

REINHOLD ENVIRONMENTAL Ltd.



**2013 Coal to Gas Conversion Round Table  
& Expo Presentation**

October 29, 2013, in Chattanooga, TN / Sponsored by Southern Company

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# Regulatory Update

2013 Coal to Gas/PCUG  
Round Table and Expo  
Chattanooga, TN

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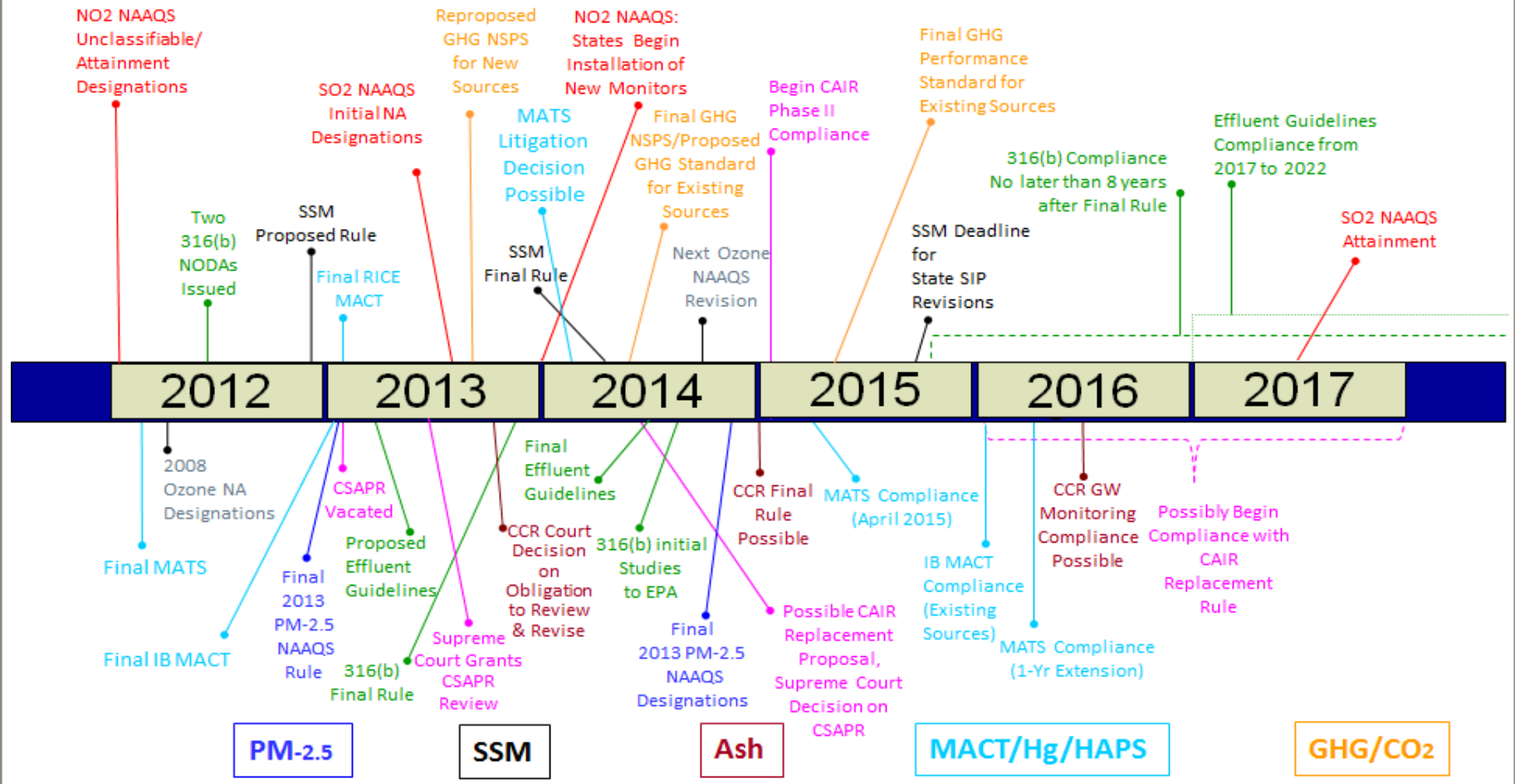
October 29, 2013

