Lessons Learned from a Refinery Order

Paul E. Foster, P.E.
Permitting and Compliance Chief
Delaware Air Quality

Blue Skies Delaware; Clean Air for Life
Delaware City Refinery
Re refinery Owners

- Tidewater Oil Company – 1955
- Getty – 1972
- Texaco – 1986
- Star Enterprises – 1992
- Motiva – 1998
- Premcor – 2004
- Valero – May 2005
Consent Decree w/ Motiva

- March 2001 Settlement
  - EPA
  - States – Delaware and Louisiana

- Main Affected Units
  - Cat Cracker
  - Coker
  - Heaters/Boilers – 30% of heat input
CD Effects

- Emissions Reduction
  - $\text{SO}_2$ – 37,000 tons
  - $\text{NO}_x$ – 1,800 tons
  - $\text{PM}$ – 1,100 tons

- Other
  - WWTP & LDAR Improvements
  - AG/TG Flaring – Root Cause Analysis
Lessons Learned
Cat Cracker
Cat Cracker Requirements

- Paragraph 57(a)

Motiva’s FCCU Regenerators at the refineries identified at Paragraph 5 shall be affected facilities subject to the requirements of the NSPS Subparts A and J for each relevant pollutant by the dates specified:
Cat Cracker Requirements

Paragraph 57(a) [cont.]

- SO2 – 12/31/04
- PM – 12/31/04
- CO – 9/30/02 (NSPS Sub J – 500 ppm)
- Opacity – Alt Monitoring Plan 12/31/04

[SO2, PM, Opacity changed to 12/31/06]
FCCU NOx

- Motiva tried catalyst additives for NOx
  - Trials failed
- Motiva made other changes to meet CO limit of 500 PPM
- NOx increased by 650 TPY
What did Motiva Do?

- Unknown at this point
- Conjecture?
  - Around 2002-2003
  - Increased air flow to regenerator
  - Increased feed from 60-62 mbpd to 65 mbpd
DNREC Actions on FCCU NOx

- Refinery sold to Premcor in 2004
- NOV issued to Motiva April 2004
  - Settlement – November 2007
  - $650m penalty, $200m EIP
- NOV issued to Premcor December 2004
  - Settlement – July 2006
Premcor FCCU Settlement

- Interim measures taken
- 20ppm NOx by May 2009
  - Ozone Compliance Year
  - Permit issued June 2008
  - Design changed by refinery – stip being paid
Lessons Learned

- Consequences
  - CO measures raised NOx
- Careful with CD Language
  - Stips set up for installation delays
  - Needed higher stips for breach of contract
Liquid Fuels

- Federal CD
  - Liquid Firing phased out by Oct 2003
  - They complied – boilers all fed by gas
  - However ....
DNREC Discovery

- Boiler #3 Stack Test Failed for TSP/PM10

... we, [Premcor] do not believe that Boiler 1 and Boiler 3 were tested under conditions representative ... a desulfurized fuel gas liquid condensate ...
DNREC Discovery

- Inspection in Sept 2007 showed
  - 2 knock-out pots piped to boiler using flex
  - Flow rate about 10 gpm
  - Flow just drains into the firebox
  - Open ended 1.5 inch hose
  - No nozzle, no atomization
DNREC Discovery

One of the 2 condensate tanks that feed Boiler #1.

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LIQUID CONDENSATE FEED LINE INTO BOILER #1.

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Next Steps

- Refinery removed hose in December 2007
  - Now back to sour water stripper
- NOV Issued January 2008
- Case Presented to Enforcement Panel February 2008
Lesson Learned

- Be Careful of Definitions
- Refinery claims that “Liquid Fuel” is fuel oil
- DNREC – Liquid is Liquid