

Williston Basin Crude Oil Transportation Bottleneck White Paper

By Ron Ness and Lynn Helms, July 7, 2006

Summary of Transportation Bottleneck:

The US portion of the Williston Basin is currently producing approximately 200,000 barrels of oil per day. North Dakota is producing 110,000 barrels per day and Richland County in eastern Montana is producing approximately 60,000 bbls per day, along with about 30,000 barrels per day from southeastern Montana and South Dakota.

Most of the crude oil produced in southwestern North Dakota, southeastern Montana, and South Dakota is shipped by pipeline to the Guernsey, Wyoming hub then to Rockies refiners or to Wood River, Illinois on the Platte Pipeline. Suncor Energy Inc. has two Denver refineries with a total refining capacity of 90,000 barrels of oil per day. One of those refineries, Commerce City near Denver, was operated at reduced capacity while the company upgraded the facility to refine more crude oil from Canadian oil sands following a fire in December 2005. The Western Canadian Sour (WCS) crude oil is shipped to the refinery via the Express Pipeline, which runs through Montana and Wyoming to Colorado. Kinder Morgan Canada, which owns the Express Pipeline, says the pipeline operated well below its 270,000 barrels per day capacity during the refinery turnaround. The Platte Pipeline has been apportioned since the 4th quarter 2005 and is applying a historical apportionment policy.

Most Richland County Montana and northern North Dakota crude oil is delivered to the Clearbrook, Minnesota hub via the Enbridge North Dakota pipeline system. This system has been apportioned for the past few months and is applying a historical apportionment policy.

The Tesoro Refinery in Mandan has a maximum capacity of 60,000 barrels per day. They report that 95% of their crude is from the western North Dakota portion of the Williston Basin. They had record throughput in 2005 but reduced refining capacity in January through February 2006 due to declining market demand in northern states for the full slate of refined products.

In addition, small amounts of WCS crude oil are occasionally trucked into North Dakota and blended with Williston Basin sweet (primarily Bakken) crude and small amounts of Williston Basin crude oil are also periodically trucked into Canada.

The entire Rocky Mountain region is experiencing oil production growth and the effects of increasing competition for existing pipeline and refinery capacity. Industry and state government are engaged in cooperative efforts to expand infrastructure in North Dakota, Montana, Wyoming, Colorado, and Utah.

Growing oil production in the Rocky Mountain region has surpassed existing transportation capacity and producers have seen their ability to market crude restricted or have experienced significant differentials from NYMEX posted crude oil prices. The prospect of not being able to market crude, or having to market at significantly reduced prices, is likely to create uncertainty with investors drilling new wells and could have long-term impacts as companies place their investments in other areas of the US or the world.

There is a sense of urgency because Bakken zone exploration in North Dakota has not yet been as successful as it has in Montana. Continued research, through drilling new wells, is needed to develop better completion techniques for an economic Bakken oil play in North Dakota. The cost of drilling a well in the Williston Basin has risen dramatically in the past year and is now between three and five million dollars per well.

North Dakota's oil industry has added more than 1,000 jobs in the past 18 months and still has over 200 jobs available through Job Service North Dakota. There are currently 40 rigs drilling new wells in North Dakota and 25 in eastern Montana with more than 3,500 operating oil wells in North Dakota alone. Oil activity in the state is having a significant positive impact on the state's economy. The state's average wage is up, oil tax revenues are creating a budget surplus for the state, and western counties are seeing housing shortages and vibrant economies once again, but decreased oil production and price are reducing economic impact and tax revenues of the state, counties, cities, and schools in oil producing areas.

Potential Solutions to Transportation Bottleneck:

- Enbridge Pipeline expansion
- Transport crude by rail
- Expand the Mandan Tesoro Refinery and build refined products pipeline
- Increase the Quality Restriction on the Enbridge Pipeline in North Dakota
- Build new refineries in Williston Basin markets
- Improve market access in U.S. to growing supplies of crude oil from Western Canada
- Access Keystone Pipeline Project
- Create a Pipeline Transportation Authority
- Place a Tariff or Excise Tax on Canadian crude oil entering North Dakota
- Review FERC pipeline apportionment policies
- Apportion the production of crude in North Dakota/Montana.

