U. S. Pipelines; Past, Present, & Prognostications

By

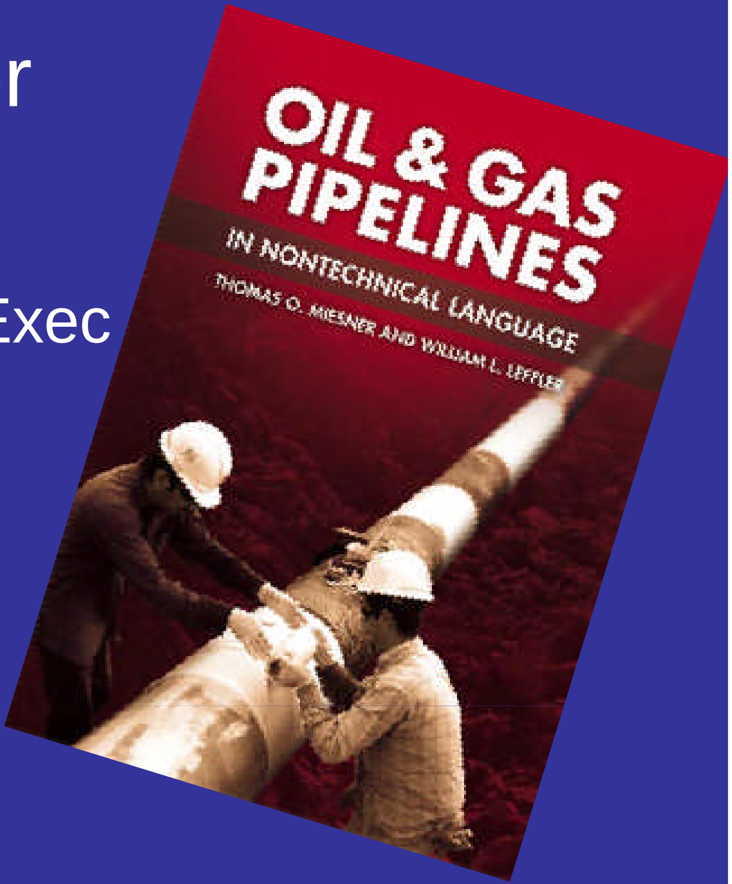
Tom Miesner

GeoGathering 2008

Estes Park, Colorado

June 2, 2008

Tom Miesner



- 26 years with Conoco
  - Pipeline Eng, Ops, JV, BD, & Exec
  - Downstream strategy and BD
- Industry groups and boards
- President Conoco Pipeline
- Chairman AOPL
- Principal Miesner, LLC
  - Pipeline Education and Training
  - Strategy and Project Development
  - Expert Testimony, Litigations and Arbitration Consulting
  - Appraisals and Independent Opinions
  - Process Improvement

Outline

- Past
  - Pipeline accidents
  - Ownership changes
  - Technology advances
  - Regulations
  - Changing supply sources
  - National events
- Present
  - Asset integrity implementation
  - The drive for return
  - Construction boom
  - Hot job market
  - Contractor consolidation
- Prognostications

Global Pipeline Industry Dimensions

- 1,995,000 km (1,245,000 miles) gas and liquids*
  - 1,300,000 km (812,500 miles) gas
  - 388,500 km (242,800) miles) crude and condensate
  - 264,900 km (165,600 miles) refined products
- About 2/3 of total miles in U. S.
- US revenue
  - Natural gas $16.4 billion
  - Hazardous liquids $8 billion

