

The Newsletter of the Wyoming Pipeline Authority

DOWN THE PIPE



PIPELINE AUTHORITY

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Executive Director Update



The legislative purpose for which the Wyoming Pipeline Authority (WPA) was created "is to plan, finance, construct, develop, acquire, maintain and operate a pipeline system or systems within or without the state of Wyoming to facilitate the production, transportation, distribution and delivery of natural gas and associated natural resources..." In 2003 the WPA's legislation was amended and expanded including the power to borrow money and evidence the borrowing in the issuance and sale of bonds or other obligations of the authority in the amount of \$3 billion.

Wyoming is the fifth largest natural gas producing state in America. Currently the State of Wyoming produces 5 Bcf/d of natural gas and exports approximately 95% of its total production. To date, the WPA has helped facilitate the construction of over 5 Bcf/d of natural gas pipeline capacity.

Historically, adequate natural gas pipeline capacity has been the focus of the WPA. However, the WPA also monitors natural gas liquids pipeline activity, crude oil pipeline capacity and carbon dioxide pipeline infrastructure. The new crude oil railroad loading facilities have also been included in the pipeline data base and map the WPA maintains for the State of Wyoming. They can be viewed at www.wyopipeline.com.

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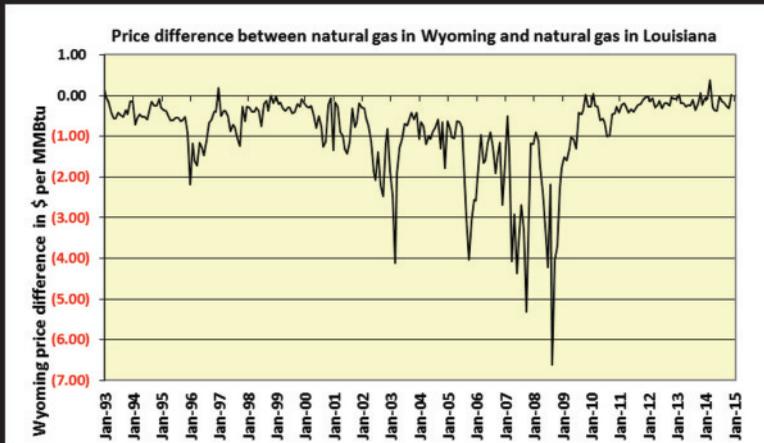
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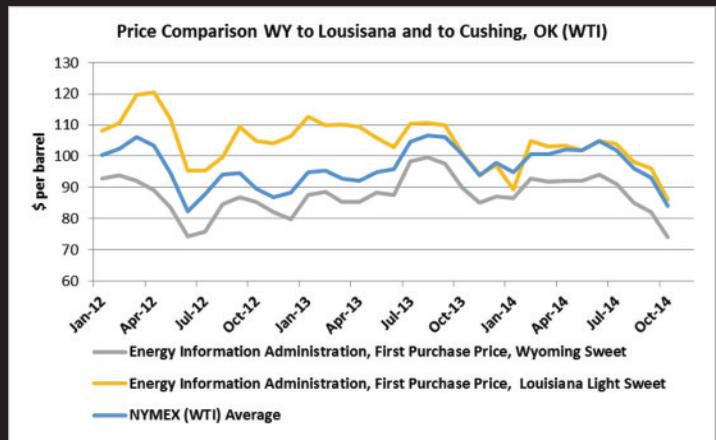
Executive Director Update, *continued from cover*



A pipeline capacity discussion is not complete without considering the difference between local/regional prices and prices at other major production or marketing hubs around the country. Owing to the robust development of natural gas pipeline capacity in the Rocky Mountain west over the last ten years, the price for natural gas produced in Wyoming is roughly at parity with prices in the Gulf Coast, the mid-continent and West Texas. The figure to the left shows the historical relationship of the value of Wyoming natural gas to these

other producing areas over time. Negative numbers reflect the discount in price suffered by Wyoming natural gas production.

