional pipeline along the Seaway Pipeline to provide export capacity from Cushing has also been discussed (Reuters, 2007).

Crude oil that enters the Midwest region from the Rocky Mountain region consists of oil that is transported via Kinder Morgan's Platte Pipeline which has a capacity of 170 M bpd from Casper to Guernsey, Wyoming. From Guernsey, Wyoming the Platte Pipeline enters the Midwest region extending to Gurley, Nebraska with a capacity of 143 M bpd takeaway capacity downstream of Gurley, NE (Kinder Morgan, 2009) and then on to the Wood River–Patoka, IL market. The decrease in capacity on the Platte pipeline downstream of Gurley, NE acts as a bottleneck and is, in part, responsible for an oversupply of Canadian oil sands crude at markets upstream of Gurley, NE, specifically the Guernsey, WY market (ALL, 2009). In addition to the Platte Pipeline, SemGroup

announced in June, 2009 that it has begun commercial operations on its White Cliffs pipeline transporting crude oil from Platteville, CO to Cushing, OK (OGJ, 2009). The White Cliffs pipeline has a capacity of 30 M bpd with expansion capability to more than 50 M bpd contributing further to the oversupply situation within the Cushing, OK market.

Foreign Imports

Foreign crude from Canada (1,162 M bpd in 2008) enters the Midwest region primarily through the Enbridge Mainline and Southern Access pipelines, although some also enters the Midwest region through the Kinder Morgan Express (Alberta to Casper, WY) and Platte (Casper, WY to Wood River, IL) Pipelines. Production and importation of Canadian oil sands crude and Canadian synthetic crude oil are both increasing (CAPP, 2009; IOGCC, Undated a; and Muse Stancil, 2007). In 2008, the production of Canadian oil sands crude totaled approximately 1.2 million barrels per day (MM bpd). This is estimated to increase to 2.2 MM bpd by 2015 and 3.3 MM bpd by 2025. These estimates are down somewhat from those projected in 2008 due to current economic conditions and a softening of the consumer market (CAPP, 2009).

The Enbridge Mainline Pipeline system enters the Midwest region at Clearbrook, MN and extends to refineries in Superior, WI. Existing pipelines carry oil from Clearbrook, MN directly south to the Wood River – Patoka, IL market area or from Superior, WI south to Chicago and Flanagan, IL or to the Wood River – Patoka, IL market. Enbridge Pipeline Partners purchased the Spearhead pipeline and reversed its flow in March 2006 to transport Canadian oil sands crude from Flanagan, IL to Cushing, OK (formerly the Spearhead pipeline had transported excess crude oil from Cushing, OK to Flanagan, IL for distribution to Illinois area refineries). The reversal of the Spearhead pipeline, with a capacity of 125 M bpd in 2006 and expanded to 190 M bpd in May 2009, provided the first direct access for Canadian oil sands crude to Cushing , OK and refineries in the Southern PADD II states.

Future Foreign Imports

Current plans for increasing the import of Canadian oil sands crude into the US market, particularly the Midwest region, include the TransCanada Keystone and Keystone XL pipeline system, and the Enbridge Alberta Clipper pipeline. An additional express pipeline has been proposed by Altex Energy to transport Canadian oil sands crude from Alberta directly to the Gulf Coast (For a list of planned or proposed pipelines see **Table 2**). Of these, the TransCanada Keystone and Enbridge Alberta Clipper are currently under construction with in-service dates of December 2009 and July 2010 respectively. These two pipelines alone would add an additional capacity of 885 M bpd for the transport of Canadian oil sands crude into the Midwest region. With the addition of the TransCanada Keystone Cushing extension, in-service date of fourth quarter 2010, an additional 155 M bpd capacity would be added with direct access to the Cushing, OK market. These three pipelines alone would add significantly to the oversupply situation that already exists within the region.

Table 2
Proposed or Planned Import Pipelines to the Midwest Region
And
Export Pipelines from the Midwest Region to the Gulf Coast Region

Pipeline	0riginating Point	End Point	Proposed In-service Date	Capacity (M bpd)
TransCanada Keystone	Hardisty, AB	Patoka, IL	December 2009	435

Table 2

Proposed or Planned Import Pipelines to the Midwest Region
And
Export Pipelines from the Midwest Region to the Gulf Coast Region