***Source: CIA Fact Book, Extracted April 11, 2007 from**

https://www.cia.gov/cia/publications/factbook/fields/2117.html

Pipeline Company Revenues & Income

PIPELINE COMPANY REVENUES, INCOMES

Table 3

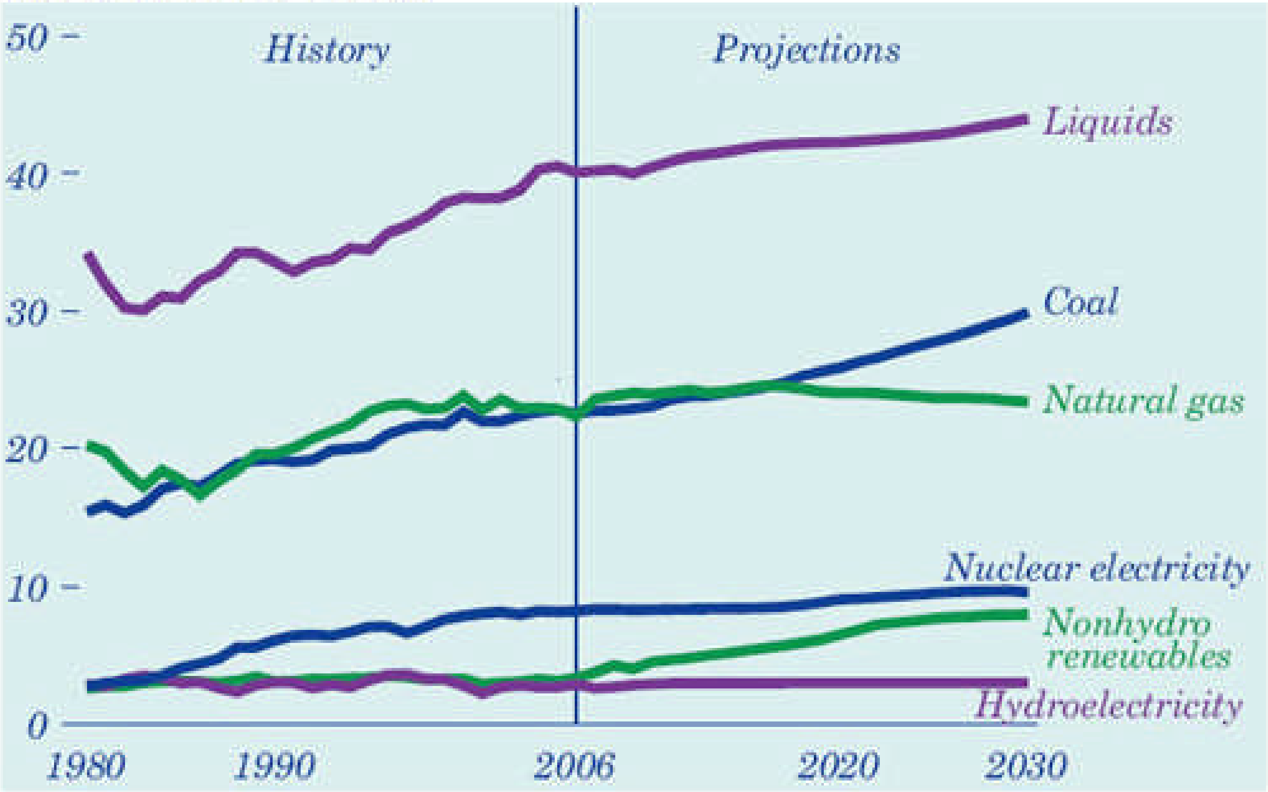
	Gas		Oil	
	Operating revenues, $1,000	Net income, $1,000	Operating revenues, $1,000	Net income, $1,000
1997	16,142,675	2,264,577	7,214,705	2,254,587
1998	13,584,783	3,010,821	6,890,083	2,050,982
1999	14,616,949	2,545,043	7,219,500	2,928,460
2000	14,980,925	2,910,835	7,483,100	2,705,463
2001	14,407,467	2,246,109	7,729,972	3,006,898
2002	14,015,308	2,734,182	7,811,951	3,408,753
2003	15,082,011	3,260,797	7,703,998	3,469,996
2004	15,781,445	3,588,344	8,019,554	3,322,738
2005	16,375,921	3,863,331	7,917,176	3,076,476
2006	$17,122,586	$4,015,253	$8,516,563	$3,743,115

Source: US FERC annual reports (Forms 2, 2A, and 6) by regulated interstate natural gas and oil pipeline companies

Source: Oil and Gas Journal

Annual Energy Demand by Fuel

Figure 3. Energy consumption by fuel, 1980-2030 (quadrillion Btu)



