



**American  
Forest & Paper  
Association**

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SUSTAINABLE PRODUCTS FOR A SUSTAINABLE FUTURE

# ***NOx Ozone Transport Federal Implementation Plan: Treatment of Paper Mill Boilers***

**OMB E.O. 12866 Meeting**  
**February 27, 2023**

## ***Background***

- EPA acts when states fail to set adequate limits for interstate transport of pollution that causes non-attainment areas
- Rule sets NOx limits (precursor to ozone formation) for power plants and manufacturing sources including **fossil fuel fired paper mill boilers for first time**
- Covers 23 States: **AR**, CA, **IL**, **IN**, KY, **LA**, MD, **MI**, **MN**, **MS**, MO, NV, NJ, **NY**, **OH**, **OK**, **PA**, **TX**, UT, **VA**, WV, **WI**, WY; 14 states with paper mills (**red**)
- Upwind states that “significantly impact” downwind states with non-attainment areas

## ***Overview/Context for Paper Boilers and Ozone Transport NOx FIP***

- AF&PA filed comments on June 21
- Supplemental information provided in September from NCASI/AF&PA in response to EPA questions
- Pulp and Paper has achieved 50% NOx reduction from 2000
- Boiler MACT resulted in cleaner fuels in pulp and paper boilers:
  - 125 coal boilers in 2010 and now less than 20 in our industry

## ***Reassessment of Paper Boiler in NOx FIP: Bottom-line***

- Paper boilers are not an “impactful industry” (not meet Steps 1 or 2)
  - Barely “met” criteria for inclusion as “Tier II” industry (11 areas when threshold is 10); last source category included
  - Errors in EPA analysis: misclassifications of units
  - Fall below “impactful” criteria – 9 areas @ >0.01 ppb contribution
    - If account for boilers that are shut down, then only 8 areas
- Not cost effective to control paper boilers (not meet Steps 3 or 4):
  - 5X above the EPA threshold for inclusion (\$7,500 vs \$38,000/ton)
  - Expected controls are infeasible – never used on paper boilers
  - Very costly (~\$650 million) to meet – 3X higher than EPA estimates
  - Small NOx emissions for paper mills - 25% less emissions than EPA

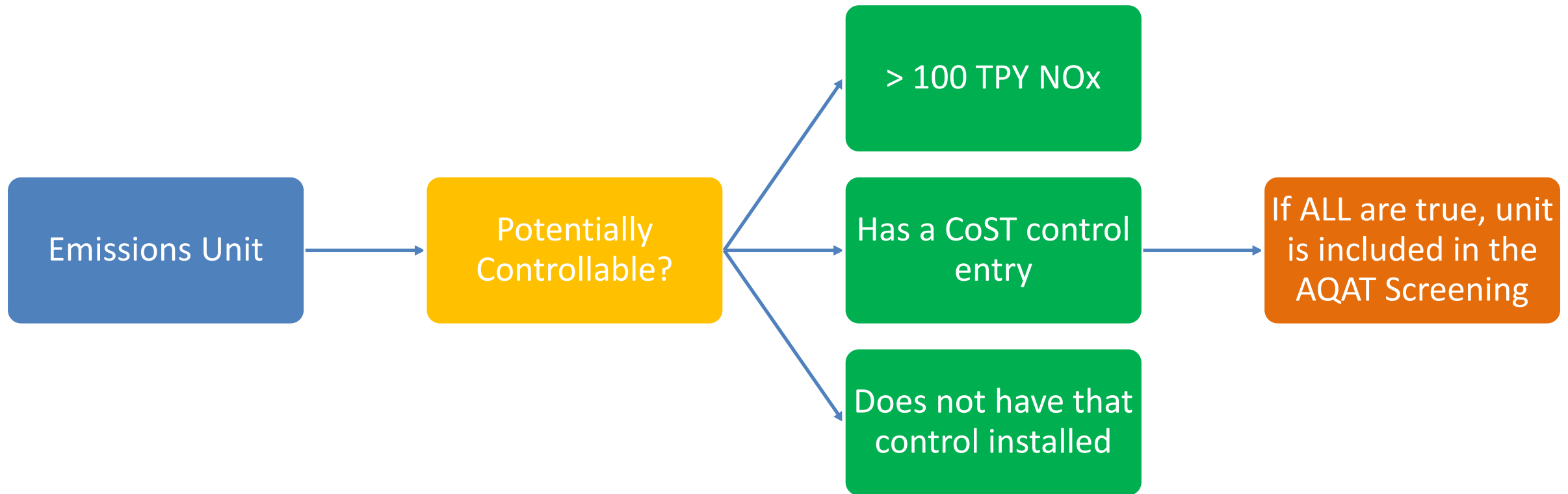
# *EPA's Statutory Discretion for NOX FIP*