Pipeline	0riginating Point	End Point	Proposed In-service Date	Capacity (M bpd)
Enbridge Alberta Clipper	Hardisty, AB	Superior, WI	July 2010	450
TransCanada Keystone Cushing Extension	KS/NE border	Cushing, OK	4Q 2010	155
TransCanada Keystone XL	Hardisty, AB	U.S. Gulf Coast	2012 – 2013	700
Enbridge Southern Access Extension (also referred to as part of BP/Enbridge Gulf Access)	Flanagan, IL	Patoka, IL	2012+	400 to 800
Enbridge Southern Access Expansion	Superior, WI	Flanagan, IL	TBD	800
ExxonMobil Mustang Expansion	Lockport (Chicago), IL	Patoka, IL	TBD	38
BP/Enbridge Gulf Access Phase 2 (Southern Access Extension portion)	Flanagan, IL	Patoka, IL	2012+	400 to 800
BP/Enbridge Gulf Access Phase 3	Patoka, IL	Nederland/Port Arthur, TX	2012+	500+
TransCanada Louisiana Access Option 1	Patoka, IL	New Orleans, LA	2014/2016	400
TransCanada Louisiana Access Option 2	Port Arthur, TX	New Orleans, LA	2014/2016	400
Altex Energy	Fort McMurray, Hardisty, AB	Beaumont/Port Arthur, TX	TBD	425
ExxonMobil /Enbridge Texas Access	Patoka, IL	Beaumont, TX	TBD	445
Sunoco Pipelines to US Gulf Coast	Cushing, OK	U.S. Gulf Coast	TBD	300
ExxonMobil Pegasus Expansion	Patoka, IL	U.S. Gulf Coast	June 2009	30
BP/Enbridge Gulf Access Phase 1 (new build portion)	Cushing, OK	Houston, TX (and potential Nederland/Port Arthur, TX extension)	2012+	150 to 200
SemGroup White Cliffs	Platteville, CO	Cushing, OK	June 2009	30 to 50
Redeployment of Existing Infrastructure				
Centurion Pipeline - reversal	Cushing, OK	Slaughter, TX	4Q 2009	60
BP Pipelines #1 reversal and expansion (part of BP/Enbridge Gulf Access Phase 1)	Flanagan, IL	Cushing, OK	2012+	150 to 200
Enbridge Ozark reversal (part of BP Enbridge Gulf Access Phase 2)	Wood River, IL	Cushing, OK	2012+	200+

Source: Canadian Association of Petroleum Producers (CAPP, 2009)

TransCanada Pipeline has plans for two pipelines that would deliver Canadian oil sands crude directly to Midwest and Gulf Coast region markets and refineries, the Keystone and Keystone XL pipelines. The Keystone pipeline would have a capacity of 435 M bpd delivering Canadian oil sands crude from Hardesty, Alberta to Wood River - Patoka, IL with a 155 M bpd capacity extension to Cushing, OK. The planned completion date for the Keystone pipeline to Wood River – Patoka, IL is December 2009 with an in-service date of late 2010 for the extension to Cushing, OK. The Keystone XL pipeline would be complimentary to the Keystone pipeline and would deliver Canadian oil sands crude from Hardesty, Alberta to existing markets and refineries in the Texas Gulf Coast. The Keystone XL would incorporate that part of the Keystone pipeline that extends from the Kansas/Nebraska border into Cushing, OK and would, in late-2012, increase the capacity of the Keystone pipeline system to approximately 1.1 MM bpd delivering Canadian oil sands crude through Cushing, OK to the Gulf Coast (CAPP, 2009 and TCPL, 2009). To date, long-term contracts commitments of 910 M bpd are in place for the Keystone pipeline system (Keystone, Keystone Cushing extension, and Keystone XL) representing approximately 83% of the Keystone systems capacity leaving approximately 190 M bpd transportation capacity remains available (TCPL, 2009).

Enbridge and British Petroleum have entered into an agreement to develop a pipeline system, the Alberta Clipper pipeline, which would deliver Canadian oil sands crude from Hardesty, Alberta directly to Clearbrook, MN and Superior, WI with an in-service date of July 2010. The Alberta Clipper would have an initial capacity of 450 M bpd and could be further expanded to 800 M bpd. From Superior, WI, Canadian oil sands crude could be transported via the Enbridge Southern Access pipeline (400 M bpd) to Flanagan, IL and then via the Enbridge Spearhead pipeline (190 M bpd) to Cushing, OK.

Altex Energy is currently working to develop an express pipeline to ship heavy crude oil/bitumen from various locations in Alberta to the Port Arthur/ Beaumont, Texas area. It will have an initial capacity of 425 M bpd and can expand to 1 million bpd with pumping additions. The system will employ 100,000 barrel batches and no break out tanks which will enhance batch integrity. It would be a contract carrier with some capacity for spot shippers, and could be in service in 2013/2014. This pipeline is still in the planning stages and it is unclear if it would pass through the Cushing, OK market in route to the Gulf Coast (CAPP, 2008 and Altex, 2009).

