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"Unintended Consequences" of MACT Controls

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Presentation Outline

- Framing the Issue
- Unintended Consequences
  - Emissions changes
  - Permitting implications
  - Regulatory implications
- Case Study and Findings
- Conclusions

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Framing the Issue

- Consider an existing solid fuel fired boiler >10 MMBtu/hr
- Boiler MACT (40 CFR 63 Subpart DDDDD, final rule January 31, 2013) regulates HAPs (hydrochloric acid (HCl), mercury (Hg)), and HAP surrogates (particulate matter (PM), carbon monoxide (CO))
- Primary effects of Boiler MACT: Choose from the following options
  - Option 1: Fuel changes on existing solid-fuel fired units
  - Option 2: Replacement of older units with new (gas fired) units
  - Option 3: Added controls on existing solid-fuel fired units
- Secondary effects
  - Emissions changes
  - Permitting
  - Regulatory applicability
- Secondary effects related to Boiler MACT similar to those of other controls-inducing standards for combustion units (BART/Regional Haze, Utility MACT, NO_2 and SO_2 NAAQS, etc.)

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Emissions changes

- For each option, emissions (in lb/MMBTU) expected to drop, on balance. Meaning:
  - Some permitting and regulatory exemptions available
  - But, check for increases, especially in CO (a Regulated NSR Pollutant), filterable and condensable PM (FPM, CPM, also regulated), and air toxics
  - Revised Annual Emissions Inventory (AEI) calcs
- Will equipment or fuel changes affect emissions from other units (e.g., secondary users of waste heat)?

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Permitting Implications (federal)

- No pollution control project exemption under the Prevention of Significant Deterioration (PSD) program
- Possible (but unlikely) alternative fuel exemption
- Possible qualification as a replacement unit
- Cautions:
  - Capacity increases
  - CO increases (perhaps outside Boiler MACT realm)
  - Relaxing (non-PSD) PSD avoidance limits – see 40 CFR 52.21(r)(4)
  - Strength of emissions estimates, especially PM species
  - Scrubber or efficiency increase => cooler exhaust => poorer dispersion => increased groundlevel concentrations
  - Modeling: Use of $PM_{2.5}$ SIL not necessarily dead, but standard of use has changed

Wait, an Air Permit Needed for an Air Pollution Control Project?

- Permitting addresses physical or operational changes
- NSR Pollution Control Project exemption progression:

guidance policy → codified rule → **court vacatur**

- Permitting math:
  - Future projected emissions - past actual emissions <=> threshold?
  - Low past actuals could spell trouble
  - Inverse, competing relationships of two pollutants could spell trouble
    - A NO_x decrease may mean a CO increase
    - A mercury or SO_2 decrease may mean a PM increase

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Permitting Implications (state)

- Potentially all the same cautions as under federal, plus:
- Some states require permits for emissions changes, even decreases
  - In MN, major amendment required for changes to units with mention of Title I condition
- Some states require/request dispersion modeling, even for decreases; especially for pollutants with newer standards ($PM_{2.5}$, NO_2, SO_2)

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Regulatory Implications

- NSPS
  - Pollution Control Project exemption (would not apply to replacement units)
  - Limited regulated pollutants
  - For modification, must be increase in potential lb/hr (short-term) emission rate
  - Primary review: D family of standards
  - Cautions: Subpart OOO, reconstruction
- CISWI/Non-Hazardous Secondary Materials
  - If combusted materials are classified as a discarded waste rather than a fuel, CISWI rule would apply instead of the Boiler NESHAP
- Title V/Operating Permit
- Other?

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Case Study: Background

- Existing Source
- Three solid fuel fired boilers, approximately 300 MMBtu/hr each
- Controlled by existing baghouse
- NO_x cap covering these three units

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Option 1: Permitting consequences

- **Convert coal boilers to natural gas**
- Modification to existing units, so past actuals available, and an emissions decrease
- Case math would result in state-only permitting
  - Emissions change less than PSD significant emission rates (SERs) for all pollutants
  - No contemporaneous netting needed
- Avoids state-only NAAQS modeling
- Does not trigger NSPS Subpart Db modification or reconstruction requirements

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Option 2: Air Permitting Consequences

- **New natural gas boilers replace the coal fired units**
- Old units show decreases, and new units show increases; decreases count with Step 2 (netting) only
- Still, state-only permitting expected
  - Project increases above PSD SERs for PM_{10}, $PM_{2.5}$, NO_x, and CO, and above subject to regulation (STR) threshold for GHG
  - Contemporaneous netting needed, likely resulting in PSD avoidance due to emissions from shutting down coal boilers
- Avoids state-only NAAQS modeling
- Triggers NSPS (Subpart Db in this case) for boilers; PCP exemption unavailable for replacement units

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Option 3: Air Permitting Consequences

- **Increase natural gas co-firing in coal boilers; retain coal capabilities**
- State-only permitting likely for most pollutants
  - NO_x emissions trigger PSD unless projected actuals are considered or control voluntarily added
  - Project increases below PSD SERs for other pollutants based on actual to potential emissions
- Prediction: state-only NAAQS modeling avoided
- Does not trigger NSPS Subpart Db modification or reconstruction requirements
- Issue: how to physically limit the total boiler heat input when co-firing fuels, without constraining operational flexibility

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Case Summary

- Ranked options in order of least painful to most complicated **for permitting**:
  1. Convert coal boilers to natural gas (Option 1)
  2. Co-firing natural gas with coal (assumes PSD is readily avoided) (Option 3)
  3. New natural gas boilers (Option 2)
- May need to revise the ranking based on costs associated with each option

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Conclusions

- MACT-related design changes may trigger permitting, dispersion modeling and emissions quantification changes
- Some emissions reducing activities may lead to increases in concentrations (or emissions rates) of pollutants, especially non-target pollutants
- Begin planning and permitting process early: design change plans must precede permitting and modeling, so permit reflects future reality (and permitting and modeling take time too)
- Ease of permitting one factor in determining best path forward

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Questions and Discussions

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