# Potential Drivers for Coal-to-Gas Conversions

- Coal-to-Gas conversions can be discussed on a generation fleet or unit specific level
- Typical Coal-to-Gas conversion projects include:
  - Converting existing coal-fired boilers to gas-fired boilers or co-firing with coal
  - Installation of new gas-fired boilers
  - Installation of new gas-fired combustion turbines (combined-cycle or simple-cycle)
  - Conversion of a simple-cycle combustion turbine to a combined-cycle configuration (addition of HRSG and steam turbine)
  - Any combination of the above at a single facility or a generation fleet
- Drivers for conversion can vary, but generally include:
  - Maintaining unit flexibility(duel fuel)
  - Economics compared to installation of new gas-fired unit
  - Economics compared to transmission upgrades required with retirement of unit
  - Economics of installing MATS compliance controls (e.g., scrubber, baghouse, ACI/DSI, etc.)
  - Economics of switching to a lower mercury/halogen coal and potential NSR implications
  - Future capital expenditure expectations for 316(b), ELG, CCR, GHG, etc.

# EPA Regulatory Timeline

Ozone      SO<sub>2</sub>/NO<sub>2</sub>      CAIR/CSAPR      Water

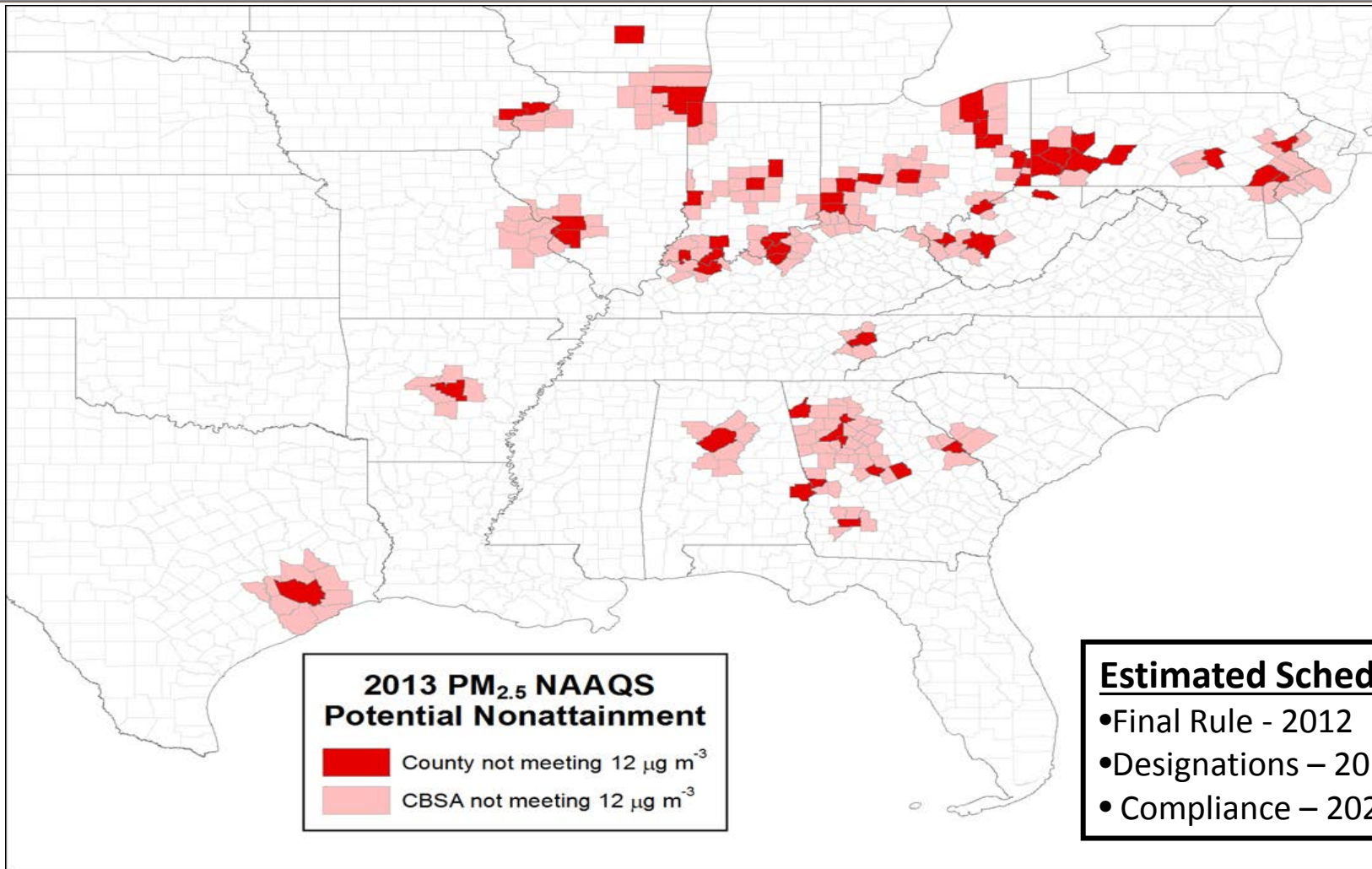


Delays possible as a result of government shutdown.

