

A More Stringent PM_{2.5} NAAQS: What It Means for You and How Best to Reduce the Impact

**Manufacturers' Education Council
33rd Annual Sustainability & Environmental Health & Safety Symposium
March 19, 2024**

**Sean Alteri, Director of Environmental Permitting and Regulatory Affairs, Nucor
Jennifer Cave, Attorney, Stites & Harbison PLLC
Tony Schroeder, Principal Consultant, Trinity Consultants**

Agenda

- ▶ NAAQS Background and History
 - ▶ 2024 NAAQS Rule Development
 - ▶ PM_{2.5} Air Quality Trends
 - ▶ PM_{2.5} NAAQS Impacts
 - ▶ Permitting Strategies
 - ▶ PM_{2.5} Modeling and NAAQS
 - ▶ U.S. EPA PM_{2.5} Modeling Guidance
-

Jennifer J. Cave, Stites & Harbison PLLC

Jennifer currently serves as chair of Stites & Harbison PLLC's Environment, Energy, and Sustainability Practice Group where she works closely with businesses to ensure compliance with local, state, and federal environmental laws and regulations. She regularly advises clients on air quality, water, and solid and hazardous waste permitting and compliance. She also regularly defends clients in administrative, civil, and criminal environmental enforcement actions.





Sean Alteri, Nucor Corporation

- ▶ Serves as the Director of Environmental Permitting and Regulatory Affairs for Nucor Corporation, North America's largest steel producer and recycler.
 - ▶ Prior to joining Nucor, his environmental experience includes more than 22 years with the Kentucky Department for Environmental Protection
 - ▶ During his career, Alteri testified before the Senate Committee on Environment and Public Works and the House of Representatives' Committee on Energy and Commerce regarding the Clean Air Act
-

Tony Schroeder, Trinity Consultants

- ▶ Principal Consultant in Trinity's Cleveland, OH office
- ▶ With Trinity since January 2003 (21+ years)
 - Part of four Trinity offices during that time
- ▶ Focus areas:
 - Meteorology
 - Air Dispersion Modeling
 - Air Permitting and Compliance
- ▶ B.S. Atmospheric Science – Ohio State
- ▶ M.S. Meteorology – Penn State
- ▶ Certified Consulting Meteorologist and Qualified Environmental Professional



Best Practices in Air Permitting & Compliance ...

A More Stringent PM_{2.5} National Ambient Air Quality Standard (NAAQS):
What it Means for You and How Best to Reduce the Impacts of the Revised
Standard

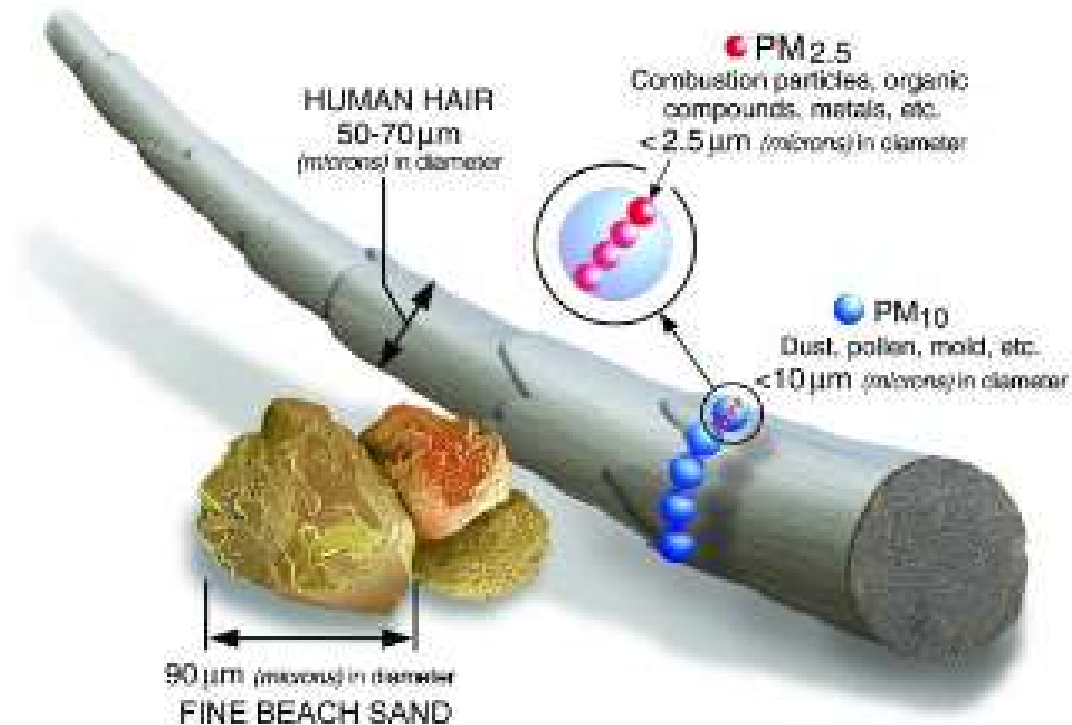
Jennifer Cave



National Ambient Air Quality Standards (NAAQS)

- Nationwide air quality goals (NAAQS) + individual state plans (SIPs) to meet goals
- EPA has promulgated NAAQS for Six Criteria Pollutants
 - Sulfur Dioxide (SO₂)
 - Particulate Matter (PM₁₀ and PM_{2.5})
 - Nitrogen Dioxide (NO₂)
 - Carbon Monoxide (CO)
 - Ozone (O₃)
 - Lead (Pb)


What is Particulate Matter?




Size comparisons for PM particles

Where does air pollution come from?