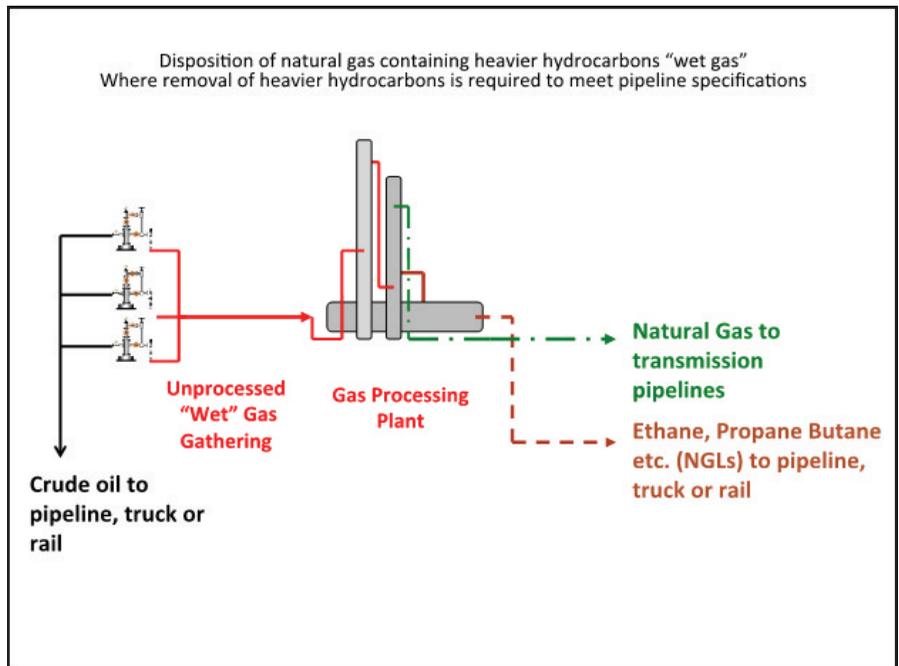
Oil prices in Wyoming have also suffered from a discount compared to prices from production in other areas of the country. Even when taking various qualities of crude oil into account, sweet versus sour for example, a lack of pipeline or other transportation infrastructure has impacted Wyoming crude oil prices. The prodigious growth of oil production in North Dakota over the last ten years has also impacted Wyoming as some of the crude oil produced in North Dakota makes its way to market via pipelines that would otherwise be available to ship Wyoming crude to other locations. There have been recent additions to the capacity to move additional crude oil out of Wyoming. A natural gas pipeline was converted to serve as a crude oil pipeline and beginning in the fall of 2014 has added 230,000 barrels per day of capacity from Wyoming to Cushing, OK. Cushing is the market and storage hub that is the delivery point for the West Texas Intermediate (WTI) Crude Oil Contract which is the “price of oil” that is commonly quoted in daily newscasts. In addition to the crude oil pipeline conversion, seven crude oil railroad loading facilities with a combined capacity of over 700,000 barrels are in service. These crude oil rail facilities allow Wyoming produced crude oil to access refinery markets nationwide.



Natural Gas Gathering and Processing

Wyoming is currently seeing increased interest in oil and gas drilling in the Powder River Basin and in Southeast Wyoming. This increased activity requires development of additional infrastructure to move the oil and gas and related products to market.

Below is a schematic of the types of facilities and pipelines that are required to support oil and gas development. When natural gas is produced, it represents a mixture of different hydrocarbon gases as it comes up the well. These different gases include methane, ethane, propane, butane and others. These different gases have differing physical properties and economic values. Generally methane with perhaps some ethane in the mix make up what we commonly consider natural gas as used in homes, businesses and power plants. The other gases including some or most of the ethane are segregated from the mixed stream at a gas processing plant. These other gases are used both as pure products, such as propane, but also as feedstock to chemical plants. The pipeline infrastructure to support new natural gas production typically then includes gas gathering lines to bring the combined mixed stream of gases from the well to the gas processing plant, a pipeline to move the ethane, propane and butane etc. (collectively “natural gas liquids” or “NGLs”) from the processing plant to market or storage points and a pipeline to move the methane from the gas processing plant into the nationwide natural gas grid. Where the volume of crude oil production is sufficient and predictable, a crude oil gathering system may also be constructed to allow the oil to reach markets. As an alternative, crude oil can also be trucked away from producing wells.



