2015 MAPA Asphalt Conference
Asphalt/Binder Update

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Welcome to MO Asphalt Conference
Next Stop…

Bong Recreation Area
EXIT 340
Types of Asphalt

- Trinidad Lake
- Pen Graded – 60/70, 120/150, 200/300
- Viscosity Graded – AC 30, 20, 15, 5
- AR Graded – AR1000, 2000, 3000
- Polymer Modified Asphalts
Types of Asphalt

- Crumb Rubber Modified
- Acidized
- Oxidized – primarily roofing
- More RAP & RAS – blends of AC
- Additives
- Rejuvenators
- Future Innovations
Trivia

- 1975  – Crude price $7.50/BBL
- 1980  – Crude price $21.50/BBL
- 1990  – Crude price $20.00/BBL
- 2000’s – Crude price $26-$94/BBL
- 2010’s – Crude price $74-$105/BBL
- 2015  – Crude price $44.70/BBL
Average Asphalt Prices

- 1990 - $105 - $120
- 2000 - $250 - $450
- 2010 - $450 - $600
US Supplied Asphalt & Rd Oil

- 1980 – 123,982,000 BBLs
- 1990 – 176,340,000 BBLs
- 2000 – 199,580,000 BBLs
- 2010 – 132,274,000 BBLs
- 2013 – 118,045,000 BBLs (21MM tons)
- 2017 Demand will increase 3.7% annually to 27MM tons - prediction
This simplified drawing shows many of a refinery's most important processes.
Basic Crude Premises

- The world is not running out of crude oil
- The world is also not running out of demand for crude oil
- Differences in growth rates of crude and products supply/demand will “drive” prices
Factors Influencing Asphalt Pricing

- Crude Oil Price
- Crude Oil Differential
- Refining Margins
- Refining Capacity
- Asphalt Supply & Demand
- Alternate Disposition
  - Coking
  - 6 oil market
Crude Oil Price

- Supply
- Demand
- Financial Markets???
Factors Effecting Oil Prices last 25 Years

- Oil Embargo – 73’-74’
- Iranian Revolution
- Iran/Iraq War
- OPEC 10% Quota increase & Asian Fin Crisis
- PDVSA strike, Iraq war, Asian Growth, Weaker dollar
- Recession, Libyan uprising, etc??
Crude Oil Supply

World Oil Reserves - Billions of Barrels

- 1065: OPEC
- 98: FSU
- 139: Non-OPEC
- 175: Canada

Source: CIA Fact book
2010 World Oil Reserves by Crude Type

- Heavy – 38%
- Medium – 20%
- Light Sour – 25%
- Light Sweet – 16%
- OPEC – 1,200 Billion BBLS
Domestic Crude Oil Supply

- Domestic Production has increased the last 5 years from 5mmb/d to 6.4mmb/d in 2012, & in 2013 ~ 7.0mmb/d. The highest level since 1993.
- The # of US drilling rigs reported in 2011 was 777 and is at 1,400 today, so a lot of exploration.
- Net crude oil imports has declined from 60% in 2005 to an estimated 39% in 2013, if that holds true it will be the first time it has dropped below 40% since 1991.
Crude Production Forecast

- Crude production will increase by over 9 MMBPD from 2010 to 2021
- The Middle East will produce over half of the growth while Europe and Asia Pacific will decline in production
- Canada, Brazil, Columbia, and Kazahkstan will show the most growth in non-OPEC countries
- Type of crude – 1.9 Heavy, 3.4 Medium, 1.5 Light Sour, 2.5 Sweet = 9.4MMBPD
Regional Production Growth by Grade

- The grade increases are not distributed proportionally; Western Hemisphere produces nearly all the incremental Heavy crude

- Western – 3.7 MMBPD, Eastern – 5.7 MMBPD

- Over 60% of Eastern increase is expected to come from Iraq and Saudi Arabia
Crude Oil Demand

Source: DOE
Crude Oil Prices

($/BBL)

WTI Brent

Crude Oil Price Differentials

- Anomaly going on in the market related to Brent/WTI pricing
  - Lower mid-continent crude costs
  - Higher mid-continent refining margins

- Expansion of crude pipelines out of western Canada has compressed the light-heavy crude differential
Crude Oil Price Differentials

($/BBL)

WTI
Brent
Maya
Bow
LH Diff
Heavy/Light Crude Differential Drivers Going Forward

- The difference in growth between heavy crude supply (production) and demand (heavy capable refining capacity) will determine heavy/light spread.
- Western Hemisphere will continue to be where all the action is on heavy.
- Short to mid-term tightness in supply vs. demand will limit discount until mid-decade.
  - Primarily driven by demand factors as significant new heavy crude comes on line in the next 2-3 years.
Crude Price Outlook – Through 2020

- **Ceiling** – Demand Factors / Surplus Capacity - $110

- **Trading Range** – Short Term Volatility Drivers
  - Geopolitical Events
  - Catastrophic Weather Events
  - Economic News
  - Inventory Fluctuations

- **Floor** – Production Cost of Marginal Barrel/Demand - $75
What Impacts Asphalt Supply?