Air pollution is gases or particles that can harm our health. MAIA is a NASA project that will study the health impacts of the air pollution that comes from particles (called particulate matter or PM). PM is produced by various natural events and human activities, each of which creates different types.




Volcanoes: volcanic eruptions are one source of sulfate particles, though their overall contribution is small.




Traffic: Car exhaust adds black carbon and organic carbon particles to the atmosphere.



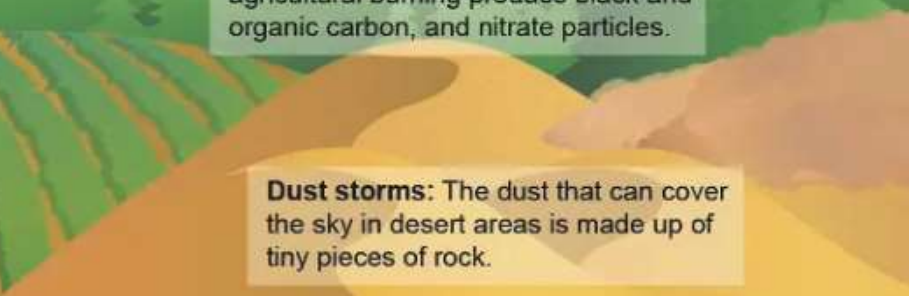
Power: Power generation creates a variety of different types of particles, especially sulfates.



Fires: Wildfires and residential and agricultural burning produce black and organic carbon, and nitrate particles.

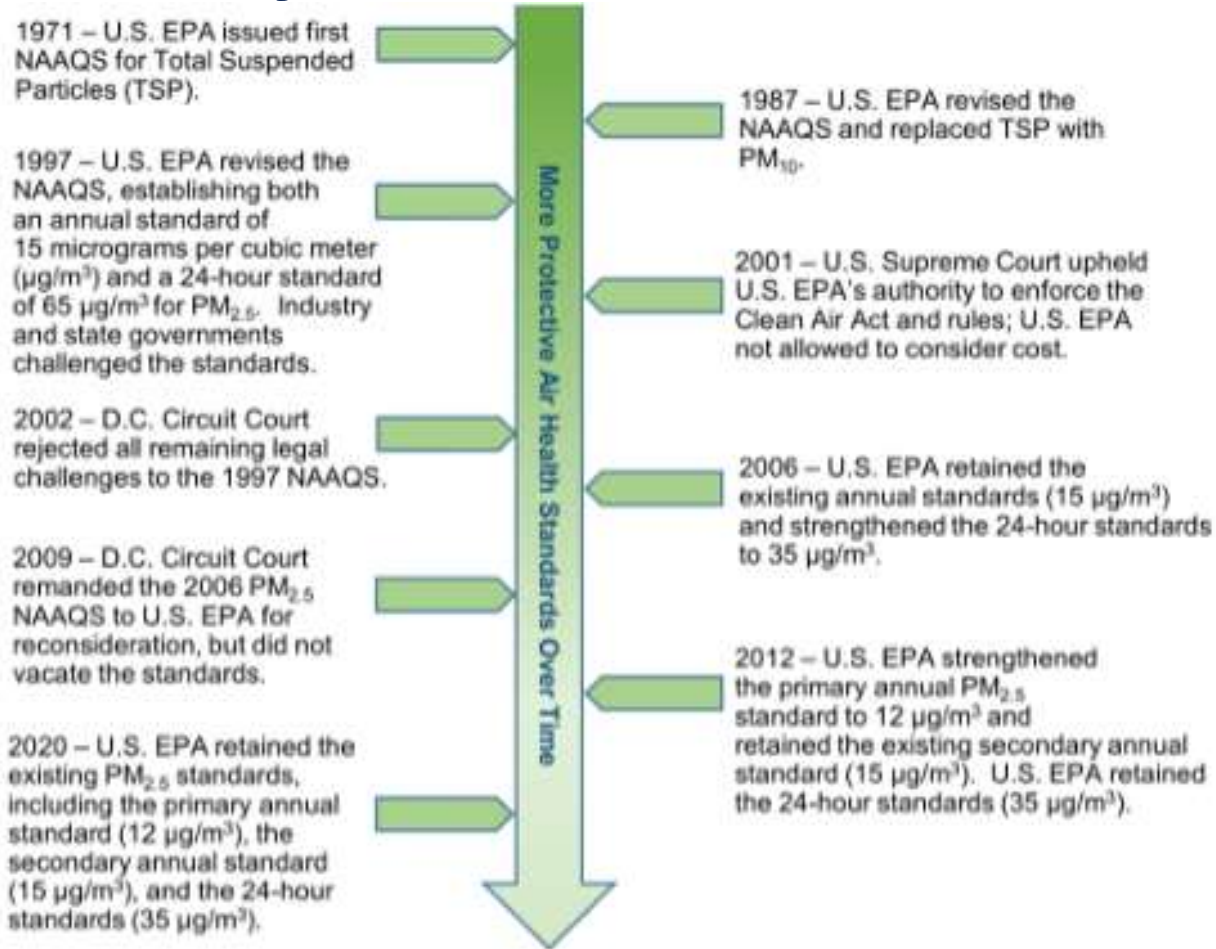


Agriculture: Farming produces nitrate particles from fertilizers and can also kick up dust.