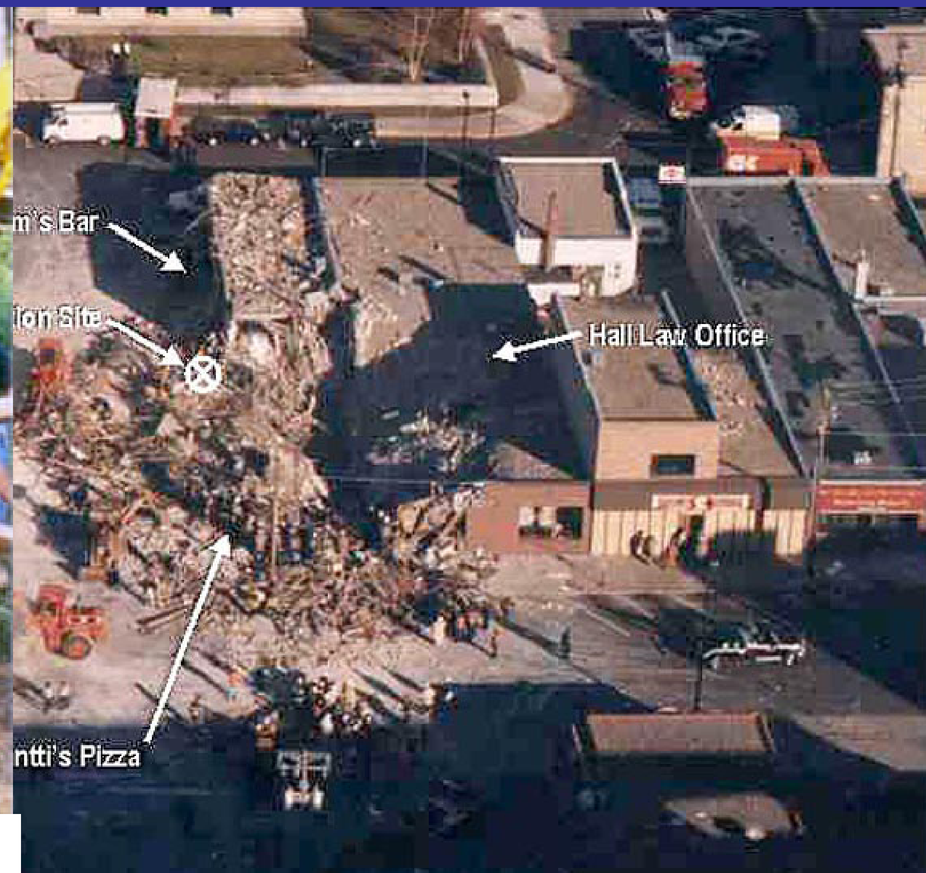
Source: Annual Energy Outlook 2008 with Projections to 2030 (Early Release)

Past Events That Shaped the Present

High Profile Pipeline Accidents

- 1992 Seminole Brenham, TX explosion
- 1994 San Jacinto River, Houston, TX release
- 1996 Koch Lively, TX explosion
- 1996 Colonial Reedy River release
- 1998 Northern States Power St Cloud, MN explosion
- 1999 Olympic Bellingham, WA release
- 2000 El Paso Carlsbad, NM explosion
- 2004 National Fuel Dubois, PA explosion
- 2005 PSE&G Bergenfield, New Jersey explosion
- 2006 BP North Slope, AK release

