Impact Of Clean Air Regulations On the Refining Industry

Northwest Construction
Consumer Council
12 November 2002
Seattle, WA
Manufacturing & Supply Business

9 Refineries
1.6 MMB/D Crude
~10% US Capacity

Puget Sound
Crude Capacity: 145 MB/D
 Configuration: Heavy Coking
 Crude: ANS

Martinez
155 MB/D
Very Heavy Coking
California

Bakersfield
65 MB/D
Very Heavy Coking
No Cat Cracking
California

Los Angeles
95 MB/D
Very Heavy Coking
75% California
25% Foreign

Delaware City
175 MB/D
Heavy Coking
100% Foreign

Convent
225 MB/D
Heavy Coking
15% Domestic
85% Foreign

Norco
220 MB/D
Light Coking
80% Domestic
20% Foreign

Deer Park
330 MB/D
Very Hvy Coking \ Lubes
90% Foreign
10% Domestic

Port Arthur
235 MB/D
Heavy Coking / Lubes
100% Foreign

Manufacturing & Supply Business

Shell Oil Products U.S.
Shell Oil Products U.S.

Current Refining Fuels Business

- Puget Sound: 390 MBPD
- Martinez: 225 MBPD LSD
- Bakersfield: 170 MBPD CARB
- Los Angeles: 185 MBPD Conventional, 185 MBPD RFG
- Delaware City: 225 MBPD LSD
- Convent: 170 MBPD CARB
- Norco: 170 MBPD CARB
- Deer Park: 185 MBPD Conventional, 185 MBPD RFG
- Port Arthur: 390 MBPD

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What’s rock’in our boat?

EPA New Source Stds

RFG Phase II & Air Toxics Limits

CARB 3 Specs
- Lower S
- Lower Bz

Low Sulfur Gasoline
- Federal Low Sulfur Std
- State sulfur rules

Sure glad we’re in a simple Commodity Business!

On-road Diesel
- Federal Low Sulfur Std
- Texas Low-Emission

Off-road Diesel
- Proposed Fed Rule 2Q’03
- Texas Low-Emission

Renewable Fuels Std?
- Ethanol mandate
- MTBE Ban

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Cost of Compliance (Industry)

Based on National Petroleum Council (NPC) Refining Study, “U.S. Petroleum Refining - Assuring the Adequacy and Affordability of Cleaner Fuels”, June 20, 2000 and DOE estimates

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What Are The Longer-Term Fuel Premises?

- Low Cost
- Reliable
- Run Length?
- Hydrogen Supply?
- MOGAS Oxygenate?
- Diesel Cetane?
- Aromatics?
- Density?
- Off-road Diesel Specs?

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**Strategic Issues - Fuels**

- **Future Fuel Specifications**
  - MOGAS and Diesel sulfur - 10 ppm S? 5 ppm S?
  - Diesel - aromatics? cetane? density?

- **Design**
  - Revamp or grass roots
  - Commercially proven
  - Design “no-regrets” case

- **Lowest total cost of ownership (TCO)**
  - Refinery gross margin impact
  - Capital investment (and unit downtime)
  - Operating and maintenance costs
  - Unit run length, reliability

- **Engineering/Construction**
  - Replicate designs where possible
  - Secure Eng/Proc/Constr early
Low Sulfur Fuels Projects

- Puget Sound
- Martinez
- Bakersfield
- Los Angeles
- Convent
- Norco
- Delaware City
- Deer Park
- Port Arthur

$375 MM LS Gasoline
$165 MM CARB
$550+ MM LSD
EPA Enforcement Initiative

- Leak Detection and Benzene controls
- Focus on significant reductions
  - SO2
  - NOx
  - Particulates
- Flaring focus
  - Sulfur Plant reliability
  - Sour Water Strippers
  - Compressors or monitoring on post ‘73 flares
- Clean Slate on Nearly All Significant Issues from States and EPA
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EPA Consent Decree - Implications

- EPA commitment to “level playing field”
  - 35% of industry currently covered
- What do future regulations look like?
  - State Implementation Plans (SIP’s), NSR Reform
  - Design “no-regrets” case
- Technology
  - In development, especially NOx control
  - Low risk tolerance for compliance projects
- Strategic Implications
  - Community relationships
  - Lower emissions can allow growth
  - Controlled units increase feed flexibility
  - Synergy opportunities
- A different relationship with EPA
EPA Consent Decree Projects

$110 MM NOx

$95 MM Flaring

$195 MM SOx

Puget Sound
Martinez
Bakersfield
Los Angeles
Deer Park
Port Arthur
Delaware City
Convent
Norco

Shell Oil Products U.S.
Puget Sound Refinery Projects

$325 MM Capital

- Low Sulfur Gasoline
- Ultra Low Sulfur Diesel
- FCCU SOx Scrubber
- Sulfur Plant & Flaring
- 3rd Party H2 Generation

Shell Oil Products U.S.
The Reality

- Cleaner fuels are here to stay
- Continued pressure to reduce emissions
- Other demands to excel
  - safety
  - environmental compliance
  - reliability
- In-time Permits/Engineering/Procurement/Construction are critical
- “No regrets” investment philosophy
- Must weigh technologies risk/rewards