# Major Environmental Rule Summary

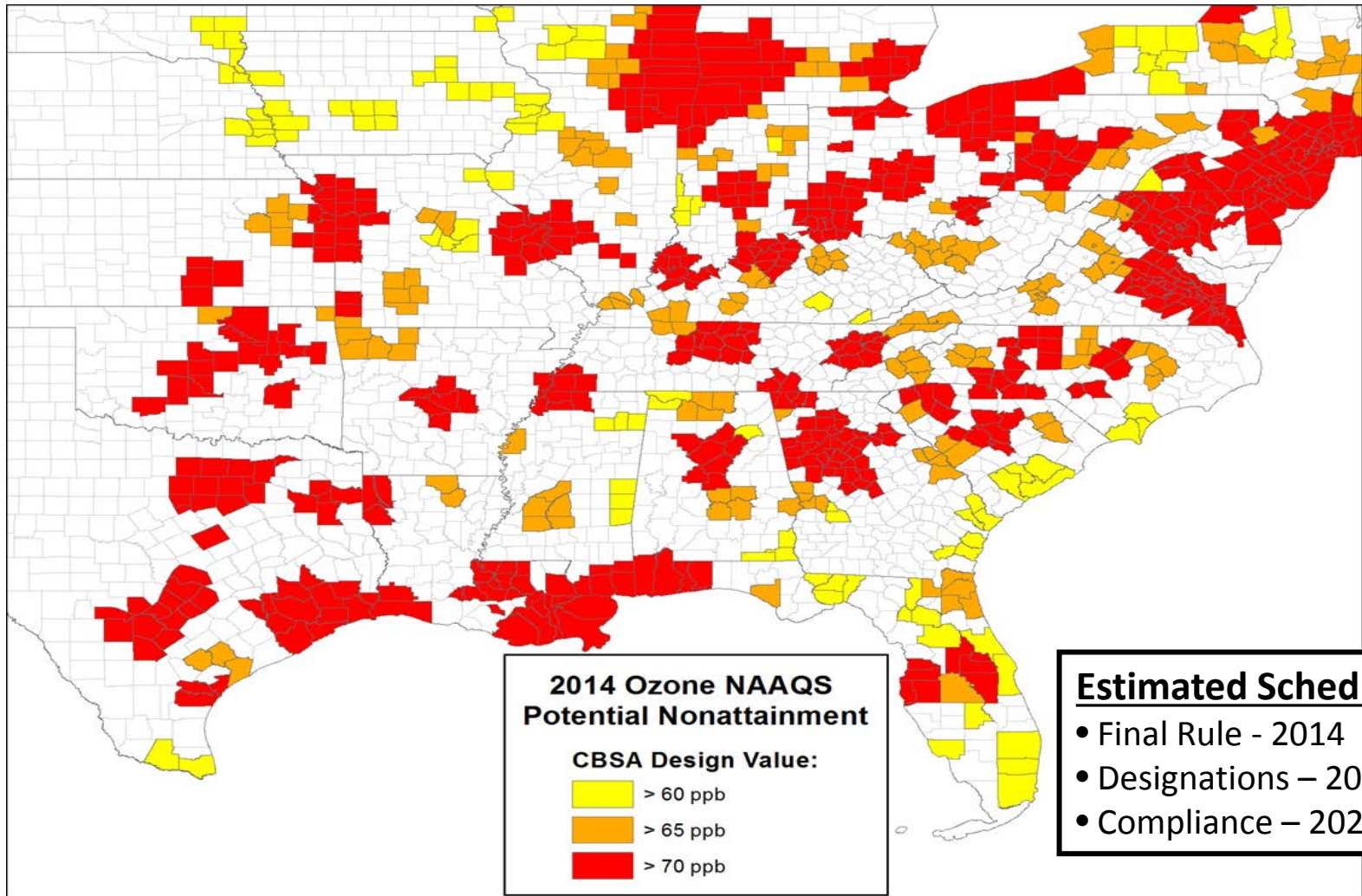
- **Utility MACT Rule (MATS)** – Stringent emission limits for PM, acid gases, and mercury for coal- and oil-fired plants: new emissions controls (i.e., baghouses, ACI, DSI) .
- **CSAPR** – Replacement for CAIR; vacated by DC Circuit Court. Additional SO<sub>2</sub> and/or NO<sub>x</sub> reductions in 27 states with limited interstate emission allowance trading program. CAIR remains in place.
- **NAAQS** – Ongoing particulate matter and ozone nonattainment issues as well as evaluation and determination of nonattainment areas for new short-term standards for NO<sub>2</sub> and SO<sub>2</sub>.
- **CCB Rule** – Federal regulation of coal combustion residuals or byproducts: groundwater monitoring, dry ash handling, pond closures, new landfills.
- **Section 316(b) Rule** – Regulation of cooling water intake structures: impingement and entrainment studies, fish-protective screens, new intake structures, cooling tower retrofits.
- **Effluent Guidelines** – Revised limits for wastewater discharges / prohibition of discharges: FGD wastewater treatment (stringent metals and nutrient limits), no discharge of ash transport water, pond closures, LVWW and leachate treatment.
- **GHG Regulation** – Permitting requirements for new and modified sources / Performance standards for new electric utility steam generating units and guidelines for existing.
- **SSM** – Proposed rule eliminating exemptions from emission limits during periods of non-normal operation.