Legal Standard	Discretionary Factors
<ul style="list-style-type: none"><li>• Contribute significant amounts to downwind receptors/air quality and cost-effective controls: not overcontrol; S. Ct. 2014 <i>EPA v. EME Homer City Generation</i></li><li>• Interpretation of <i>Wisconsin v. EPA</i> from DC Circuit (938 F 3d 303) also relevant to upwind vs downwind emission reduction contributions per the Good Neighbor Provisions.</li></ul>	<ul style="list-style-type: none"><li>• What is “significant” contributor – impactful sector, amount of NOx and location of emissions</li><li>• Not “over control” (only necessary reductions) per <i>Homer City</i></li><li>• Consider costs and effectiveness to narrow scope of rule, EPA set threshold/cutoff for cost effective in proposal</li><li>• Choice of which sources to make reductions including mobile sources per section 177 and 172</li><li>• Allow time for states to act before FIP</li></ul>

## ***Information Provided EPA on Proposal Rule***

- Industry surveyed members on existing NOx controls, NOx levels, fuels used, controls in place, etc. – major effort in short time
- Inventory adjustments/improvements – duplicates, misclassification of units, or not power boilers
- Modeling discrepancies – replicated analysis with correct data using EPA's Air Quality Assessment Tool (AQAT)

# Non-EGU Screening Inventory Development of Baseline Emissions Unit List





## Specific Inventory Adjustments – Removed from EPA Baseline

Ultimate Analysis – 11 units removed from the baseline

- Six units are Recovery Furnaces, not boilers
  - Three units burning biomass so should be excluded
  - One unit has controls already so no “controllable” emissions
  - One unit not in the 2017 NEI
- 
- In addition, many boilers have less than 100 TPY NO<sub>x</sub>
    - Alternative analysis shows even less impact



## Analysis Provided to EPA in September 2022: **Not impactful**

State	Oxone Non-Attainment Receptor Location	Non-EGU EPA Screening Document (ppb)		With NCASI Adjusted Inventory (ppb)	With Adjusted Inventory + Remove Units with <100 TPY NOx (ppb)
IL	Chicago/Alsip	0.0352		0.0323	0.0317
IL	Chicago/Northbrook	0.0425		0.0396	0.0389
TX	Galveston	0.0430		0.0408	0.0382
CT	Greenwich	0.0279		0.0149	0.0148
TX	Houston/Aldine	0.0147		0.0142	0.0128
WI	Kenosha	0.0102		0.0077	0.0076
CT	New Haven	0.0349		0.0214	0.0213
PA	Philly-Bristol	0.0135		0.0107	0.0106
WI	Racine	0.0098		0.0073	0.0072
WI	Sheboygan	0.0133		0.0097	0.0097
CT	Stratford	0.0328		0.0195	0.0193
CT	Westport	0.0256		0.0156	0.0155
Receptor Count >0.01		11		9	9
Max Receptor		0.0430		0.0379	0.0322

## ***Pulp and Paper Boiler NOx Control Challenges***

- NOx limits are likely to force application of Selective Catalytic Reduction (SCR) on coal boilers and some gas boilers
  - Pulp and paper boilers have not implemented SCR
  - Need to reheat stack gas to make work
  - Regional Haze four factor analyses and historical RACT/BACT analyses have shown SCR is not reasonable
- Implementation of Selective Non-Catalytic Reduction (SNCR) on solid fuel boilers does not achieve a high control efficiency
  - Boilers swing with production and steam demand
- Disbenefits – ammonia slip, GHG increases, CO increase with NOx reductions

## ***Cost Analysis Showing Not Cost Effective***

### **AF&PA Survey and Analysis**

- Reviewed available data from NCASI, NEI, and other sources to build boiler list
- Excluded small units, biomass units, recovery boilers
- Identified 48 of 100 fossil fuel boilers that need controls (SCR or LNB/FGR) based on lb/MMBtu
  - EPA only identified 25 boilers
- Reduced NOx to 80% of the proposed emission limit – not by % control (as EPA assumed)
- Three times the cost! \$98 M vs \$30 M annually