Domestic Production

Beginning in early 2005, NYMEX spot market prices climbed to record levels reaching a peak in mid-2008 since which time they have declined to levels that are comparable to mid-2005 (EIA, 2009). The increase in prices experienced from early 2005 to mid-2008 stimulated domestic production and exploration thus reversing the regional production decline trend and creating a production growth mode (IOGCC, Undated a). Since 2005, production within each of the eleven Midwest region states that have oil production has either stabilized, shown slight growth (approximately 1 to 4%), or in the case of North Dakota, shown considerable growth. Crude oil production in North Dakota has increased from a level of 98 M bpd in 2005 to 190 M bpd in January of 2009. To address the oversupply situation within the Northern PADD II states, particularly North Dakota, the North Dakota Industrial Commission conducted a Feasibility Study which proposed a new 55 M bpd pipeline that would extend north and connect to the TransCanada Keystone pipeline. No date has been set to begin this project but permitting, design and construction was estimated to take three years (NDIC, 2009a). Additionally, EOG Resources has announced that they have started construction on a new crude oil rail loading facility near Stanley, ND. Scheduled to begin operation in December 2009, the facility could ultimately ship up to 60,000 BOPD to Cushing, OK and other major crude hubs. While this action would help to address the oversupply situation within the Northern PADD II states, particularly North Dakota, it would also contribute to the oversupply situation at Cushing, OK or other market destinations.

The growth in regional production combined with imports into the region has not been paralleled by an increase in refining capacity or in export transportation capacity. The result has been that crude oil supplies exceed refining and export transportation capacity within the Midwest region creating either an inability to market the oil or a depressed price for the oil that can be marketed.

Refining Capacity

The total US refining capacity at the end of 2008 and early 2009 is 17.6 MM bpd, a 1.7 % increase over that in 2006 and an 11.4 % from 1998 (no new refineries have been built in the US in the last 30 years). Current refinery capacity within the Midwest region is approximately 3.66 MM bpd. Refinery utilization within the Midwest region has decreased slightly over the last four years with refineries operating at approximately 92% capacity in 2005 and 2006 which decreased to 90% in 2007 and 88% in 2008 (EIA, 2009). The lower refinery utilization may be a contributing factor to the current, or continued, price differential within the region.

Future Refining Capacity

A number of refineries within the region are currently engaged in or planning upgrades that are primarily designed to increase refining capacity for heavy oil that the refineries either are receiving, or are planning on receiving, from Canadian imports of oil sands heavy crude. While these upgrades will generally increase overall refining capacity, it will be capacity that has been increased for the specific purpose of processing heavy oil from Canadian oil sands imports. Increasing refining capacity geared specifically toward the processing of heavy oil could result in a situation where domestic producers could actually experience less refining capacity for lighter crude stocks than before these refining upgrades were implemented.

At present, there are two refineries in the region that are engaged in upgrades to increase their overall capacity as well as increase their ability to refine heavy crude oil imported from Canada; these are the WRB (Joint venture between Conoco/Philips and Encana) refinery at Wood River, IL and the Marathon refinery at Detroit, MI (CAPP, 2009).

Upgrades at the WRB Wood River, IL refinery are planned for completion in 2011 and will increase overall capacity from 306 M bpd to 356 M bpd as well as double heavy oil processing capacity from 120 M bpd to 240 M bpd.

Upgrades at the Marathon Detroit, MI refinery are planned for completion in 2012 and will increase overall capacity from 100 M bpd to 115 M bpd as well as increase heavy oil processing capacity by 80 M bpd.

Several other refineries have plans for upgrades in the future as market conditions dictate. These planned upgrades, similar to those already underway by WRB and Marathon, are primarily designed to increase refining capacity for Canadian oil sands heavy crude. The ExxonMobil refinery in Joliet, IL with a capacity of 239 M bpd has plans to increase their ability to process heavy crude oil; an in-service date is yet to be determined. The British Petroleum refinery in Whiting, IN with a capacity of 160 M bpd has plans to construct a new coker and crude distillation unit to be in-service in 2012. The British Petroleum refinery in Toledo, OH with a capacity of 155 M bpd has plans to increase heavy crude processing ability to 120 M bpd and overall capacity to 180 M bpd with an in-service date dependant on market conditions. The Husky refinery in Lima, OH with a capacity of 165 M bpd has plans to increase heavy crude processing ability to 105 M bpd and overall capacity to 170 M bpd; an in-service date is yet to be determined. The Valero refinery in Memphis, TN with a capacity of 195 M bpd has plans to upgrade their catalytic-cracking unit to be in-service in 2012 (CAPP, 2009). The Sinclair refinery in Tulsa, OK with a capacity of 70 M bpd has plans that will allow the refinery to process low quality, heavy sour crude and will increase overall capacity to 115 M bpd (Tulsa World, 2008).