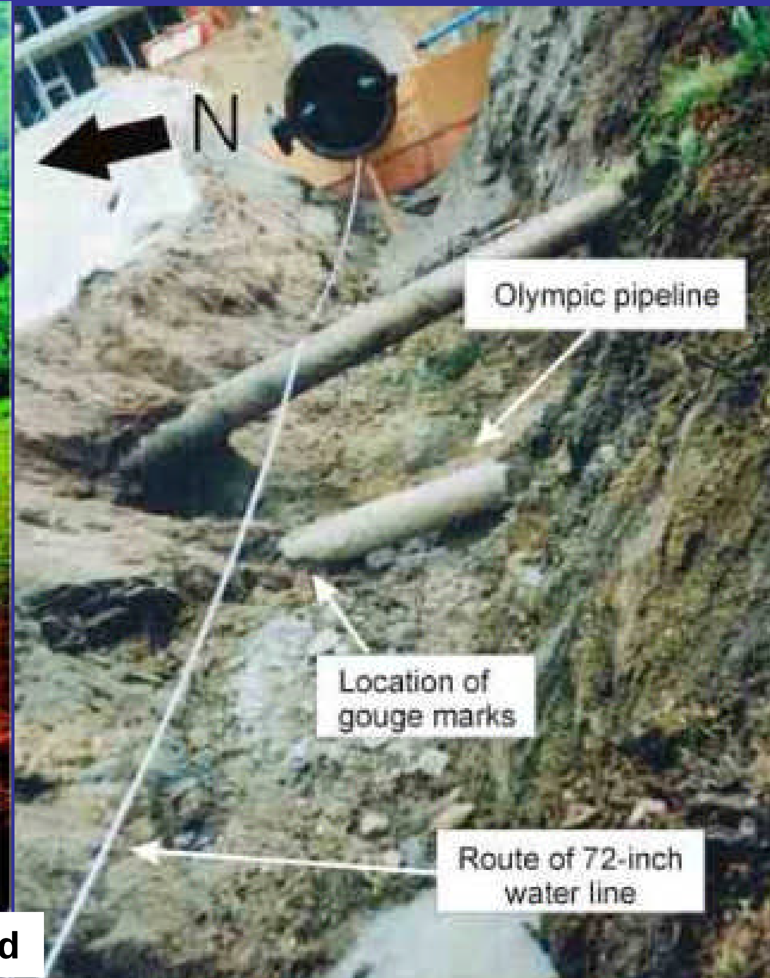
Reddy River and St. Cloud



Source National Transportation Safety Board

Olympic

Source National Transportation Safety Board



El Paso

Source National Transportation Safety Board

BP Release Arial View

Photo Credit: Unified Command Photo

BP Release Close Up

Photo Credit: BPXA

Photo Credit: BPXA

The Move to MLP Ownership

- 1986 – Buckeye Pipeline
- 1990 – TEPPCO Partners LP
- 1992 – Enron Liquids Pipeline, LP
- 1997 – Kinder and Morgan buy the GP of Enron Liquids Pipeline
- 1998 – Enterprise Products Partners LP
- Integrated majors and independents sell assets to MLPs or form their own MLPs

Technology Advances

- Equipment automation
- Scada
- Leak detection
- Internal Line Inspection
- Hydraulic calculations and power optimization
- GPS
- GIS

Key Laws and Regulations

- Natural Gas Safety Act of 1968 and Hazardous Liquid Pipeline Safety Act of 1979
  - Pipeline Safety Improvement Act of 2002
  - Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006
- Clean Water Act of 1972
- Tax Reform act of 1986
- FERC Orders 436 (1985) and 636 (1992)
- Title XVIII of the Energy Policy Act of 1992

Implications of Safety Rules

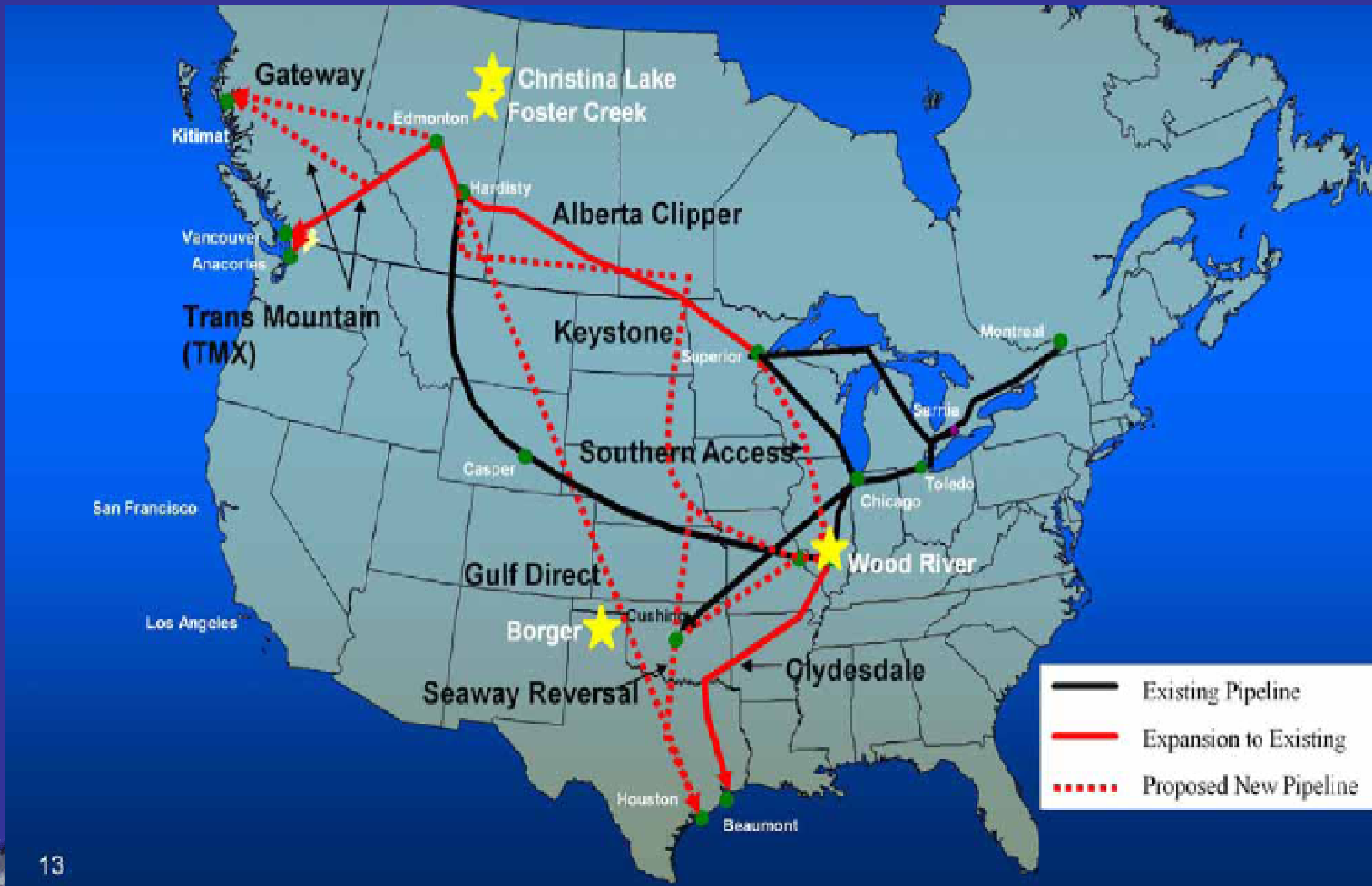
- Operator Qualification
- High consequence area inspections
- Integrity management plans
- Damage prevention
- Public communications (API 1162)
- Low stress integrity management
- Distribution integrity management

