Challenges Facing the Domestic Fuels Industry

Bob King and Mike Kulakowski
MSTRS Meeting
1/12/00

Topics

- Introduction to Refining
- Permitting and Construction
- Regulatory History and Future
- Cost Estimates
- Financial History
- Reality Check
- Recommendations
Introduction to Refining

The “4 Bs”

- Boiling
  - Distillation -- the basic separation process

- Breaking
  - Cracking processes -- Fluid Catalytic Cracking (FCC), Hydrocracking and Coking

- Bending
  - Rearranging molecules -- alkylation, isomerization

- Blending
  - Putting it all together while meeting specifications economically
**Timing Required to Complete Gasoline Desulfurization**

Timeline, months

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<tbody>
<tr>
<td>Lead Time</td>
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Fuels Regulatory Time Line

- **EPA Phase 2 RVP**
- **EPA LSD CARB LAD**
- **CARB CBG**
- **EPA RFG Simple Model**
- **EPA RFG Complex Model**
- **EPA RFG Phase II**


4 year lead time for permitting, design and construction

Does not show individual state initiatives on gasoline quality
Differences Between Past and Future Regulations

• Nature of regulations
  – Most prior regulations did not impact all production (i.e. participation was selective)
    • Fewer participants -- less demand for equipment
    • Participation decided on an economic basis
  – Upcoming regulations DO impact every gallon
    • All refiners must participate regardless of economics

• Stringency of regulations
  – Operability impacts
Cost of Future Fuel Requirements

<table>
<thead>
<tr>
<th>Program Description</th>
<th>Effective Date</th>
<th>Capital Cost ($B)</th>
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<tbody>
<tr>
<td>EPA Gasoline Sulfur</td>
<td>2004-6</td>
<td>4-7</td>
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<tr>
<td>EPA Low Sulfur Diesel (on-road)</td>
<td>2004-8?</td>
<td>4-8</td>
</tr>
<tr>
<td>EPA Low Sulfur Diesel (off-road)</td>
<td>2002-8?</td>
<td>1-2</td>
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<tr>
<td>California MTBE Removal/Phase 3 RFG</td>
<td>2002</td>
<td>0.2 – 1.0</td>
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<td>Blue Ribbon Panel Recommendations</td>
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<td>?</td>
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<tr>
<td>Mobile Source Air Toxics</td>
<td>?</td>
<td>?</td>
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<tr>
<td>Refinery MACT</td>
<td>2001-4</td>
<td>?</td>
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<tr>
<td>126 Petitions</td>
<td>2000-3</td>
<td>?</td>
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</tbody>
</table>

*Industry is facing massive regulatory project investments*

Refining and Marketing Financial Returns

Source: EIA Form 28
Regulatory Reality Check

- Deliverability of very low sulfur fuels in commingled systems
- Technology demonstration
- Need near-perfect refining operations
- Permitting
- Resource availability
- Unanticipated outcomes

Gasoline Desulfurization Commercial Experience

<table>
<thead>
<tr>
<th>Licensor</th>
<th>Commercial Units</th>
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<tr>
<td>Mobil (Octgain)</td>
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<tr>
<td>CDTech (CDHDS)</td>
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<tr>
<td>Phillips SZorb</td>
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<tr>
<td>Black and Veatch (IRVAD)</td>
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</table>
BUILDING TRADES MANPOWER SHORTAGE

- CII STUDY shows 75% of Constructors have shortages
- Business Roundtable Construction Committee survey of members showed 25% of projects have cost increases & schedule delays due to labor shortfall.
- Shortages are as common in non-union as in the union sector.
- Both the Quantity and Quality are suffering.
- Not a local problem; national in nature.
- Will not go away quickly.

BUILDING TRADES MANPOWER SHORTAGE

WHY?
- Current Economic Boom & Commercial Development
- Construction Craft Retirements are outpacing new apprentice enrollments - Numbers are decreasing.
- Construction cannot attract high school graduates in sufficient numbers - Poor Image.
  “Young people see it as dirty, uninteresting work done in bad weather.”
- Some are of the opinion wages are not high enough to attract.
Key Regulatory Needs

- Fuels regulations in series, not parallel
- Recognition of “reality check” items in regulatory development
- A road map that does not change
- REAL flexibility in fuels rules
- Recognition that the refinery and distribution network are systems facing simultaneous compliance with many rules

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