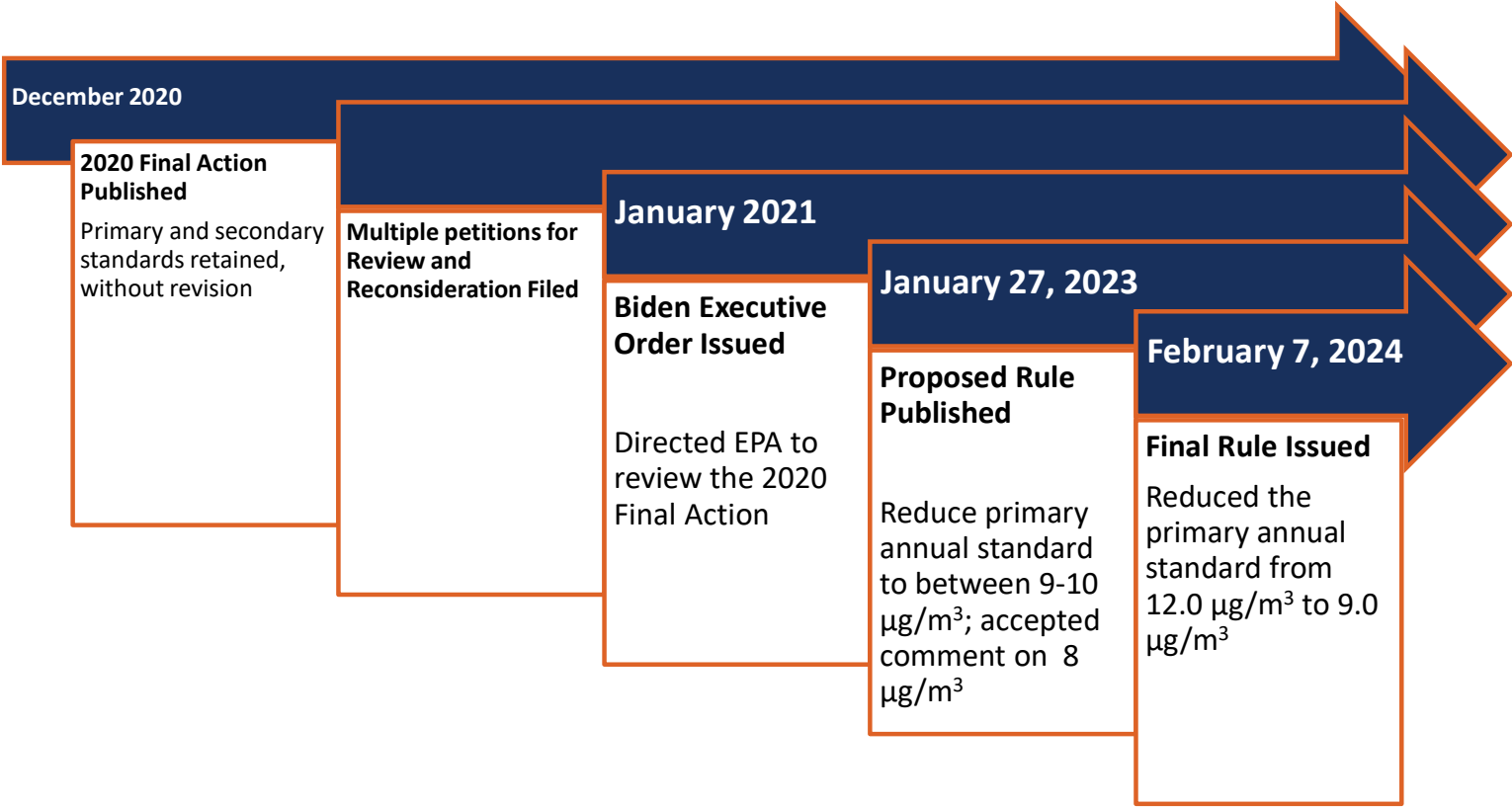


Dust storms: The dust that can cover the sky in desert areas is made up of tiny pieces of rock.

PM NAAQS History



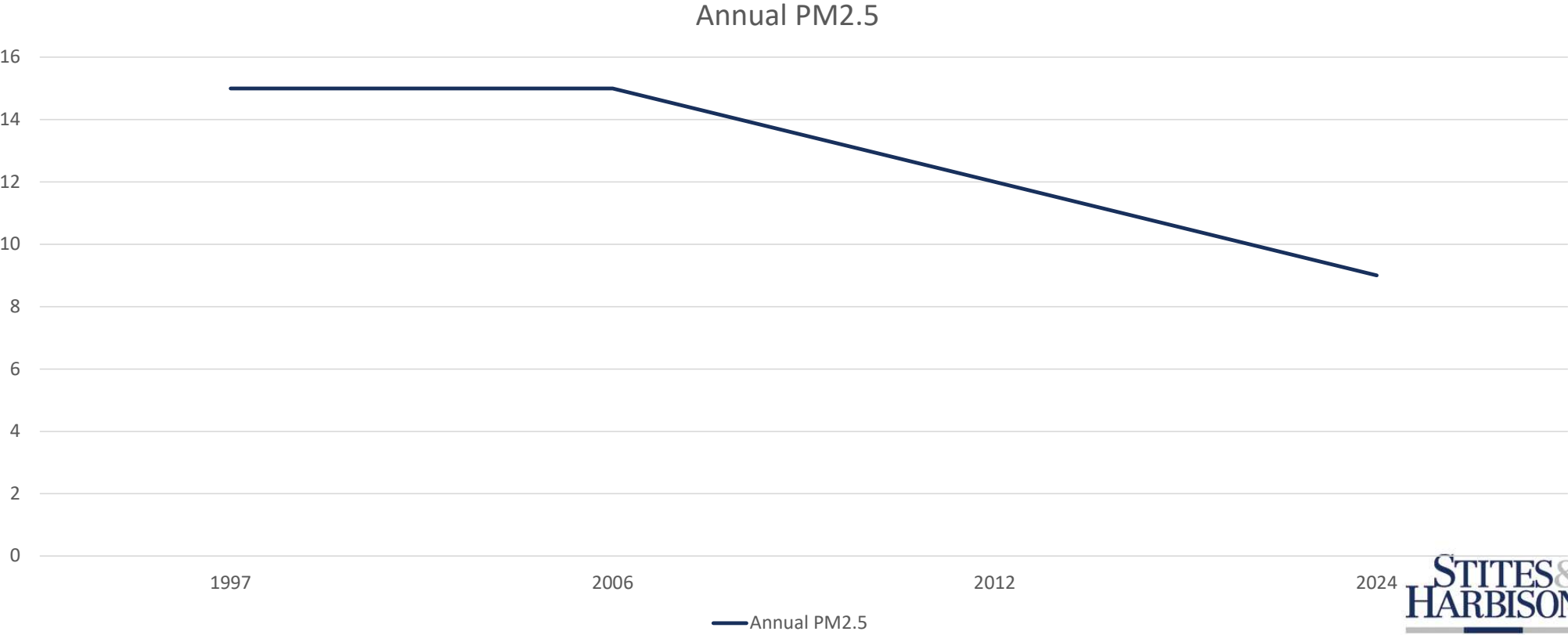
2024 PM_{2.5} NAAQS Final Rule Development