Advantages/Disadvantages of Potential Solutions:

- Enbridge Pipeline expansion
 - Advantages:
 - Enbridge is moving forward with a \$30 million expansion project consisting of a series of upgrades to the system over the next 16 months that could add up to 30,000 barrels per day by mid-2007
 - The project will be done in several phases, the first adding up to 6,000 bbl per day by using drag reducer beginning in May 2006 and 7,500 bbl per day by October 2006 via increased operating pressure
 - Reversal of the Portal Pipeline into Canada could add an additional 25,000 barrels of pipeline capacity to the Williston Basin
 - Transporting crude oil by pipeline is the most efficient and cost-effective method of getting the product to the marketplace
 - Disadvantages:
 - Hydro tests may not be successful and could slow or limit the expansion
 - Reversal of the Portal Pipeline would be expensive and result in a higher freight charge since its farther to market
 - Permitting delays could occur and process of expansion takes time
 - Might create an opportunity for Canadian crude to fill the capacity expansion
- Transport crude oil by rail
 - Advantages:
 - 300 cars at 600 barrels each = 180,000 barrels potentially available with one railroad; in addition more rail cars may be available
 - Round trip to Edmonton every 10 days = 18,000 barrels per day
 - Rail cars could serve as a short-term solution to move barrels into another market
 - Disadvantages:
 - Approximate transportation cost by rail is \$6-\$10 per barrel including trucking
 - Transporting crude by rail adds other logistical problems and is not the most efficient way to transport crude oil

- Expand the Mandan Tesoro Refinery and build refined products pipeline
 - Advantages:
 - New capacity of 60,000-120,000 barrels per day of Williston Basin crude
 - EPA permit timeframe much shorter than for new refineries
 - Energy bill includes incentives for small refinery expansions
 - Long term, high salary jobs in North Dakota
 - Create a long-term market for North Dakota crude oil
 - Williston Basin reserves studies indicate long term supply is available
 - Disadvantages:
 - Current northern area refined products market is full with no growth, in fact, renewable mandates are reducing market share for niche market refiners
 - Limited access to growing markets without new pipeline
 - Major investment required
 - It would take a long pipeline to reach growing refined products market areas

- Increase the minimum quality restriction on Enbridge Pipeline system in North Dakota
 - Advantages:
 - Reduce the incentive to truck heavy Canadian crude into North Dakota to blend with Williston Basin sweet and transport through North Dakota pipelines to Minnesota and eastern markets
 - Will require more Williston Basin sweet to be added to blend with the heavy Canadian crude oil to meet the higher minimum gravity requirement
 - Disadvantages:
 - Damage relations with Canadian producers and purchasers
 - The amount of Western Canadian Sour crude oil entering North Dakota is minimal
 - Some Bottineau and Renville County crude may not meet quality restrictions
 - Need to be careful not to discriminate among shippers and violate (common carrier) pipeline's existing tariff or FERC regulations

- Build New Refineries in Williston Basin Markets
 - Advantages:
 - New refining capacity for Williston Basin crude
 - Enhance the economy by adding more value to North Dakota oil
 - Add new high skill, high wage jobs in North Dakota
 - Williston Basin reserves studies indicate long term supply is available
 - Disadvantages:
 - It will likely take years to permit a new oil refinery through EPA
 - The Three Affiliated Tribes plan to use Canadian crude in their proposed refinery
 - Rates of return for the refinery sector are not high enough to attract the long term private investment in capital needed to support construction of new refineries in the U.S., thus few new refineries have been proposed in the U.S.
 - Current northern area refined products market is full with no growth, an additional refinery may only add to the problem without a new market