Regional Exports

Compared to imports, a relatively small amount of crude oil is exported from the Midwest region to the East Coast region (16 M bpd in 2008), the Rocky Mountain region (45 M bpd in 2008), the Gulf Coast region (65 M bpd in 2008), and Canada (22 M bpd in 2008).

Exports to the East Coast region consist of oil transported via pipeline from Chicago to the northeast.

Exports to the Rocky Mountain region consist of oil transported via pipeline from North Dakota to refineries in Montana.

Exports to the Gulf Coast region consist of oil transported via pipeline from the Wood River – Patoka, IL market to refineries in Texas. In March 2006, the flow of the ExxonMobil/Enbridge Pegasus Pipeline (66 M bpd) was reversed to allow Canadian oil sands crude that had been transported to the Wood River – Patoka, IL market access to Gulf Coast refineries. The reversal of the Pegasus pipeline represented the first direct pipeline access for Canadian oil sands crude to Gulf Coast refineries. Of the 66 M bpd capacity of the Pegasus pipeline, 50 M bpd has been committed capacity with nominations exceeding capacity since it was reversed. ExxonMobil/Enbridge has plans to expand the capacity of the Pegasus pipeline from 66 M bpd to 96 M bpd in June of 2009 (CAPP, 2009).

Future Regional Exports

Data on planned, or ongoing, expansions of existing pipelines and new pipelines that would be exporting crude oil out of the Midwest region to the Gulf Coast region is provided in **Table 2**. Many of the export pipelines and expansions have in-service dates beyond 2012 or are yet to be determined as a result of the economic situation and softening of the market (CAPP, 2009). Therefore, it is unlikely that increased export capacity will provide any relief to the current oversupply situation in the near-term.

Administrative/Market Issues

The federal fuels standard for Ultra Low Sulfur Diesel (ULSD) required refinery modifications before June 2006. Additionally, some Midwest region refineries are in the process of adding (or are planning to add) coking units allowing processing of low gravity, high sulfur crudes, such as heavy Canadian oil sands crude (CAPP, 2009), into fuels rather than just into asphalt. Therefore, some refineries are no longer as dependent on higher quality domestic crude for fuel production as they previously had been (IOGCC, 2007 and Undated a).

The large volume production of Canadian oil sands crude and Canadian synthetic crude oil provide for negotiation of large volume, long-term contracts with refineries (IOGCC, 2007 and Undated a) and in some cases the US refineries are actually owned by Canadian companies (e.g. Suncor in PADD IV, Colorado) or, as is the case for two other refineries (Wood River, IL and Borger, TX) where Conoco Phillips has entered into a joint venture with a Canadian company, Encana. The average regional domestic producer does not have a similar volume; therefore, they are at a potential pricing disadvantage when negotiating contracts resulting in excess crude not being purchased by refiners within the region.

Regulatory Issues

Oil pipelines are governed by the US Federal Energy Regulatory Commission (FERC) through the Interstate Commerce Act (ICA). The ICA requires that rates charged for crude oil transport must be just and reasonable. The ICA prohibits an oil pipeline company from subjecting a shipper to undue or unreasonable preference or disadvantage. When requests for product shipments on a common carrier's facilities exceed the pipeline's capacity, the space must be allocated among shippers in a non-discriminatory manner. This usually occurs on what is called a "pro rata" basis but there are other methods of allocation.

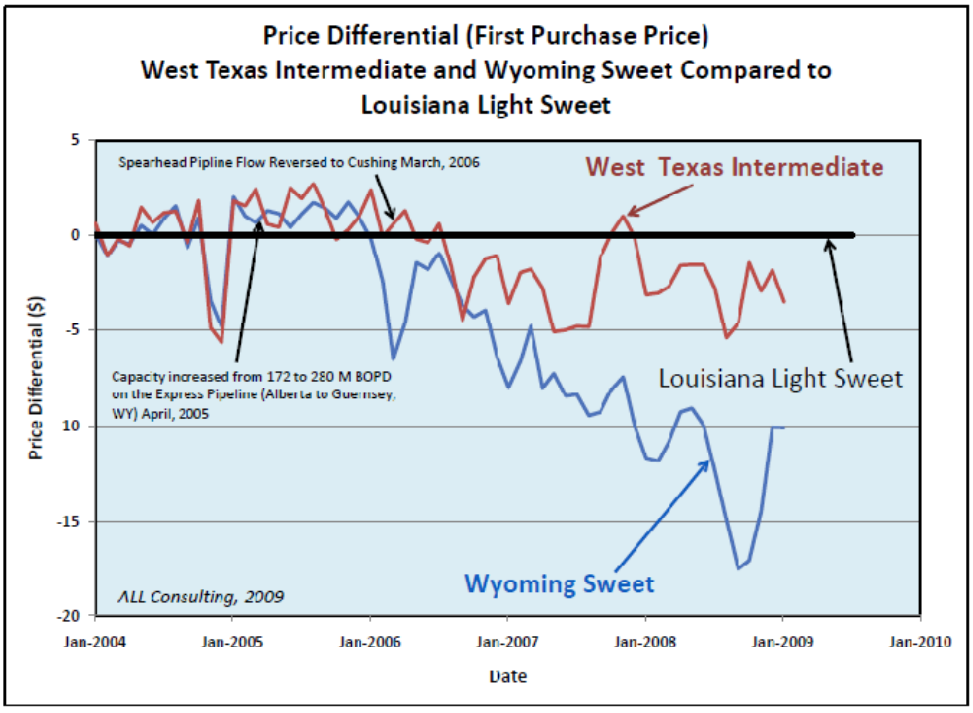
> *"As common carriers, oil pipelines cannot allocate capacity on a first-come, first-served basis, or to the highest bidder. If more volumes are tendered than the pipeline can accommodate, the pipeline must allocate capacity in a non-discriminatory manner. Many pipelines allocate pro rata based on the volumes nominated. Some pipelines use, and FERC has approved, historical shipments as a basis for the pro rata allocation.*[i] *Under this method, a shipper's volumes over a specified period (3-12 months) form the basis for rationing the capacity, and a small amount of capacity, ranging from 3-15%, but typically 5% is reserved for "new" shippers to allow shippers to build up historical volumes over time. FERC requires that an oil pipeline's prorationing method be included in its tariff*[ii]*"* (IPAA, 2006).