Final 2024 Primary and Secondary PM Standards

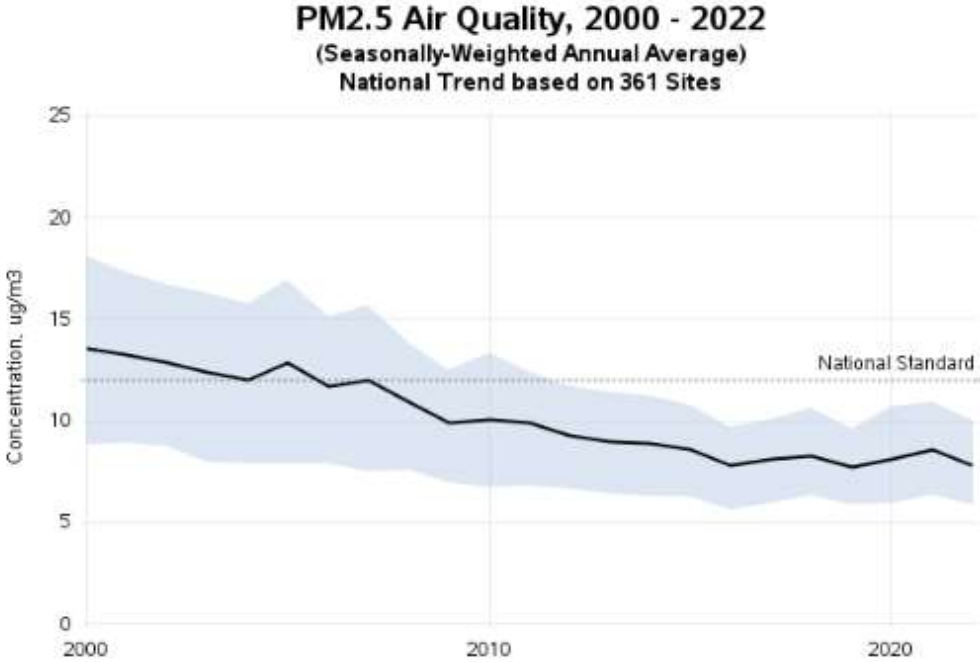
Indicator	Averaging Time	Primary/Secondary	Level	Form
PM _{2.5}	Annual	Primary	9.0 ug/m ³	Annual arithmetic mean, averaged over 3 years
		Secondary	15.0 ug/m ³	
	24-hour	Primary and secondary	35 ug/m ³	98 th percentile, averaged over 3 years
PM ₁₀	24-hour	Primary and secondary	150 ug/m ³	Not to be exceeded more than once per year on average over a 3-year period