# EPA's Final PM<sub>2.5</sub> Annual NAAQS (12 $\mu\text{g}/\text{m}^3$ )



Based on 2009 – 2011 monitoring data. Final designations likely to be based on 2011-2013 monitoring data. For NAAQS designations, the presumptive nonattainment boundary is the core-based statistical area (CBSA). Final designations may include additional or fewer counties.

# EPA's Staff-Recommended Ozone NAAQS (60 – 70 ppb)



Based on 2009 – 2011 monitoring data. Final designations likely to be based on 2011-2013 monitoring data. For NAAQS designations, the presumptive nonattainment boundary is the core-based statistical area (CBSA). Final designations may include additional or fewer counties.

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# Proposed & Preferred ELG Options

Proposed Options			Preferred: Existing Sources				Preferred dNSPS	
	1	2	3a	3b	3	4a	4	5
FGD Wastewater	CP	CP + Bio	BPJ	<2,000MW = BPJ >2,000 MW = CP + Bio	CP + Bio	CP + Bio	CP + Bio	ZLD
Fly Ash	Pond (BPT)		Dry				Dry	
Bottom Ash	Pond (BPT)		Pond (BPT)			>400 MW = Dry/Closed <400 = Pond	>50 MW = Dry/ Closed- Loop; <50 MW = Pond	Dry/ Closed- Loop
Leachate	Pond (BPT)		Pond (BPT)				CP	CP
FGMC Wastewater	Pond (BPT)		Dry				Dry	
Gasification Wastewater	Evaporation		Evaporation				Evaporation	
Non-Chemical Metal Cleaning Wastes	CP		CP				CP	

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CP – chemical precipitation, Bio – biological, BPT - Best Practicable Control Technology, BPJ – Best Professional Judgment

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# Air Options

MATS

NAAQS

CSAPR

CAVR

GHG

SSM ?

FGD

Baghouse

CaBr<sub>2</sub>

ACI/DSI

CEMS

SCR / SNCR

Natural Gas Capability

Efficiency Projects

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# Land & Water Options

316(b)

ELG

WQS

CCR

316(b) Studies

Groundwater Monitoring

Dry Ash Conversions

Intake Modifications

Cooling Towers

Pond Closure

FGD WWT

Deep Well Injection

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# Major Coal-fired Unit Regulatory Impacts

## MATS

- Hg – 1.2 lb/TBtu
- PM (filterable) – 0.03 lb/Mbtu
- HCl – 0.002 lb/Mbtu or SO<sub>2</sub> – 0.2 lb/Mbtu (w/ FGD)
- Compliance in April 2015 or April 2016 (w/ 1-yr extension)

## 316(b)

- Requires studies and reports on waterbodies and CWIS
- Impingement – 1) <0.5 fps through screen velocity or 2) fish friendly screen design meeting mortality standards
- Entrainment (>125 mgd) – extensive studies and BTA

## ELG

- FGD WWT, dry ash handling, leachate, flue gas Hg control wastewater, non-chemical metal cleaning waste
- Side effects – ash pond closures, new landfills

## CCR

- Assuming Subtitle D – requires all ponds to be closed or lined with all new landfills requiring a liner system. All lined impoundments must have leachate and groundwater monitoring systems
- Side effects – ash pond closures and new landfills