Oil pipelines typically operate as common carriers, which require shippers to nominate volumes for delivery into a pipeline on a monthly basis without a long-term contract for pipeline capacity. When shippers nominate more oil or oil products in a given month than the pipeline can transport, shipper volumes are apportioned (reduced) based on the tariff in effect. Apportionment can be caused by factors such as growing supply, increased demand, pipeline reconfigurations and refinery maintenance.

Regional Market Issues

In May and June of 2009, the Domestic Energy Producers Alliance (DEPA), in conjunction with the Northern Alliance of Independent Producers (NAIP), conducted a survey of independent producers within the Midwest region to determine what factors they considered to be the cause of negative price differentials within their market. A total of 30 producers responded to the survey. These producers represented a total of 15.5 M bpd of production with individual company production ranging from less than 100 bpd to 4.8 M bpd. The overwhelming response was that the negative price differentials where the result of an oversupply of oil within the region, particularly at the Cushing, OK market, primarily due to increased imports of Canadian oil. The next cause for the negative price differentials consisted of there being less demand due to the economy and a soft market. Two respondents also noted the reversal of pipelines to facilitate the transport of Canadian oil to Cushing, OK as a cause for the negative differentials experienced. Not only did the reversal of the pipelines bring in more oil to Cushing, OK it also removed local export capacity thus further exacerbating the oversupply situation within that market.

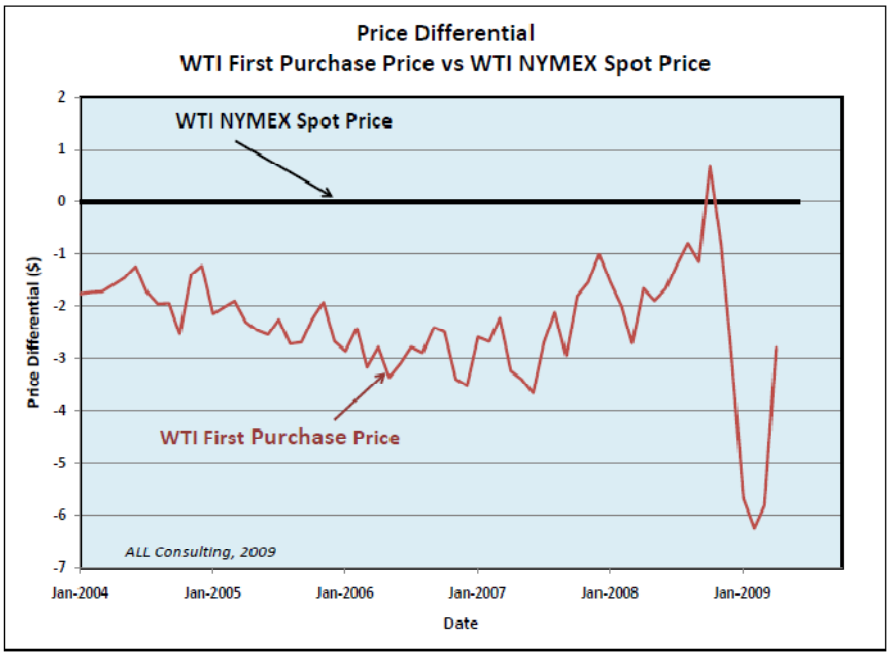
Figure 1



In light of increased domestic production, significant

importation of Canadian oil sands crude and the reversal of pipelines to transport Canadian oil sands crude to Cushing, OK, the near-term first purchase price differentials that appeared in mid- 2006 and have continued through early 2009 (**Figure 1**) for the Cushing, OK market are likely to continue a depressed market state over the short-term due primarily to insufficient relief of export transportation constraints, a finite regional refining capacity, and apportionment of existing pipelines due to large contracts for the transport of Canadian oil.