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LIQUEFIED NATURAL GAS (LNG)

Local & National Perspective

Liquefied Natural Gas or LNG is just what it sounds like. The natural gas that serves our homes and businesses can be cooled to a point that the gas becomes a liquid. For methane, the principal component of natural gas delivered to our houses, the temperature is minus 260° Fahrenheit. Cooling natural gas to become a liquid allows much more energy to be stored in a given volume. A cubic foot of LNG contains over 600 times the energy of that same cubic foot filled with un-pressurized natural gas. Thus, converting natural gas to LNG allows natural gas to be transported and stored in ways not otherwise economical. Wyoming's interest in LNG rises from two such examples. LNG represents a workable and economical alternative to diesel

fuel in high horsepower engine applications such as mine haul trucks. Conversion of mine haul trucks and other high horsepower applications reduces costs to the users, improves competitiveness of Wyoming heavy mining activities and increases in-state consumption of Wyoming produced natural gas. During 2014, the WPA assisted the Wyoming Business Council, the Office of the Governor and members of industry in the preparation of a report summarizing the practical and economic advantages of using LNG within the state. The importance of LNG does not stop at the state border or the US border. LNG is the means by which natural gas can move between nations when a pipeline connection is not feasible. During the late 1970's and early 1980's it was the consensus that the United States was running out of domestic natural gas. Countries such as Algeria and Trinidad had natural gas reserves well in excess of their anticipated needs. Deals were struck and facilities and ships were built to move LNG from these foreign sources to the United States. Terminals to receive LNG were constructed in

“LNG represents a workable and economical alternative to diesel fuel in high horsepower engine applications such as mine haul trucks.”

Boston, on the shore of Chesapeake Bay, and the coasts of Georgia and Louisiana. As it turned out, changes in regulations, seismic technology, hydraulic fracturing technology and drilling technology collectively demonstrated that the United States had ample natural gas supplies and imports from offshore sources were not required. Imports of LNG to the US never became a significant share of US supply and those imports have now effectively ceased. The growth of natural gas supply and production in the US has reversed the potential for LNG from a source to be imported to one that can be exported. Exports of LNG will provide jobs during construction and operation of export terminals, provide tax base to the

host locations, provide added stability to domestic natural gas markets and improve the balance of payments ledger for the US. As Wyoming is now well connected to the natural gas grid and currently exports roughly 95% of the gas produced out of state, the development of LNG

export terminals at any North American location is in the interest of Wyoming. In response to this opportunity, the WPA in coordination with the Office of the Governor and the Legislature will advocate at the FERC for the approval of LNG export terminals.

