Jordan Cove LNG - Opening a New Market for Piceance Gas across the Pacific

Energy & Environment Symposium

April 20, 2016

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Veresen today

Building an interconnected network of energy infrastructure in our geographic footprint to provide our customers with highest value midstream solutions.

Pipelines
- 6,000+ km of regulated gas transmission
- 1,300+ km of NGL transportation

Midstream
- 900 km of gathering systems
- 670 mmcf/d of processing
- 100,000 HP of compression
- 100,000+ bbls/d of fractionation

Power
- 13 plants
- 830 MW of generation
- 17 years average PPA
Ruby Pipeline

- Veresen acquired a 50% interest in Ruby in 2014
- Ruby provides direct access to the U.S. West Coast through the proposed Pacific Connector Gas Pipeline
Jordan Cove LNG

- Jordan Cove facility includes:
  - Two -160,000 m³ full containment LNG tanks,
  - 6 Million tons of liquefaction capacity (~ 0.93 BCFD),
  - Marine facility,
  - Power Generation & Compressor Drivers (~ 320 MW)
  - Gas Pretreatment (CO₂, H₂O, S and Hg removal)
- 500-acres for Jordan Cove LNG site and environmental mitigation lands
Front End Engineering and Design (FEED)

- **March 10, 2016** – Veresen BOD approves $50 MM funding/authorization to develop competitive parallel FEED design/quotations bids:
  - **CB&I & Chiyoda (CCJV)** - CCJV have collaborated on 13 LNG project around the world.
  - **Kiewit, Black & Vetch and JGC (KBJ)** - KBJ provides a strong Joint Venture, JGC who has dominated the large scale, green-field LNG Projects across the world.
- Office locations in Houston, Kansas City and Japan
- Man-hours to complete FEED ~ 200,000 hrs. or 125 people
- FEED to be completed by Nov. 2016
- EPC Contractor to be selected by year-end 2016
LNG Terminal Features

Jordan Cove LNG Terminal Construction Parameters

- 930 workers (average construction workforce)
- 2,100 workers at peak
- 8.3 million man-hours on-site
- Estimated JCLNG terminal Cost $6 B
- 48 month construction duration
- In-Service Date 2022

160,000 m³ LNG Storage Tanks

Typical Overseas LNG Export Terminal
High Level JCLNG Project Schedule

- April 8, 2016 – JCLNG/PCGP requests rehearing from FERC
- May 8, 2016 – FERC rules on Rehearing Request
- November 2016 – EFSC issues South Dunes Power Plant Site Certificate
- 4th Q 2016 – EPC Contractor selected from two finalists
- By end of 2016?? – FERC Certificate
- 2nd half 2017 – Final Investment Decision (FID)
- 2022 – JCLNG/PCGP Facilities Commencement of Delivery (COD)
So what does an LNG export project in Coos Bay have to do with you in this audience?

- Since around 2010 drilling rigs once active on the Colorado Western Slope have moved east to develop the Marcellus and now the Utica formations.

- Historical markets have been lost, resulting in the reduction of NW Colorado gas production from 2.3 BCFD in 2010 to 1.8 BCFD last year.

- An integrated North American natural gas pipeline network allows the lowest delivered cost gas to take market share except when an ocean is encountered.
Jordan Cove LNG site located within the Oregon International Port of Coos Bay

- 7-mile vessel transit from LNG terminal to open water
- Established maritime focused community
Physical Properties of Liquefied Natural Gas (LNG)

- Natural gas becomes a liquid natural gas (LNG) when cooled to -260 °F (-160 °C)
- LNG takes up about 1/600th the volume of natural gas
- LNG is slightly less than half the density of water (3.5-4.0 lbs./U.S. gal).
- One gallon of LNG contains approximately 70% of the energy content of gasoline
MEMBRANE TYPE LNG CARRIER
Capacity 160,000 m$^3$ = 3.4 BCF
Veresen Announces Commitments for 50% of Jordan Cove Liquefaction Capacity

- **March 22, 2016** - JERA Co., a JV of Tokyo Electric Power (TEPCO) and Chubu Electric Power signed the Key Term Sheet Agreement (KTS) for 1.5 million tons of Jordan Cove LNG liquefaction capacity for a term of 20 years. The KTS sets out the primary commercial terms leading to the execution of the Long-Term Service Agreement (LTSA).

- **April 8, 2016** – Veresen reached certain key commercial terms with ITOCHU Corporation for the purchase of 1.5 million tons of Jordan Cove LNG liquefaction capacity for a term of 20 years.
Japan’s Electrical Utility Sector

- Only 10 utilities provide all of Japan’s electricity needs.
- Tokyo Electric Power and Chubu Electric Power are the largest and third largest utilities, serving over 60 million people, roughly 48% of the nation’s population.
Tokyo Electric Power Futtsu LNG Receiving Terminal
TEPCO Fired Thermal Power Plant Network – Tokyo Bay
Why Japan is important to both JCLNG and Western Slope Gas Producers

- **JERA’s Mission Statement** (from February 10, 2016 Business Plan)
  - “Procurement [of LNG] through a combination of highly flexible short-term/spot market contracts and economically efficient/stable long-term contracts”

- Japan is the third largest energy consumer in the world and must import 95% of all their energy needs.

- Japan imported 87.5 million tons of LNG in 2013, approximately 35% of the global LNG trade.

- JERA alone (TEPCO & Chubu) represented approximately 16% of global demand in 2013, making JERA the largest purchaser of LNG in the world
Primary Historical Source Locations for LNG and New emerging supply hubs . . .

Supply prospects
- Older (pre-2010)
- Emerging (since-2010)
Japan LNG Supply Sources 2013
87.5 Million Metric Tons

Regional Totals
- Middle East - 29%
- Russia – 10%
- Oceania – 30%
- Australia - 21%
- Africa – 4%
- Other – 6%

Japan's LNG imports by source, 2013

Source: BP Statistical Review of World Energy 2014
Other: Algeria, Egypt, Norway, Equatorial Guinea, Trinidad, Yemen, Peru, Angola, re-exported amounts
North American LNG Portals for Asian Markets

- Shipping distance to key markets
  - Jordan Cove on the Oregon coast provides direct access to Asian markets
The Jordan Cove and Western Slope Gas Production is Important to the Japanese

- JCLNG using a tolling service model – no terminals outside of North America offer this option
- JCLNG Terminal Pricing Competitive with GOM brownfield LNG into Asia
- 9 days shipping from Coos Bay, Oregon to Tokyo
  - No Panama Canal risk
  - Diversity of North American supply points (meteorological risk)
- Gas supply from two large distinct gas basins
  - Unique supply basins from those sourced by GOM LNG terminals
- Reduces geo-political risk - Russian and the Middle East suppliers
- Portfolio Diversification - Every LNG Buyer wants a slice of N.A. gas
Energy Horizontal – Akashi Strait, Kobe, Japan

(Soon to be carrying gas from the Piceance Basin)
Thank you

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