Figure 2



It is unlikely that pipeline projects that are currently proposed for exporting crude from the Midwest region (**Table 2**) will alleviate this situation as the primary purpose of these proposed pipelines is to facilitate the transport of Canadian oil sands crude imports to Gulf Coast refineries.

From January 2004 to July 2006, the first purchase price for West Texas Intermediate (WTI) at Cushing, OK averaged approximately $0.50 above Louisiana Light Sweet (LLS). Since the reversal of the Spearhead pipeline in July, 2006 bringing Canadian oil to Cushing, OK from the Chicago – Flanagan, IL market area, the first purchase price of WTI, through January, 2009, has averaged approximately $2.50 less than LLS (EIA, 2009) (**Figure 1**). In addition to a negative price differential developing between the first purchase price of WTI and the first purchase price of LLS, a negative price differential also developed between the first purchase price of WTI and the NYMEX spot price for WTI (**Figure 2**). Beginning in December of 2008 the first purchase price of WTI fell significantly below the NYMEX spot price. Historically, from January 2004 through November 2008, the first purchase price of WTI has averaged approximately $2.17 below the NYMEX spot price. In December of 2008 the monthly average first purchase price of WTI fell to a little over $3.00 less than the NYMEX spot price with this differential increasing to approximately $6.25 in February of 2009 (EIA, 2009). The negative price differential between the first purchase price and the NYMEX spot price developed as a result of excess supplies at Cushing, OK combined with soft market demand (MarketWatch, 2009a) creating a contango situation that encouraged the storage of crude at Cushing(GLG, 2009).

RESULTING MARKET CONDITIONS

The combination of required seasonal refinery maintenance, lack of increase in refinery capacity and lower refinery utilization within the Midwest region, increased importation of Canadian oil sands crude, increased domestic production within the Midwest region and the lack of sufficient pipeline export capacity to keep up with the increased regional production and imported Canadian oil sands crude have contributed to a net excess of oil available to the regional refineries which has resulted in price differentials that began in mid-2006 and have continued into early 2009. Simply put, supply has exceeded demand and refining capacity within the Midwest region. Refinery maintenance issues aside, demand at the refineries has been relatively constant for

the region and it is the increases in production and importation that have lead to an oversupply of crude and the resulting negative price differentials for the first purchase price of WTI vs the first purchase price of LLS and the first purchase price of WTI vs the NYMEX spot price for WTI. It is this fluctuation of prices for WTI that has raised the question of whether WTI is still a representative benchmark price for domestic crude (Platts, 2009). The question of WTI as a benchmark relates to whether it accurately reflects supply and demand conditions across the country or is the price of WTI influenced by localized conditions relative to the ability of pipelines to easily transport WTI in response to market demand and the availability of sufficient refinery capacity to receive WTI for processing. In other words, as long as the transport of WTI out of Cushing is constrained by insufficient pipeline or refinery capacity, then its ability to act as an appropriate benchmark will remain in question.

FUTURE PROJECTIONS

The Midwest region's balance - imbalance between regional refining and regional imports/exports (**Table 1**) means that perturbations on the demand side, both within and outside of the region, can have significant short-term impacts on price differentials. With the predicted increase in Canadian oil sands crude imports, it is likely that the pricing differentials will continue. This tendency is likely to persist until:

1) new pipelines accessing additional refining markets are built
2) existing export pipelines are expanded
3) new refining capacity is built within, and outside of, the region
4) domestic production rates decline, and/or
5) there is a reduction in Canadian oil sands crude production and resulting imports*

*Based on CAPP (2009) projections, importation rates can only be expected to increase for the next decade and; therefore, Canadian production and imports are not likely to contribute to a return to balance. Current projections are for Canadian imports into the Midwest region to increase from 1,164 M bpd in 2008 to 2,005 M bpd in 2015 (CAPP, 2009).

In 2008, the production of Canadian oil sands crude totaled approximately 1.2 million barrels per day (MM bpd) which represents roughly half of Canadian oil production for that year. This is estimated to increase to 2.2 MM bpd by 2015 and 3.3 MM bpd by 2025.

Conversely, imports into the Midwest region from the Gulf Coast region have declined from 1,848 M bpd in 2005 to 1,487 in 2008. The decline in imports from the Gulf Coast region is made up for an increased Canadian oil sands imports and increased domestic production.