## NAAQS

- New Ozone standard in 2014 (60 – 70 ug/m<sup>3</sup>)
- Final PM<sub>2.5</sub> standard (12 ug/m<sup>3</sup>) in 2012
- Final short-term SO<sub>2</sub> standard (75 ppm) in 2010
- Final short-term NO<sub>2</sub> standard (100 ppb) in 2010

## CSAPR

- Addresses interstate transport of SO<sub>2</sub> & NO<sub>x</sub> for power plants in 27 states contributing to Ozone and PM NAA .
- Similar to CAIR but with limited outside state trading
- Could require additional SO<sub>2</sub> and NO<sub>x</sub> reductions
- EPA is fighting for C SAPR but working on replacement

## SSM

- EPA signed SIP Call for 36 states to revise SSM rule
- Basis for argument is SSM rules allow violation of NAAQS
- Potential for high capital & O&M costs, operational constraints, and numerous permit violations & legal battles

## GHG

- New units – coal-fired including IGCC requiring partial CCS (1100 lb/MWh).
- Modified, reconstructed, & existing units – EPA to issue guidelines based on BSER for states SIP development

# Major Gas-fired Unit Regulatory Impacts

316(b)

- Requires studies and reports on waterbodies and CWIS
- Impingement – 1) <0.5 fps through screen velocity or 2) fish friendly screen design meeting mortality standards
- Entrainment (>125 mgd) – extensive studies and BTA

ELG

- Limited Potential Impact**
- Potential non-chemical metal cleaning waste impacts
  - Legacy waste waters

NAAQS

- New Ozone standard in 2014 (60 – 70 ug/m<sup>3</sup>)
- Final PM2.5 standard (12 ug/m<sup>3</sup>) in 2012
- Final short-term NO<sub>2</sub> standard (100 ppb) in 2010

CSAPR

- Addresses interstate transport of SO<sub>2</sub> & NO<sub>x</sub> for power plants in 27 states contributing to Ozone and PM NAA .
- Similar to CAIR but with limited outside state trading
- Could require additional SO<sub>2</sub> and NO<sub>x</sub> reductions
- EPA is fighting for C S APR but working on replacement

SSM

- EPA signed SIP Call for 36 states to revise SSM rule
- Basis for argument is SSM rules allow violation of NAAQS
- Potential for high capital & O&M costs, operational constraints, and numerous permit violations & legal battles

GHG

- GHG BACT – resulting in permit limitations
- New units – Gas-fired including CC & CT (1000-1100 lb/MWh)
- Modified, reconstructed, & existing units – EPA to issue guidelines based on BSER for states SIP development

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# Potential Impacts of Coal-to-Gas Boilers

- MATS applicability: >15% annual heat input or 10% during 3 calendar years on coal or Oil
  - Continued coal O&M and future regulatory impacts (i.e., CCR & ELG)
  - Potential tracking and operational concerns
- Coal with gas co-firing
  - Potential offset of PRB coal conversions or to provide operational flexibility
- Boiler changes, siting, and permitting concerns
  - Potential for NSR significant emission threshold increases - CO and VOC most common (PM & NOx possible)
  - Potential facility changes to include: gas burners, onsite and offsite gas transmission, balance of plant changes
    - Gas line siting concerns: distance to nearest pipeline availability of firm transportation (FT), threatened and endangered species, cultural resources, wetland impacts, land acquisition/easement access
    - Balance of plant concerns: new aux boilers, gas conditioning equipment, and concerns with PSD/BACT controls
- Have potential for unknown future GHG, CSAPR, and SSM impacts

# Potential Impacts for Gas Combustion Turbines

- NSR concerns
  - BACT/LAER controls and/or permit limits, Offsets
  - Modeling short-term NAAQS compliance (1-hr NO<sub>2</sub> and 24-hr PM<sub>2.5</sub>)
    - Ancillary equipment emissions and stack height impacts
    - Startup and shutdown emission impacts
    - Surrounding sources (major & minor) and availability of data concerns
- Siting and permitting concerns
  - Required water availability and surface water discharge assimilation
  - Gas transmission, electric transmission, and water pipeline siting (Linear Facilities)
    - Distance to nearest pipeline and transmission (line availability/capability)
    - Threatened and endangered species
    - Cultural resources (local SHIPO)
    - Wetland impacts (Section 404 CWA and/or Section 10 RHA permitting)
    - Land acquisition/easement access (crossing Army Corp. lands requires additional Section 408 permitting)
- Have potential for unknown future GHG, CSAPR, and SSM impacts



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Questions