Changing Supply Sources

- Canadian oil sands crude oil
- Rocky Mountain gas
- Increased drilling fueled by energy prices
- Offshore LNG
- Gulf of Mexico crude oil and gas
- Russian crude to Asia Pacific
- Russian gas to Europe
- Asia Pacific infrastructure

Crude Oil from Canadian Oil Sands

Crude Oil Transportation Alternatives



Retrieved August 7, 2007 from the ConocoPhillips web site

Natural Gas from the Rockies & LNG from Coasts

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National Events

- 9/11
- Hurricanes Rita and Katrina
- Rising prices
- BP woes
- Excavation damage

Current Challenges

Asset Integrity Implementation

- Operator qualification for covered tasks
- Periodic inspections of lines in HCAs
  - Internal line inspection
  - Hydrotesting
  - Direct assessment
  - Other technology
- Integrity repairs
- Rising costs for materials and labor
- Low stress rules
- Distribution integrity is just around the corner

Return Requirements

- GP receives increasingly larger percentages. For example…
    - 2% 0 – 60 cents
    - 15% 61 – 72 cents
    - 25% 73 – 93 cents
    - 50% 94+ cents
- Rising interest rates could drive down prices
    - – Units yield 2 to 2.5% above 10 year T bill
    - – As interest rates rise prices must fall to maintain yield

Construction Boom

- North America
  - Enbridge
  - Transcanada
  - Rocky Mountain Express (REX)
  - Colonial expansion
  - Alaska gas
- International
  - South and Central America 8,957 miles
  - Western Europe and European Union countries 1,160 miles
  - Middle East 3,941 miles
  - Africa 10,848 miles;
  - FSU and Eastern Europe 15,161 miles;
  - Asia Pacific 13,212 miles

P&GJ's Worldwide Pipeline Construction Preview

Other Issues

- Hot job market
  - Movement of personnel
  - New graduation hiring
  - Transfer from other industries
- Engineering and consulting
  - Consolidation
  - Integration along the value chain
  - Independent consultants
- Independent operators

Prognostications

- Public communication and education will increase
- A pipeline is a pipeline
- Canadian crude imports will continue
- Refined product movements will be flat
- Gathering, especially gas will continue to grow
- LNG import facilities will be over built
- Managing processes will come of age
- Knowledge will be critical for success
- A new generation of pipeliners will emerge

Operators of the Future

- Sound overall understanding of the industry
- Solid technical understanding
- Comfortable with technology tools
- Excellent project management skills
- High sensitivity to stakeholder needs
- Outstanding ability to understand data
- Effective communication skills

Suppliers of the Future

- Sound overall understanding of the industry
- Excellent technical skills
- Comfortable with technology tools
- Effective project management skills
- Sensitivity to stakeholder needs
- Effective data management skills
- Appreciation for the value of communication