History of PM2.5 Annual Standard

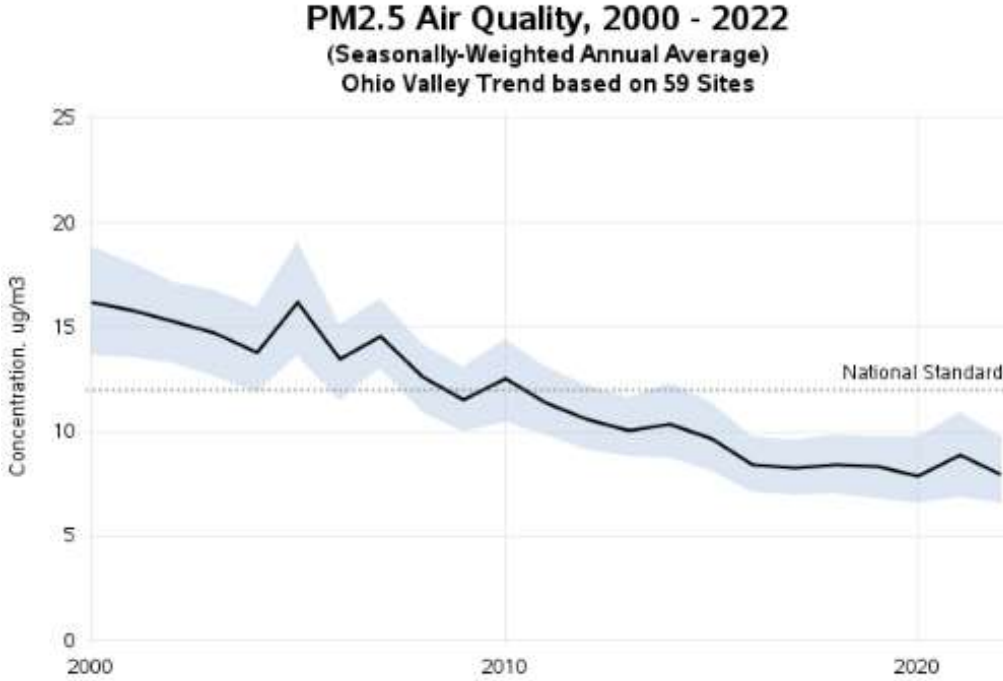


PM_{2.5} Data Analysis

- National



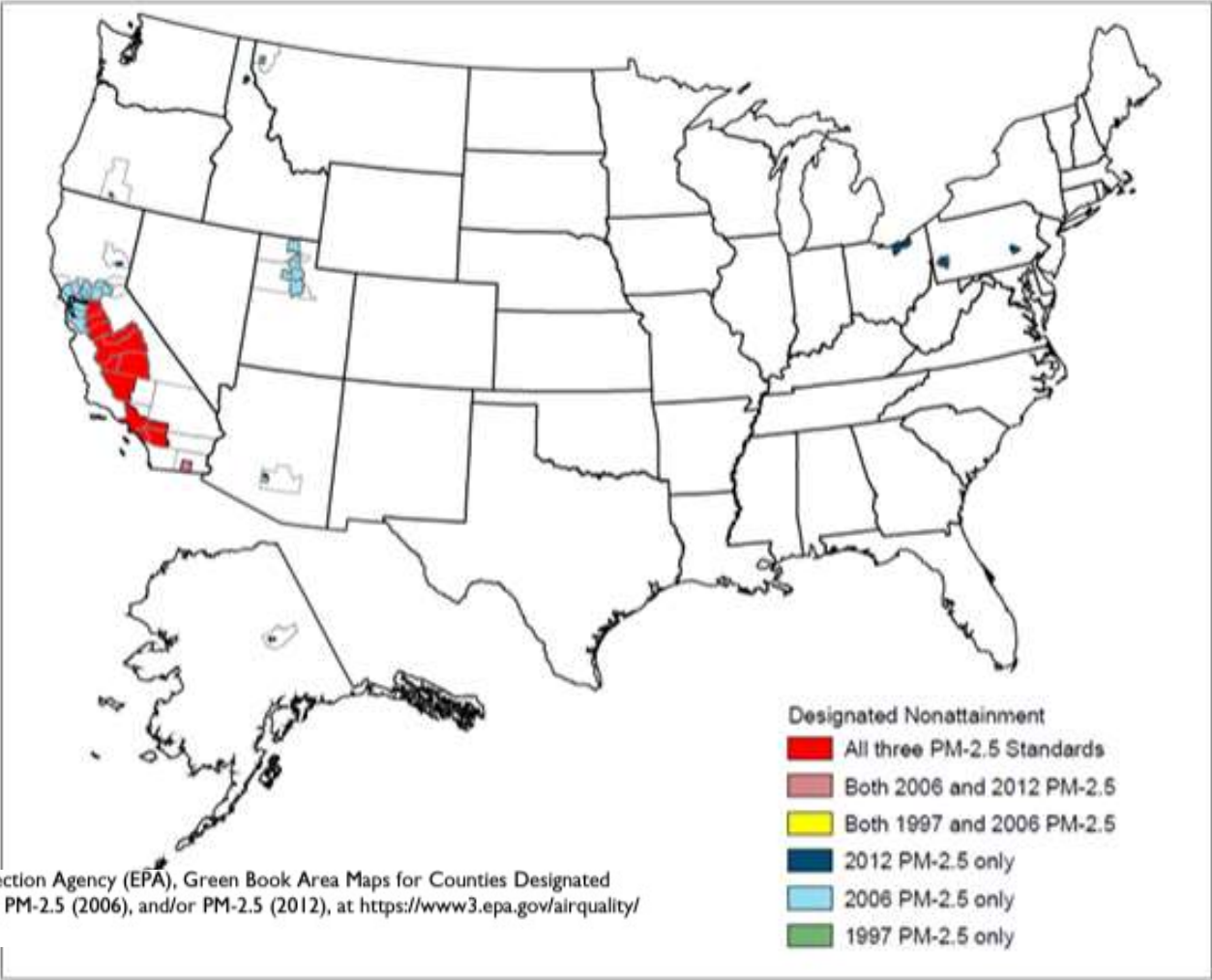
- Ohio Valley Region



Source: <https://www.epa.gov/air-trends/particulate-matter-pm25-trends>

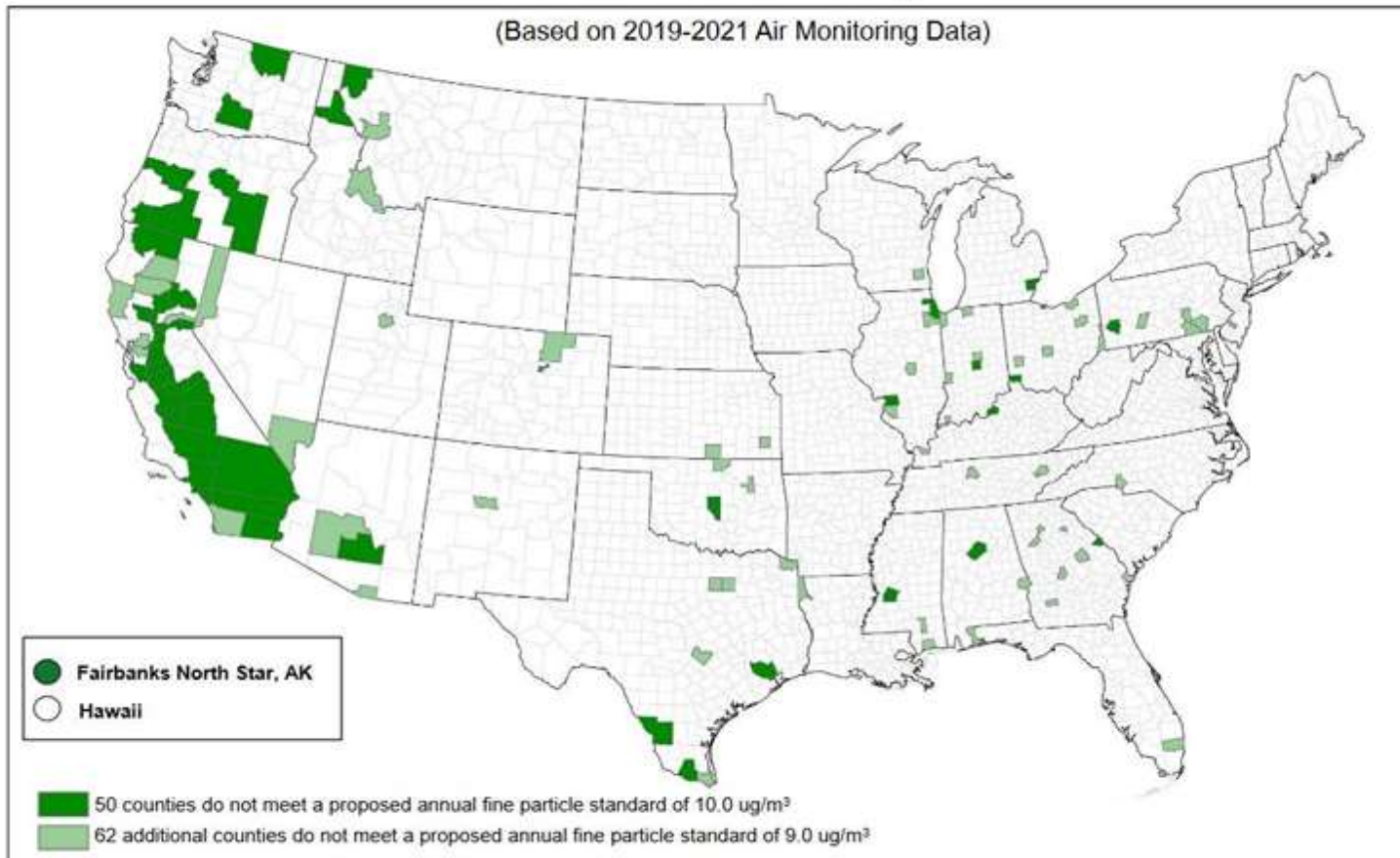
Figure 1. Areas Currently (2023) Designated Nonattainment for a PM_{2.5} Standard