SUMMARY

The Midwest region has historically been a net importer of crude oil. Refinery capacity within the region is greater than six times the regional production (**Table 1**). As such, the Midwest regional refineries have relied on imports of crude oil to meet the demand for processed petroleum products. Traditionally, this crude oil was supplied by the Gulf Coast region transporting crude oil from south to north via pipeline to refineries in the Midwest. The influx of Canadian oil sands crude has changed this situation such that pipelines within the region are being reversed to facilitate the import of Canadian oil sands crude entering the region from the north to refineries in the Midwest and Gulf Coast regions in the south. At the same time, both foreign and domestic oil continues to be transported to Cushing, OK from the Gulf Coast. These factors have resulted in an oversupply of crude oil within the Midwest region, particularly at the Cushing, OK market, resulting in a negative price differential for West Texas Intermediate vs Louisiana Light Sweet that started in mid-2006 and has continued to the present and for the first purchase price of WTI vs the NYMEX spot market price during the

end of 2008 and the beginning of 2009. Additional factors affecting the negative price differential include a finite refining capacity in the region, increased domestic production within the region, and limited export pipeline capacity combined with the reversal of pipelines to facilitate the import of Canadian oil sands crude to Midwest and Gulf Coast refineries.

POTENTIAL SOLUTIONS

Canada is the #1 importer of crude oil to the US (the top five countries importing crude oil in 2008 were: Canada, 2,459 M bpd; Saudi Arabia, 1,532 M bpd; Mexico, 1,299 M bpd; Venezuela, 1,191 M bpd; and Nigeria, 990 M bpd) (EIA, 2009) ; a situation which is highly advantageous to US energy security. In light of the growing demand in the US market and the potential for increased Canadian production, there is little doubt that additional import pipeline capacity from Canada will be needed. However, this must be accomplished in a balanced manner that also accommodates the markets for domestic crude. Midwest and Canadian business interests must cooperatively examine the various contributing factors to ensure future growth in all sectors of the oil and gas industry in both countries. Creative resolution of the situation will no doubt present a complex dilemma requiring politically appropriate, equitable, and economically practicable foresight and planning in order to achieve appropriate solutions.

The following activities merit further consideration as potential solutions to the supply/demand imbalance and consequent price depression that has been experienced in the Midwest region:

Capital Improvements – planned

- A number of pipelines have been proposed that would increase export capacity from the Midwest region to the Gulf Coast. These pipelines have been planned to facilitate the transport of Canadian oil sands crude to the Gulf Coast region but may offer some relief to the oversupply situation through bypassing some Midwest region markets or through creating some additional export capacity for regionally produced crude oil. The proposed pipelines include:
    - The British Petroleum/Enbridge Gulf Access Phase 3 with a capacity of 500+ M bpd from Patoka, IL to Nederland/Port Arthur, TX and an in-service date of 2012+.
    - The TransCanada Louisiana Access Option 1 pipeline with a capacity of 400 M bpd from Patoka, IL to New Orleans, LA and an in-service date of 2014 to 2016.
    - The British Petroleum/Enbridge Gulf Access Phase 1 (new build portion) with a capacity of 150 to 200 M bpd from Cushing, OK to Houston, TX and an in-service date of 2012+.
    - The ExxonMobil/Enbridge Pegasus pipeline expansion with an increased capacity of 96 M bpd from Patoka, IL to the Gulf Coast and an in-service date of June 2009.
    - The Centurion pipeline reversal with a capacity of 60 M bpd from Cushing, OK to Slaughter, TX and an in-service date of fourth quarter 2009.
- WRB Refining (a joint venture between Conoco Phillips and Encana) is increasing capacity at its Wood River, IL refinery by 50 M bpd and its Borger, TX refinery by 25 M bpd as well as making upgrades to these refineries that are necessary to process heavy Canadian oil sands crude. Increasing refinery capacity may provide some relief however; the focus of these upgrades is to increase these refineries ability to process heavy Canadian oil sands crude and may not benefit regional producers.

