Current Issues in Petroleum Refineries

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Topics re Petroleum Refining

• “What’s that Thing”
  – Basics of Refinery Processes
  – October 2007

• “The Three N’s of Air”
  – Basics re NSPS, NESHAPs and NSR
  – October 2011

• “Current Issues in Petroleum Refining”
  – Current Business and Environmental Issues
  – October 2012
Current Hot Issues

- Business Issues
  - Increase in North American oil and gas production
  - Reduction in gasoline demand; the emergence of diesel

- Environmental Issues
  - NSPS Ja
  - Construction permitting
  - Stricter specs for gasoline
Business Issues

- Increase in North American oil and gas production
  - Proven reserves of U.S. oil and natural gas in 2010 rose by the highest amounts ever recorded since estimating began in 1977 (why is this date relevant?)
  - Canadian fields coming online
  - Reduced demand for crude imports from outside N.A.
  - A few years ago, we were looking at importing liquefied petroleum gas – the balance is shifting towards exports
  - Cost of raw materials is a major impact on cost and profitability
  - But how do we get the crudes to the refineries – Keystone Pipeline?

1 – U.S. Energy Information Agency
Business Issues – cont’d

• Some of the reasons for increased production
  – Hydraulic fracturing
  – Shale oil production
  – Enhanced techniques are frequently in the news with viewpoints for and against
  – Stated positions for
    • Have major economic benefits in regions where fields have increased production
    • Less dependence on overseas suppliers that may be in less stable political regimes
  – Stated positions against
    • Concerns about chemicals used in fracturing process
    • Concerns about additional processing required for shale oil extraction
  – Will continue to be discussed as domestic production increases
Business Issues – cont’d

• U.S. Gasoline demand has peaked – why?
Business Issues – cont’d

- What is going on in Europe?

**Figure 4.2. Ratio of Middle Distillate Consumption to Consumption of Gasoline and Light Naphtha Products by Region, 1997-2007**

Environmental Issues

• Not an exhaustive list!
• NSPS Ja
  – Finally Final?
  – Flares
    • Won’t most refineries trigger sooner rather than later?
    • Meet H₂S spec for routine flaring
    • CEMS
    • Root cause analysis
    • Proposed flow limit removed
  – Fuel gas combustion devices
    • Need cleaner fuel than the existing NSPS J system – added 365 day H₂S spec to the 3 hour spec in NSPS J
    • NOx spec added
Environmental Issues – cont’d

• NSPS Ja - continued
  – Catalytic cracking (FCCU) – changed from J
    • Changed affected facility definition – was the regenerator/air blower, now all of the unit including control devices (ex the furnaces regulated separately)
    • Added NOx limit, lower PM limit for new units
  – Sulfur Plants – changed from J
    • Also changed affected facility definition – was claus only, now includes pits and control devices (not secondary sulfur storage tanks)
    – For existing FCCUs and Sulfur Plants – does the new definition help or hurt?
  – Cokers – newly added to NSPS
    • Requires venting coke drum to fuel/flare down to 5 pounds
    • How does a facility trigger?
Environmental Issues – cont’d

• Construction permitting
  – Have you tried to model against the new NAAQS for SO\textsubscript{2}, PM or NO\textsubscript{x}?
  – May need to identify credits to net out, or accept lower limits for permitted sources to make your project feasible
  – New ozone standard coming
    • Virtually all of the state may be non-attainment
    • Welcome to ozone SIPs and NNSR
    • Start thinking about potential VOC and NO\textsubscript{x} reduction steps
  – Greenhouse Gas
    • Per EPA, 50 GHG PSD permits have been issued as of early October, none yet for Petroleum Refineries
    • “Energy efficiency” is BACT – how will that be measured and enforced?
Environmental Issues – cont’d

• Next round of specifications for gasoline
  – Higher ethanol requirement?
  – Lower vapor pressure requirements – when do you put the displaced molecules?
  – Lower sulfur – only the “hard-to-desulfurize” molecules are left – will new equipment be costly
  – Will these changes require construction permits?
Questions or Comments?

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