(existing PM_{2.5} include the 1997, 2006, and 2012 standards)



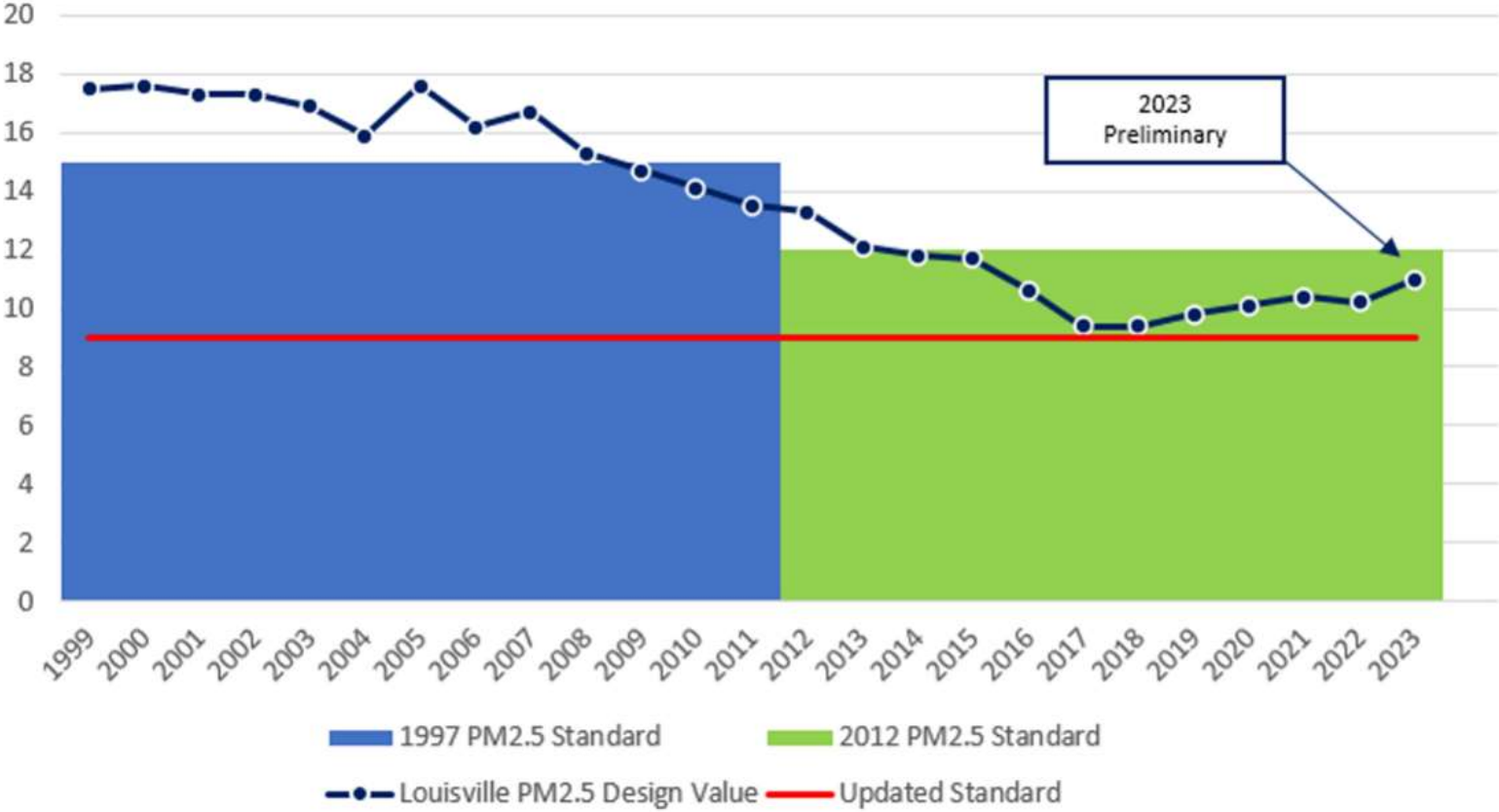
Source: U.S. Environmental Protection Agency (EPA), Green Book Area Maps for Counties Designated Nonattainment for PM-2.5 (1997), PM-2.5 (2006), and/or PM-2.5 (2012), at <https://www3.epa.gov/airquality/greenbook/mappm25both.html>.