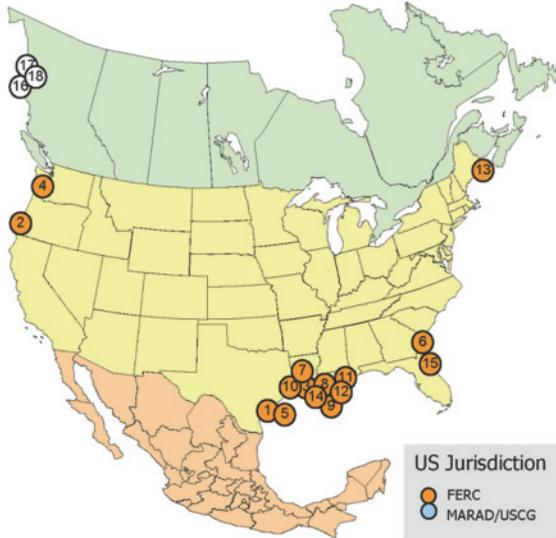


LNG Facility, Cove Point, Maryland



North American LNG Export Terminals

Proposed



Export Terminal

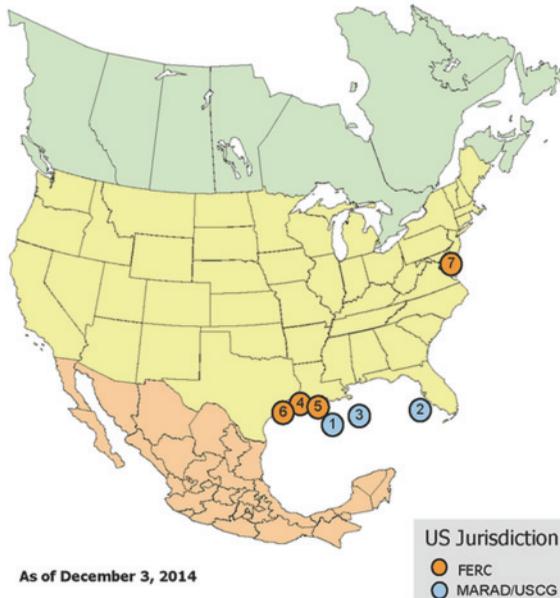
PROPOSED TO FERC

1. **Corpus Christi, TX:** 2.1 Bcfd (Cheniere – Corpus Christi LNG) (CP12-507)
2. **Coos Bay, OR:** 0.9 Bcfd (Jordan Cove Energy Project) (CP13-483)
3. **Lake Charles, LA:** 2.2 Bcfd (Southern Union - Trunkline LNG) (CP14-120)
4. **Astoria, OR:** 1.25 Bcfd (Oregon LNG) (CP09-6)
5. **Lavaca Bay, TX:** 1.38 Bcfd (Accelerate Liquefaction) (CP14-71 & 72)
6. **Elba Island, GA:** 0.35 Bcfd (Southern LNG Company) (CP14-103)
7. **Sabine Pass, LA:** 1.40 Bcfd (Sabine Pass Liquefaction) (CP13-552)
8. **Lake Charles, LA:** 1.07 Bcfd (Magnolia LNG) (CP14-347)
9. **Plaquemines Parish, LA:** 1.07 Bcfd (CE FLNG) (PF13-11)
10. **Sabine Pass, TX:** 2.1 Bcfd (ExxonMobil – Golden Pass) (CP14-517)
11. **Pascagoula, MS:** 1.5 Bcfd (Gulf LNG Liquefaction) (PF13-4)
12. **Plaquemines Parish, LA:** 0.30 Bcfd (Louisiana LNG) (PF14-17)
13. **Robbinston, ME:** 0.45 Bcfd (Kestrel Energy - Downeast LNG) (PF14-19)
14. **Cameron Parish, LA:** 1.4 Bcfd (Venture Global) (PF15-2)
15. **Jacksonville, FL:** 0.075 Bcfd (Eagle LNG Partners) (PF15-7)

PROPOSED CANADIAN SITES IDENTIFIED BY PROJECT SPONSORS

16. **Kitimat, BC:** 1.28 Bcfd (Apache Canada Ltd.)
17. **Douglas Island, BC:** 0.23 Bcfd (BC LNG Export Cooperative)
18. **Kitimat, BC:** 3.23 Bcfd (LNG Canada)

Approved



Import Terminal

APPROVED - NOT UNDER CONSTRUCTION

U.S. - MARAD/Coast Guard

1. **Gulf of Mexico:** 1.0 Bcfd (Main Pass McMoran Exp.)
2. **Offshore Florida:** 1.2 Bcfd (Hoëgh LNG - Port Dolphin Energy)
3. **Gulf of Mexico:** 1.4 Bcfd (TORP Technology-Bienville LNG)

Export Terminal

APPROVED - UNDER CONSTRUCTION

U.S. - FERC

4. **Sabine, LA:** 2.76 Bcfd (Cheniere/Sabine Pass LNG) (CP11-72 & CP14-12)

APPROVED - NOT UNDER CONSTRUCTION

U.S. - FERC

5. **Hackberry, LA:** 1.7 Bcfd (Semptra – Cameron LNG) (CP13-25)
6. **Freeport, TX:** 1.8 Bcfd (Freeport LNG Dev/Freeport LNG Expansion/FLNG Liquefaction) (CP12-509)
7. **Cove Point, MD:** 0.82 Bcfd (Dominion – Cove Point LNG) (CP13-113)