Capital Improvements – proposed or contemplated

- Two pipelines have been proposed to increase export capacity from the Midwest region to the Gulf Coast. These are:
    - The ExxonMobil/Enbridge Texas Access pipeline with a capacity of 445 M bpd from Patoka, IL to Beaumont, TX and an in-service date that is yet to be determined.
    - The Sunoco US Gulf Coast pipeline with a capacity of 300 M bpd from Cushing, OK to the gulf Coast and an in-service date that is yet to be determined.
- Reversing the flow direction of Enbridge's Portal pipeline Berthold, ND to Steelman, Saskatchewan in Canada would potentially transport 25 M bpd of Williston Basin crude into Canada (Enbridge, 2009) thus providing additional export capacity to Northern PADD II states.
- Belle Fourche Pipeline is exploring ways to reconfigure their pipeline system serving western North Dakota. By reversal of traditional north to south flow on one of its pipelines and the construction of a 35- mile loop into the Alexander area, Belle Fourche hopes to create additional outlets for southwestern North Dakota-produced crude oil. In conjunction with other regional pipelines, Belle Fourche is working to make other changes to their operations that will create multiple market outlets for all Williston Basin crude oil (NDIC, 2007) which would benefit both Northern PADD II states and Rocky Mountain region (PADD IV) states.
- The Seaway Pipeline Company has contemplated the reversal of its 350 M bpd Seaway Crude Pipeline which currently transports crude from the Texas Gulf Coast to Cushing, OK. This would provide an additional export option for excess crude supplies in Cushing (MEES, 2007; Bloomberg, 2008).
- Expansion of the Tesoro refinery in Mandan, ND would provide a long-term solution for refining within the western portion of the Northern PADD II states; however, a refined products pipeline would be necessary to export the products as the local market has no growth opportunities. It would likely require a long pipeline to reach an expanding market (ND DMR, 2006). This potential solution seems unlikely in light of market challenges facing the refined products (NDIC, 2007).
- In April of 2009, the North Dakota Industrial Commission conducted a Feasibility Study addressing the potential for a new pipeline to increase export capacity for Williston Basin oil as a result of increased production from the Bakken Formation. The Feasibility Study proposed a new 55 M bpd pipeline that would extend north and connect to the TransCanada Keystone pipeline. No date has been set to begin this project but permitting, design and construction was estimated to take three years (NDIC, 2009a). An increase in export capacity for oil produced in North Dakota, the largest producing state within the Midwest region, would provide some relief to the oversupply situation for the Northern PADD II states. To further address the oversupply situation in the Northern PADD II states, EOG Resources has announced that they have started construction on a new crude oil rail loading facility near Stanley, ND. Scheduled to begin operation in December 2009, the facility could ultimately ship up to 60,000 BOPD to Cushing, OK and other major crude hubs (NDIC, 2009b). While this action would help to address the oversupply situation within the Northern PADD II states, particularly North Dakota, it would also contribute to the oversupply situation at Cushing, OK or other market destinations.
- Aggregation of crude among regional producers to facilitate marketing of domestic production by creating a greater volume supply that would be available over a longer term (IOGCC, 2007). Such a concept is interesting in that it would provide greater collective negotiating power than each of the smaller US producers have independently; however, it is still limited by the finite capacity of pipelines and refineries within the region.

Market Incentives – to drive expansion of pipeline and/or refinery capacity

- Quality Bank (this is a project currently under consideration by the North Dakota Oil and Gas Research Council) – involving the concept at looking at "quality banks" (blending facilities) to see if crude oil quality can be blended/combined to optimize marketability.

Institutional Measures

- Creation of a US/Canadian forum to evaluate a means towards achieving an optimal balance between the need for importation of Canadian crude and the necessity of avoiding displacement of the Midwest regional production. Such a forum should include representatives of the refining industry for input regarding the most advantageous volumetric ration for Canadian oil sands crude and Wyoming Sweet etc.
- FERC rules regarding pro-rationing should be revised to sufficiently discourage shippers from over nominating during periods of constrained pipeline capacity. Increasing pipeline capacity would serve to alleviate this problem, but, if additional capacity is created without commensurate changes in regulatory protocol, price differentials are likely to continue within the Midwest region.
- Establish state tax incentives or royalty relief to incentivize companies to commit to new construction or expansion projects that will provide a degree of over capacity in the system (IOGCC, 2007). Such an approach should provide for a coordinated effort among the affected states Public Utility Commissions to ensure comprehensive planning.
- The IOGCC should continue the regional task force to explore the possibility of establishing consortiums for aggregation of crude oil for marketing purposes (such as might be employed to collectively commit to the available volume on the Keystone Pipeline project) or for the development of new or expanded pipelines or refineries, and otherwise provide regional coordination and planning for production, shipping and refining capacities, and projections.

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[i] *Id.*, at P 14 n.8 (*citing Total Petroleum, Inc. v. Citgo Products Pipeline, Inc.*, 76 FERC ¶ 61,164, at 61,947 (1996); *see also ConocoPhillips Transportation Alaska, Inc.*, 112 FERC ¶ 61,213, at P 28 (2005)(finding that "prorationing policies based on historical volumes are an acceptable means of allocating capacity.").
[ii] 18 C.F.R. § 341.8 (2005)("Carriers must publish in their tariffs rules governing such matters as prorationing of capacity . . . ."); *see also*, *SFPP, L.P.*, 86 FERC ¶ 61,022, at 61,114-16 (1999).