	<b>Fossil boilers</b>	<b>Controlled boilers</b>	<b>Method</b>	<b>NOx tons reduced</b>	<b>Annual cost</b>
<b>EPA Analysis</b>	69	25	CoST and NEI	3,305	\$30 million
<b>AF&amp;PA Analysis</b>	99	47	Cost Manual and updated inventory	2,588	\$98 million

## ***Cost Ineffectiveness: Detailed Analysis***

- EPA used CoST to estimate effectiveness – better approach is to use EPA’s Control Cost Manual
- AF&PA estimated costs for 250 MMBtu/hr coal and gas units
- Controls are not cost effective – \$38K/ton vs \$7,500/ton threshold
  - 10x higher than EPA estimated

	Capital Cost per unit	Annual Cost per unit	Total Capital Cost	Total Annual OS cost	\$/ton
EPA Analysis	CoST	CoST	CoST	\$30 million	\$3,807
AF&PA Analysis - coal SCR	\$28 million	\$2.6 million	\$700 million	\$98 million	\$37,900
AF&PA Analysis - gas SCR	\$10 million	\$2.1 million			
AF&PA Analysis - LNB/FGR	\$4.7 million	\$1.1 million			

## Cost Effectiveness Comparison - Extended

- Even alternative scopes of coverage, boiler controls are not cost effective
- Limiting to larger boilers or certain fuels still exceeds EPA's cost effectiveness threshold (and still are not “impactful” to downwind areas)

Scenario	# of Boilers with control cost	# Mills with control cost	Ozone Season tons NOx reduced	Ozone Season Operating Cost	Ozone Season Annual Cost	Ozone Season \$/ton
Proposed Rule	47	32	2,588	\$ 45,000,000	\$ 98,000,000	\$ 37,900
250 MMBtu and up	22	19	1,956	\$ 27,500,000	\$ 63,000,000	\$ 32,400
Just gas boilers	36	26	1,546	\$ 29,500,000	\$ 55,600,000	\$ 36,000
Just coal boilers	10	8	1,011	\$ 144000,000	\$ 40,000,000	\$ 40,000
Just coal 250 MMBtu and up	6	6	953	\$ 11,500,000	\$ 32,000,000	\$ 33,700

## *Wrap- Up/Summary*

- Analysis shows, paper boilers do not meet criteria of significant impact on downwind ozone non-attainment areas as part of Step I analysis
- Nor do paper mill boilers meet EPA's criteria for cost effectiveness as part of Step III analysis – exceed by a factor of five!
- Exclude paper boilers from Tier II of final rule

## If Ten Closed Units are also removed from Baseline: Further support for not being “impactful”

- No NOx reductions will come from these units – some even demolished or mill closed
- Ten (10) Units or Facilities Shutdown:
  - Paperworks Industries Inc Unit ID 65400113
  - International Paper Unit ID 80386613
  - WestRock CP LLC Unit ID 80642113
  - Wausau Paper Towel & Tissue, LLC Unit ID 4023413
  - Domtar Paper Company, LLC Unit ID 35469313
  - Resolute Forest Products Unit ID 16713213
  - Wisconsin Rapids Paper Unit ID 125447913, Unit ID 125447213
  - Georgia Pacific Consumer Products Unit ID 30874113
  - Green Bay Packaging Inc Unit ID 30879813
  - Flambeau River Papers LLC Unit ID 65185213

## Additional Analysis – Excluded closed units as well

State	Receptor	EPA Non-EGU Screening Document (ppb)		With Adjusted NCASI Inventory (no closed units) (ppb)	With Adjusted Inventory + Remove Units with <100 TPY NOx (ppb)
IL	Chicago/Alsip	0.0352		0.0259	0.0248
IL	Chicago/Northbrook	0.0425		0.0312	0.0298
TX	Galveston	0.0430		0.0379	0.0322
CT	Greenwich	0.0279		0.0230	0.0227
TX	Houston/Aldine	0.0147		0.0135	0.0106
WI	Kenosha	0.0102		0.0069	0.0066
CT	New Haven	0.0349		0.0281	0.0275
PA	Philly-Bristol	0.0135		0.00998	0.00950
WI	Racine	0.0098		0.0065	0.0062
WI	Sheboygan	0.0133		0.0086	0.0083
CT	Stratford	0.0328		0.0265	0.0259
CT	Westport	0.0256		0.0207	0.0202
Receptor Count >0.01		11		8	8
Max Receptor		0.0430		0.0379	0.0322