Figure 2. Areas That Would Likely Not Meet the Proposed PM_{2.5} NAAQS Based on Their 2019-2021 Design Values



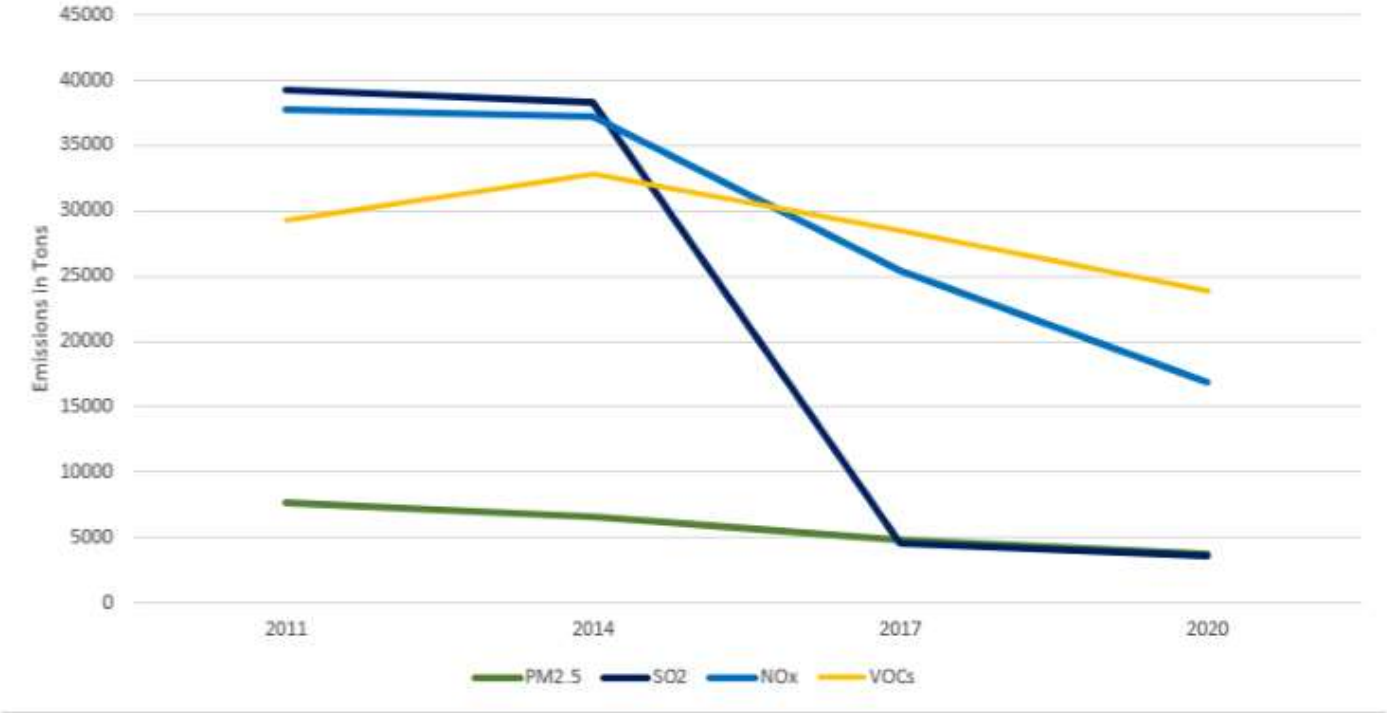
Source: U.S. Environmental Protection Agency (EPA), Proposed Decision for the Reconsideration of the National Ambient Air Quality Standards for Particulate Matter (PM), at <https://www.epa.gov/system/files/documents/2023-01/PM%20Maps%20-%202022%20proposal%20%282%29.pdf>.

