E.H. Pechan & Associates, Inc.

Including the Emission Effects of Refinery Cases and Settlements in Projections for the EPA's CAAA Section 812 Analysis

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Presentation Organization

- Section 812 Study Context
- Refinery Settlements – What They Cover
- Modeling Approach
- Observations and Conclusions

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Section 812 Study Context

- Periodic, comprehensive cost/benefit study
- 1990 Clean Air Act Amendments
- Retrospective (1970-1990)
- First Prospective (1990-2010) completed in 1999
- Second Prospective (1990-2020) underway

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Second Prospective

- Projection year work focuses on 2010 and 2020 from a 2002 base year
- All criteria pollutants except lead
- Ammonia (NH_3) included
- With and without CAAA scenarios

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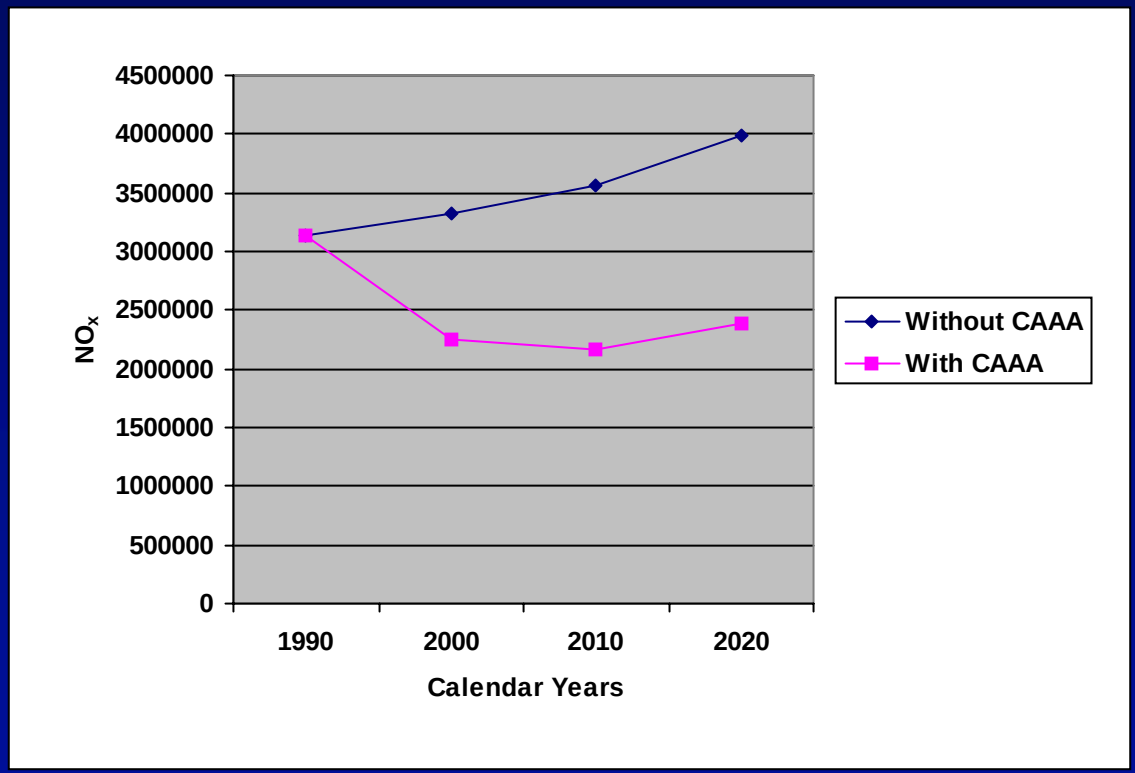
Example Emissions Display

Non-EGU Point Source Emissions



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Refinery Settlements Analysis

- SO_2 and NO_x focus
- Prioritization by refinery company expected emission reductions
- Largest expected emission reductions included

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Refinery Companies Included

- BP Amoco
- CITGO
- Conoco Philips
- Equilon
- Marathon Ashland

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Refinery Companies Included (cont'd)

- Montana Refining
- Motiva
- Navajo Refining
- Premcor
- Sunoco

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Major Affected Refinery Sources

- FCCUs/fluid coking units
- Process heaters and boilers
- Flare gas recovery
- Leak detection and repair
- Benzene/wastewater

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FCCU/FCU Control Requirements

- SO_2
  - Option 1 – Install wet gas scrubbers
  - Option 2 – Use catalyst additives
  - Option 3 – Use existing wet gas scrubber
- NO_x
  - Option 1 – Install SCR or SNCR
  - Option 2 – Use catalyst additives

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Heaters/Boilers

- SO_2 – Eliminate burning of solid and liquid fuels
- NO_x – Install ULNB or the equivalent to heaters and boilers $\geq$ 40 MMBtu per hour

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Issues in Modeling Associated Emission Reductions

- FCCU/FCU records in the 2002 NEI easy to locate
- One refinery had associated emissions at CO boiler

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FCCU SO_2 Control Requirements

- New wet gas scrubber – 90% SO_2 CE or the specified SO_2 CE
- Catalyst additives – 70% SO_2 CE based on the literature
- Existing wet gas scrubber – No additional CE applied or no requirement

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Heater/Boiler Control Requirements

- SO_2 – None applied: few fuel oil burners in the NEI
- NO_x – equivalent to meeting 0.04 lbs/MMBtu NO_x rate average

  50 percent reduction to affected units

  > 40 MMBtu/hour or

  10 tons/year NO_x

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Other Sources (Flare Gas Recovery, LDAR, Benzene/Wastewater)

- Less significant criteria pollutant reductions
- 2002 NEI emission estimates uncertain

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Observations/Conclusions

- Emission limit application
  - NO_x constraint company-wide
  - Discretion in application to units
- Issue in areas considering further NO_x controls
  - OTC example
  - Sensitivity tests suggested

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Observations/Conclusions (cont'd)

- Consider settlement-requirements in BART determinations
  - Effective BART?
  - BART floor?
- Emission inventory improvements
  - Report boiler/heater design capacities
  - Track/report control device installations
  - Compare base year emissions inventory with refining reporting to OECA

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Observations/Conclusions (cont'd)

- Alternative ways to express emission changes
  - Percentage reductions (preferred)
  - Emission totals by facility
- Limitations
  - Settlements that occurred by September 2005
- National emission reductions
  - 60 thousand tons NO_x
  - 210 thousand tons SO_2

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For more information
www.epa.gov/oar/sect812

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