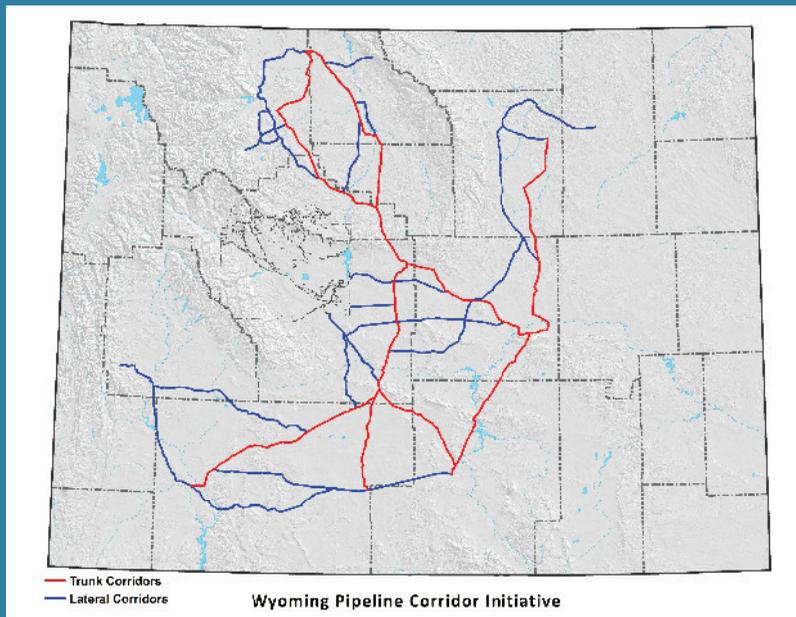
As of December 3, 2014

Office of Energy Projects

WYOMING PIPELINE CORRIDOR INITIATIVE

Nearly fifty percent of the surface land in Wyoming is controlled by the Federal government. A variety of agencies including the Bureau of Land Management (BLM) administer these lands for various uses. One of those uses is for the location of pipelines to move natural gas, crude oil, natural gas liquids, refined products such as gasoline and diesel and carbon dioxide between sources and markets. The ten field offices of the BLM utilize individual field office planning guides to assist in long term coordinated administration. These plans are referred to as the individual field office's Resource Management Plan (RMP). Among the many aspects of a RMP is the discussion and proposed location of corridors for pipelines through that field office. Over the last few years, several RMPs have come up for periodic review and modification. In the course of those reviews it was discovered that many RMPs lack an acknowledgement of the need for corridors to support future oil and gas production not only within the individual field office but also as needed to create a reasonable and workable network of corridors across the many field offices.

The Office of the Governor and the Wyoming Legislature recognized the need to address the insufficient



and mismatched corridors so that future opportunities for job growth, tax base and general economic development that accompany oil and gas production would not be frustrated. In 2012 the Legislature redirected \$2 million in previously received AML funds to support the development of a set of corridors for a carbon dioxide pipeline network across public lands throughout the state. The pursuit of these corridors is the means by which a general re-examination, realignment and refreshment of the pipeline corridors across federal lands can occur. To be clear, the WPA is not

building a carbon dioxide pipeline grid. That activity will occur by private industry. However, by pre-emptively addressing the need for these corridors to align and match future needs, Wyoming will have made it far less likely that a potentially daunting regulatory task will dissuade future private investment in Wyoming. The figure above depicts the general alignment of the corridors that would accomplish this goal.

Recent Activities of the Wyoming Pipeline Authority in the Regulatory Arena



Oil and gas production and transportation are highly regulated activities with many different agencies involved. Proposed changes in regulations and rules occur frequently. Requests for permission to construct or alter facilities are commonplace. The WPA monitors these proposals and requests and in instances where the WPA can make a comment or argument that reflects the specific interests of Wyoming it does so. Recent involvement by the WPA includes:

- Supporting a new pipeline connection to serve an ammonia plant to be built by J.R. Simplot near Rock Springs. When completed, this plant will increase the average daily consumption of natural gas within Wyoming by 10%. The new pipeline was subject to approval by the Federal Energy Regulatory Commission (the “FERC”). The WPA provided supportive comments regarding the project to the FERC highlighting the advantages to Wyoming from the increased tax base, employment and value of goods produced when more of Wyoming’s abundant production could be used in the state rather than exported. The FERC granted the application in an expeditious manner and the project is due in service in 2015.
- The WPA opposed a request by a natural gas pipeline to FERC to change the quality specifications for a natural gas pipeline critical to Wyoming’s access to natural gas consumers in Nebraska, the Dakotas, Iowa, Minnesota and Wisconsin. The pipeline proposed rule changes on its system that would have made it cost prohibitive for natural gas from Wyoming to meet the revised specifications and thereby eliminating Wyoming gas from that market. The WPA along with others in the industry alerted the FERC to the lack of engineering and operational support for the changes and the resulting lack of uniformity with the rest of the pipelines in the country. The FERC agreed with the WPA and the requested changes were denied. At current prices approximately \$2.1 MM dollars worth of Wyoming gas continues to flow through that pipeline each day to those Midwest consumers.
- The WPA provided comments to the Environmental Protection Agency regarding proposed EPA rule changes affecting the flaring of natural gas. The flaring of natural gas is an important topic in Wyoming and elsewhere but the WPA believes those issues are best addressed by oil and gas commissions of the respective states. The WPA pointed out that the proposed rule change could eliminate state control but also that the language proposed was internally inconsistent and was unworkable as written. The EPA is currently evaluating those comments.