ASPHALT SUPPLY IN A VOLATILE OIL WORLD

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Issues to be Discussed

- Crude Oil Supply
- Crude Oil Pricing
- Refining Capacity
- Products Supply
- Products Pricing
- Future of the Industry
CRUDE OIL SUPPLY

A WORLD LOOK
Crude Oil Supply (2006)

World Crude Oil Production
Millions of Barrels Per Day

- FSU/E. Europe: 26.0
- W. Europe: 12.6
- Latin America: 11.3
- US/Canada: 10.6
- Asia/Pacific: 9.8
- Africa: 6.3

Total: 85MMB/D

World Proven Crude Oil Reserves
Billions of Barrels

- FSU/E. Europe: 79
- W. Europe: 116
- Latin America: 743
- US/Canada: 201
- Asia/Pacific: 102
- Africa: 36

Total: 1,292 BB
Crude Oil Demand

- Demand has risen by 7 MMBD (9%) since 2002.
- Demand at 85 MMBD or 98% of world daily delivery capacity.
- Vulnerable to supply disruptions caused by storms, accidents, breakdowns, political unrest.
- 65% of proven reserves within national oil companies and 16% held by Russia.
- Traditional companies have full access to 7% of reserves and 12% through partners (if allowed).
CRUDE OIL PRICING
WTI Price by Quarter
12 Mo. Crude Inventory vs. Average
REFINING CAPACITY
Topping Refinery

CRUDE OIL

650-

GASES

NAPHTHA
AND

GASOIL
FEEDSTOCKS

“Tea Pot”
Not A Refinery
Really Just A
Crude
Distiller

6OIL or
ASPHALT
(if heavy crude)
Simple Refinery

CRUDE OIL

650-

GASES

NHT

CRU

KHT

DHT

TO MOGAS

JET/KERO

TO NO.2

650+

6OIL or ASPHALT
(if heavy crude)

“Hydroskimming” Refinery, many exist all over the world
CCU - “Complex” Refinery

CRUDE OIL

GASES

650-

NHT CRU

KHT DHT

TO MOGAS

TO MOGAS

JET/KERO

TO 20IL

DU

GASES 650-1050

ALKY

TO MOGAS

TO MOGAS

GASOIL

TO 20IL

CCU

GASOIL

VAC

650+

1050+

ASPHALT

60IL
CCU/HCU/Coker - “Very Complex” Refinery

1. **CRU**
   - ISOM
   - NHT
   - CRU
   - KHT
   - DHT

2. **HCU**
   - MTBE
   - ALKY

3. **CCU**
   - MOGAS
   - MOGAS
   - MOGAS
   - 2OIL

4. **DU**
   - GASES
   - H2 PLANT
   - 650-750
   - 750-1050

5. **VAC**
   - H2 PLANT
   - GASES

6. **COKER**
   - TO
   - MOGAS

7. **TCU/Vis**
   - REASPHALTER
Refinery Yield (% of Crude Intake)
U. S. Refining Capacity

Last New U. S. Refinery Built in 1976

Source: Oil & Gas Journal
U. S. Asphalt Refining Capacity

Production Range: 600 B/D to 60,000 B/D

Source: Oil & Gas Journal
U. S. Refining Coking Capacity

- # Refineries w/Cokers
- Coke Production, MT/D

- 1995: 50
- 2000: 56
- 2006: 58

- 1995: 81
- 2000: 120
- 2006: 138
U.S. Coker Construction Projects 2005 - 2011

- Engineering, Procurement & Const. Phase
  - Total Refineries: 245 MB per day
  - Asphalt Refineries: 135 MB per day

- Planning or Early Engineering Phase
  - Total Refineries: 176 MB per day
  - Asphalt Refineries: 121 MB per day

* Source: Argus Asphalt Report
PRODUCTS
SUPPLY/DEMAND
Supply Source for U. S. Demand

[Bar graph showing domestic crude production, imported crude, and imported products from 1995 to 2005.]

- **Domestic Crude Production**
- **Imported Crude**
- **Imported Products**
U. S. Product Demand, MB/D

- Gasoline
- Diesel
- Jet
- Resid
- Asphalt

Years:
- 1995
- 2000
- 2004
- 2005
Historical Asphalt Supply/Demand

Millions Tons - Liquid

Source: Oil & Gas Journal
PRODUCTS PRICING
Prices by Quarter

- WTI
- Gasoline
- Asphalt
Economic Analysis – 2005 YE

**Gasoline/Diesel Pricing**

- Jan., 06 Price: $70.00/BBL
- Less Distribution: 6.00/BBL
- Net to Refinery: $64.00/BBL

**Kansas Asphalt Pricing**

- 12/05 YTD: $32.94/BBL*
- ($35/Ton): 6.25/BBL
- Lost Value: $37.31/BBL
- $26.69/BBL

*Source – Poten & Partners*
Coking Economics – 2005 YE

- 30,000 BBLs/Day Asphalt Production
- \( \times 70\% \) Gasoil Production
- 21,000 BBLs Gasoil for Gasoline/Diesel
- \( \times \$37.31/\text{BBL} \) Gasoline/Diesel diff. To Asphalt

- \$783,510 per day added margin
- \$1 Billion / \$783,510 = 1,276 days (3.5 years payoff)
Economic Analysis – Recent Update

**Gasoline/Diesel Pricing**
- Jan., 07 Price: $62.75/BBL
- Less Distribution: 6.00/BBL
- Net to Refinery: $56.75/BBL

**Kansas Asphalt Pricing**
- 12/06 MTD: $49.11/BBL*
- ($35/Ton): 6.25/BBL
- $42.86/BBL
- Lost Value: $13.89/BBL

*Source – Poten & Partners*
Coking Economics – Recent Update

- 30,000 BBLs/Day Asphalt Production
- X 70% Gasoil Production

- 21,000 BBLs Gasoil for Gasoline/Diesel
- X $13.89/BBL Gasoline/Diesel diff. To Asphalt

- $291,690 per day added margin

- $1 Billion / $291,690 = 3,428 days (9.4 years payoff)
FUTURE OF THE INDUSTRY
Current Realities

- Crude production at maximum rates based on exiting infrastructure
- U.S. refining running at maximum capacity
- No new refineries in the near term
- Existing refinery expansions must fill gap
- Increase crude capacity and conversion capabilities to meet light product demand
- Asphalt must keep pace with conversion feed values to encourage production
- Asphalt not as politically charged as fuels
Factors Influencing Asphalt Price

- Absolute price of crude (WTI benchmark)
- Light/Heavy crude price differential
- Light product “crack spread”
- Coking economics
- Impact of clean fuels (sweet crudes)
- Heavy crude availability (Venezuela)
- Transportation costs
- Supply/Demand
Future For Asphalt

- More heavy crude being run (availability and price)
- Clean fuels capital behind refiners, up-graders next?
- Asphalt is more expensive in a $60.00 crude world
- Asphalt has to trend faster with crude oil prices
- Asphalt has to be more competitive with light products
- Transportation costs rising – Rail, Barge, Terminalling
- Refiners less willing to shoulder price risk
- State asphalt price indexes reduce supplier/contractor risk
QUESTIONS