- International Markets (USA no longer main driver for crude and product prices)
- BRIC GDP vs. USA GDP
- BRIC = Brazil, Russia, India, China
- Gross Domestic Product (GDP) is the total market value of all final goods and services produced in a country in a given year
- 2000 – US GDP was 10,000 billion / BRIC GDP was 3,000 billion (20% of US)
- 2011 – US GDP was 15,000 billion / BRIC was 11,200 (75% of US)
- 2013 – Will BRIC GDP meet or exceed the US’s GDP?
Economic & Demand Assumptions

- **GDP Growth**
  - Despite uncertainties, recovery to continue in 2013
  - Worldwide GDP to average 3.7% through 2020
  - US GDP growth will average 2.6%

- **Petroleum Product Demand**
  - Worldwide growth to average 1.5%/year through 2020, led by developing countries
  - US demand growth to average 0.3%
  - Alternatives will be 11% of total growth
What Impacts Asphalt Supply?

- Crude Oil prices vs. Gasoline/Diesel prices
- WTI price vs. Brent Crude price

(Chart below illustrates $ Spread between WTI / Brent)
This simplified drawing shows many of a refinery's most important processes.
Refining Margins

($/BBL)

Mid-Continent
Gulf Coast
Refining Margins

($/BBL)

Mid-Continent
Gulf Coast
Brent - WTI

1/31/2009
3/31/2009
5/31/2009
7/31/2009
9/30/2009
11/30/2009
1/31/2010
3/31/2010
5/31/2010
7/31/2010
9/30/2010
11/30/2010
1/31/2011
3/31/2011
5/31/2011
7/31/2011
9/30/2011
11/30/2011
1/31/2012
3/31/2012
5/31/2012
7/31/2012
9/30/2012
Refinery Facts

- 1982 – 301 operating refineries
- 2011 – 148 operating refineries
- 1982 – 17.9 million barrels of crude oil input capacity
- 1994 – 15 million barrels of crude oil input capacity
- 2001 – 17.2 million barrels of crude oil input capacity
- 1982 – Asphalt Production approx 750,000 bbls/day
- 2011 – Asphalt Production approx 500,000 bbls/day
What Impacts Asphalt Supply?

- **Utilization Rates** - % utilization is calculated as gross crude inputs divided by latest reported monthly operable capacity

- **Annual Utilization Rates:**
  - 2006 – 89.7%
  - 2007 – 88.5%
  - 2008 – 85.3%
  - 2009 – 82.8%
  - 2010 – 85.4%
  - 2011 – 85.4% (thru 8/31/2011)
Asphalt Demand

Source: DOE
Asphalt Supply

- Once all these cokers get built, there will be no asphalt!
What Impacts Asphalt Supply?

- Cokers = Units of Mass Destruction
- Coking capacity has increased from 1990 – 2011 by 1 million bbls / day
- A few examples:
  - ConocoPhillips – WoodRiver, IL – 65,000 b/d – Completed in 2011
  - Total Petrofina – Pt Arthur, TX – 50,000 b/d – Completed in 2011
  - Motive – Pt Arthur, TX – 95,000 b/d – To Complete in 2012
  - Marathon – Detroit, MI – 28,000 b/d – To Complete in 2012
  - BP – Whiting, IN – 102,000 b/d – To Complete in 2013
Alternative Disposition

- Coking
  - Over 160 MBPD of new coking capacity coming online in Padd II from 2011 through 2013.
  - Increased heavy crudes runs will minimize the asphalt lost to cokers, but the net impact will still be negative.
Heavy Oil Refining Expansion

- Additional heavy crude refining capacity – 705 MMBPD
- Loss of light crude capacity – 500 MMBPD
- 2013 – BP Amoco – Whiting, IN, Marathon – Detroit, MI, and Valero/Norco, Meraux, LA
Alternative Disposition

- **Fuel Oil**
  - Strong demand in Eastern markets
  - Pricing will trend with world crude (Brent) pricing
Factors Influencing Asphalt Pricing

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What Impacts Asphalt Pricing?

- Roofing Demand
- Residual Fuel Oil
- Crude Prices/Refinery Economics/Cokers/Bunkers
- Asphalt Demand
- Natural Disasters
- International Markets
- Transportation – Trucks, Rail, Barge
- Bunker Fuel (WTI vs Brent Graph Below)
Conclusion

- **Supply Side / Refineries**
  - Watching margins and production costs
  - Willingness to reduce runs, shutdown refineries, or consolidate operations to focus on markets with better returns
  - Fewer refineries
  - Crude slates impact on quality and quantity of asphalt
  - Movements towards flexible pricing
  - Demand for asphalt bottoms for alternative uses
Conclusion

- **Technology**-
  - Existing and new technologies for emulsion/applications, continuing the effort to make roads last longer and to do more lane miles with less asphalt.
  - **Recycled asphalt pavements** (largest volume recycled material in the world)
  - **Recycled shingles** (grinding and extracting)
  - **Tire rubber products**
Conclusion

- Last 3 years US has been a net exporter of asphalt

- What’s Known vs. Unknown????
  - Politics & Economics
  - Production
  - Technology – for crude recovery
Impact of Domestic Light Crude

- Bakken, Eagle Ford, and Permian – all of which yield light sweet crudes
- Problem – Refiners have just completed huge capital expenditures to run heavy Canadian
- Diesel yields – Bonny light from Nigeria yields 21-24%, for Bakken it’s around 14% ????
Outlook

As a result of the complexity and volatility there are a lot of unanswered questions in the future.
Current Asphalt Supply Information

- What is the current supply situation?
- What is the outlook?
- What is the price going to do?
“In the business world, the rearview mirror is much clearer than the windshield.”

- Warren Buffet
Questions?