

# The Premcor Refining Group Inc.

Comments/Discussion Regarding  
Draft 1 of Regulation 1142

# Regulation 1142, Draft 1

## Presentation agenda

- Reg.1142 should incorporate cost effectiveness into the evaluation of appropriateness of controls.
- Are other emission limits more appropriate?
- Reg. 1142 should exclude CO Boilers.
- Summary of DCR NO<sub>x</sub> Reduction Projects
- Discussion Items.

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## Cost Effectiveness Considerations

- Appropriateness of controls required by the rule should be evaluated based upon cost effectiveness (\$/ton removed).
- Cost effectiveness should incorporate capital expenditures and operation and maintenance costs on an annualized basis.
- Best Available Retrofit Technology (BART) controls for SO<sub>2</sub> and NO<sub>x</sub> are projected to have a maximum cost range from \$1,000 to \$10,000 per ton.
- Example cost effectiveness evaluation provided on the following slide.

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## Cost Effectiveness Example: 37-H-1

- Steam Methane Reformer equipped with approximately 500 burners. Function is to produce H<sub>2</sub>. Not a typical process heater.
- Baseline emissions, 86.5 tpy, Average emission factor is 0.09 lb/MMBTU.
- Controlled emissions projected to be 59.2 tpy (@0.04 lb/MMBTU). Results in a 27.2 tpy reduction.
- Est. capital cost: \$19.1 MM, annual O&M cost, \$1.9 MM.
- With 15 year capital recovery factor @ 7% interest, annualized cost is \$ 4MM/year.
- Cost Effectiveness: \$147,063/ton, ineffective control.

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## Is 0.04 lb/MMBTU the appropriate level of control?

- Boiler 2 was designed to fire petroleum (pet) coke. Pet coke and oil firing has ceased per CD.
- In 2004 pursuant to CD, Premcor installed ULNBs, Flue gas recirculation (FGR), Fuel induced gas circulation (FIGR) and steam injection NO<sub>x</sub> controls on Boiler 2.
- These controls were installed to guarantee 0.04 lb/MMBTU NO<sub>x</sub> emissions.
- Capital cost was approximately \$14 MM.

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## Is 0.04 lb/MMBTU the appropriate level of control?

- Federal CDs define current generation ULNBs as “burners that are designed to achieve NO<sub>x</sub> emissions of 0.02 to 0.04 when firing natural gas @ 3% O<sub>2</sub> at full design load without air preheat, even if upon installation actual emissions exceed 0.04 lb/MMBTU (HHV)”.
- The refinery process heater and boilers combust refinery fuel gas which contains significant amounts of H<sub>2</sub>.
- H<sub>2</sub> content raises flame temperature and contributes to elevated NO<sub>x</sub>
- Boilers such as Boiler 2 use preheated air to promote energy efficiency, resulting in higher NO<sub>x</sub> emissions on a lb/MMBTU basis.
- It may be more appropriate to set a limit @ 0.06 lb/MMBTU, which may not require the capital investment to meet 0.04 lb/MMBTU. (i.e. only ULNBs or only FGR may be necessary).

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## CO Boilers should be excluded from Reg. 1142

- CO Boilers are neither process heaters nor industrial boilers. The primary purpose of CO Boilers is the destruction of CO and organic HAPs.
- Industrial boilers are an enclosed device using controlled flame combustion and having the primary purpose of recovering thermal energy.
- CO Boilers are waste heat boilers because they derive less than 50% of rated heat input capacity from auxiliary fired burners.
- Premcor completed installation of an SNCR NO<sub>x</sub> control system on 11/30/05 at a cost of \$ 6 MM pursuant to the CD. Premcor is currently undergoing an optimization of the SNCR.
- Premcor has already reached an agreement with DNREC to implement NO<sub>x</sub> controls on the FCCU COB to achieve 20 ppm.

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## Summary of DCR

### NOx Reduction Projects Since 2002 and Future Commitments

- Elimination of oil firing for boilers.
- Installed ULNBs/FGR and FIGR on Boiler 2.
- Installed/commissioned SNCR on FCU CO Boiler.
- Committed to achieving 20 ppm NOx on FCCU COB.
- Planning to control Boiler 1 to 0.04 lb/MMBTU by 12/31/08 and shutting down Crude Vacuum heater and replacing with new BACT controlled heater.
- Further reductions are planned in capital budget.

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## Discussion Items

- Complying with the 0.04 lb/MMBTU limit for the refinery sources identified by DNREC may result in 5.26 TPD in NO<sub>x</sub> reductions.
- Cost to achieve these reductions may cost \$170 MM.
- 5.26 TPD is only 6.7 % of DNREC's 78.1 TPD target.
- If costs to achieve the remaining reductions had similar cost effectiveness for other sources in the state, the cost of achieving 78.1 TPD would be \$1.2 Billion.
- Where are the remaining reductions being achieved?
- Have other industries been targeted? What are their reduction targets?
- Why has 2002 been selected as the baseline year?
- How did DNREC arrive at the 78.1 TPD NO<sub>x</sub> /40.1 TPD VOC reduction targets?

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## Discussion Items Cont'd

- Are mobile source reductions planned? According to data supplied by DNREC, on-road emissions account for 50.6 TPD or 35% of Kent/New Castle County NO<sub>x</sub> emissions.
- Has DNREC accounted for Tier 2 requirements and how they contribute to Delaware's NO<sub>x</sub> reduction goals?
- Are non-road source reductions planned? According to data supplied by DNREC, non-road emissions account for 43.1 TPD or 30% of Kent/New Castle County NO<sub>x</sub> emissions.
- Premcor will submit a formal response to DNREC regarding the Draft Regulation 1142.