- Improve market access in U.S. to growing supplies of crude oil from Western Canada
 - Advantages:
 - Part of the situation is the growing amount of supplies from Western Canada that exceed the northern tier refinery market demand
 - Solutions are underway to extend access to new refinery markets
 - A recent reversal of an Enbridge line now allowing Canadian crude to move from Chicago to Cushing, Oklahoma
 - ExxonMobil has reversed another pipeline to deliver WCS from Illinois to the Gulf Coast large refinery market
 - The Enbridge Lakehead system has proposals to expand and extend in stages between now and 2009 that will continue to slowly gain access to a variety of markets east of North Dakota
 - Disadvantages:
 - Solutions to the east and south help the overall problem but still pose capacity restraints in North Dakota

- Access Keystone Pipeline Project
 - Advantages:
 - Capacity of 480,000 bbl per day with 350,000 committed and planned expansion to 600,000 bbl per day leaves more than 100,000 bbls per day of current capacity and 250,000 bbl per day ultimate capacity available
 - The Keystone Pipeline Project will parallel North Dakota on the Canadian side of the border and then pass north to south through eastern North Dakota
 - Expect permits to be filed with the North Dakota Public Service Commission in 2006
 - Disadvantages:
 - Designed to transport Western Canadian Sour (WCS) to U.S. refining hubs
 - This is a long-term project and will take three years to complete
 - A significant amount of new pipeline would need to be installed to connect to the Keystone pipeline either in Canada or North Dakota
 - North Dakota oil will have to be shipped in 200,000 bbl batches
 - The project is too far along to make significant route changes

- Create a Pipeline Transportation Authority
 - Advantages:
 - The North Dakota Legislature passed a bill in 2005 creating a Transmission Authority. The purpose of the Transmission Authority is to allow the State of North Dakota to provide assistance in developing new transmission lines to export North Dakota electricity
 - The North Dakota Legislature could pass legislation in 2007 to authorize similar assistance with the transportation of crude oil, natural gas, or refined petroleum products
 - Wyoming's Pipeline Authority, which is charged with promoting the development of all types of pipelines, is studying potential short-term and long-term solutions
 - Allows the state to engage in the process, remove state regulatory roadblocks and lend support as needed
 - Disadvantages:
 - Requires legislation and at the earliest would take until spring 2007 to become law
 - Might not achieve any positive results

- Place a tariff or excise tax on Canadian crude oil entering North Dakota
 - Advantages:
 - Creates a disincentive for transporting Western Canadian Sour crude into North Dakota to be blended with North Dakota sweet crude oil
 - Generates revenues for the State of North Dakota
 - Disadvantages:
 - CAFTA, NAFTA and WTO filings very likely and would result in litigation
 - The amount of western Canadian sour crude oil entering North Dakota has not been determined
 - Could violate the Interstate Commerce Act
 - Common carriers such as pipelines are not allowed to discriminate among shippers who meet tariff conditions
 - We may determine North Dakota oil has better markets in Canada at some point in the future

- Review FERC pipeline apportionment policies
 - Advantages:
 - Could be tailored to give highest priority to Enhanced Oil Recovery (EOR) production. EOR projects require huge amounts of capital investment and must be operated at maximum efficient rate to prevent permanent loss of reserves.
 - Could give higher priority to new well production. Drilling of new wells results in the greatest positive economic impact on local communities.
 - Could give more priority to marginal well production. Marginal wells are very sensitive to oil price and may be plugged and abandoned resulting in permanent loss of reserves if subjected to large price discounts.
 - Current historical apportionment practices favor existing production which most likely has reached payout on initial investment and is less impacted by price discounts.
 - Disadvantages:
 - Significantly more complex process
 - Possible damage to relations with existing crude purchasers and transporters
 - Need to be careful not to discriminate among shippers and violate (common carrier) pipeline regulations

- Apportion the production of crude in North Dakota/Montana
 - Advantages:
 - Protects correlative rights by making sure all wells are produced
 - Disadvantages:
 - Reduction of Williston Basin crude oil transported to market may create a greater opportunity for Canadian crude to fill transportation capacity
 - Public hearings are required
 - No assurance Montana will follow suit thereby allowing more Montana oil to be transported
 - The state of North Dakota calculates each well's allowable production according to published rules. The rules are outdated from the early 1980s and they do not address Enhanced Oil Recovery units or other major changes in production