LMAPCD PM_{2.5} NAAQS Trends



Source: <https://louisvilleky.gov/air-pollution-control-district/document/apcd-february-2024-board-presentation-2023-annual-report>

Emissions of PM_{2.5} From Permitted Sources in LMAPCD Decreasing

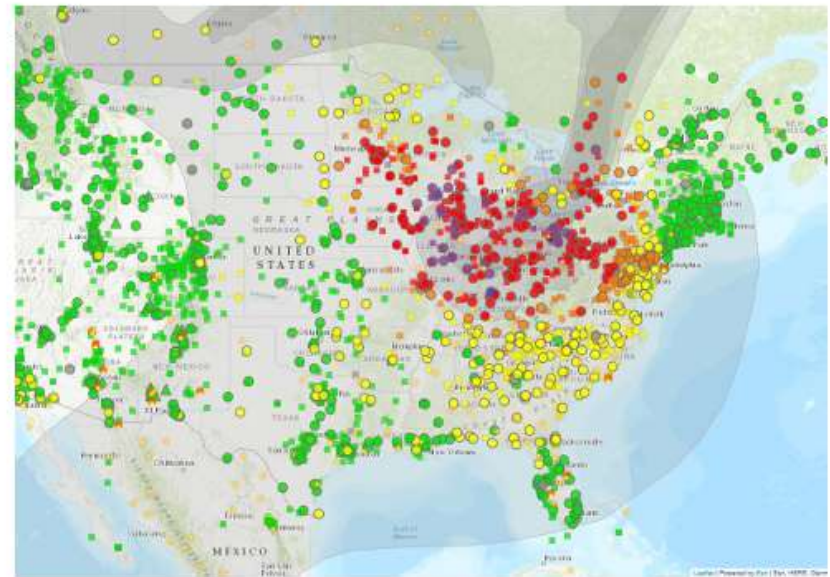


Summer 2023 Wildfire Smoke Impacts on PM_{2.5} Air Monitoring Data

- In June and July, Louisville experienced 16 days that were "unhealthy for sensitive groups" and one that was "unhealthy" due to either ozone, PM_{2.5}, or both.
- Six in same period in 2023.



Hazy day at APCD Monitoring Site



AirNow Fire & Smoke Map Screenshot
6/28/2023

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Best Practices in Air Permitting & Compliance

A More Stringent PM_{2.5} National Ambient Air Quality Standards

What it Means for You and How Best to Reduce the Impact of the Revised Standard

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OUR MISSION



OUR MISSION

**GROW THE CORE
EXPAND BEYOND
LIVE OUR CULTURE**

OUR CHALLENGE IS TO
BECOME THE WORLD'S SAFEST STEEL COMPANY.

WE LIVE EACH DAY WITH **GRATITUDE**
FOR THE FAMILIES, CUSTOMERS AND
PARTNERS THAT MAKE OUR WORK POSSIBLE.

NUCOR®

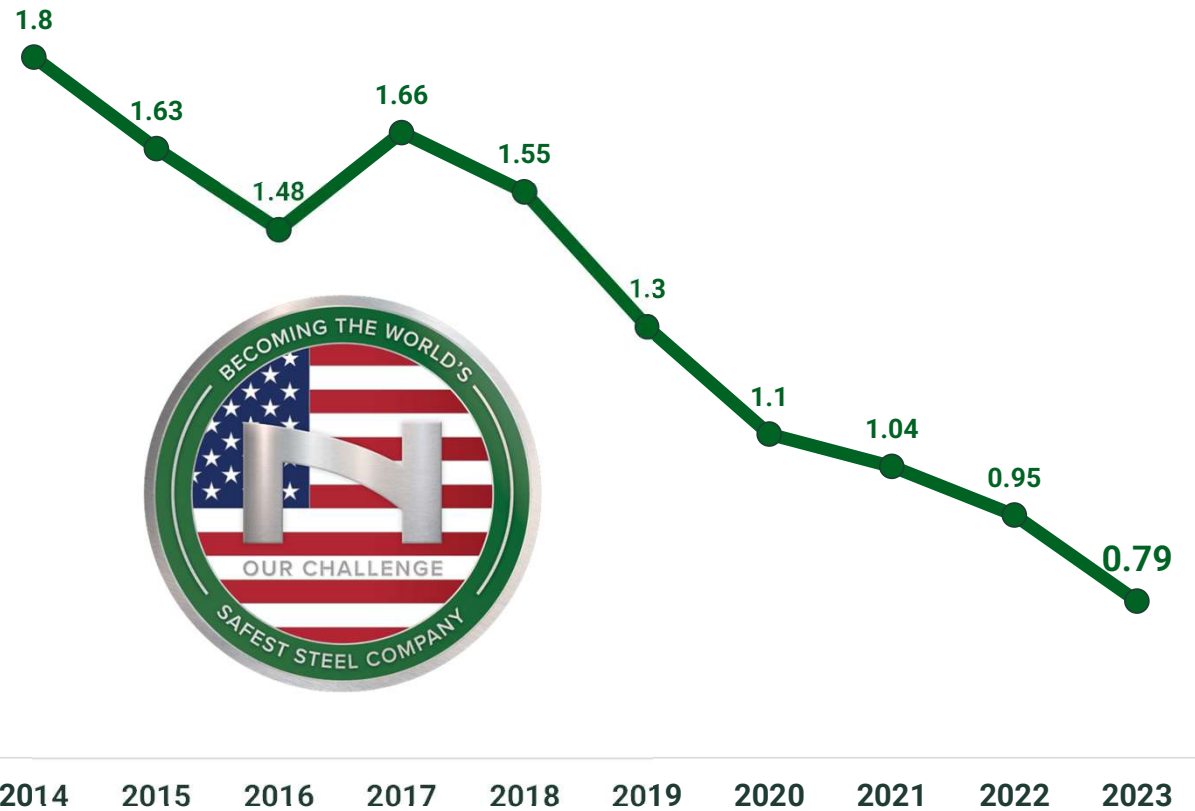


NUCOR®

SAFETY – OUR #1 VALUE

**2023
SAFEST YEAR
IN COMPANY
HISTORY**

Nucor Injury & Illness Rates (All Nucor): 2014 – 2023
OSHA Recordables per 200,000 hours/year



NUCOR OVERVIEW

- North America's largest steel producer & recycler of any material
- One of world's cleanest and most efficient steelmakers
- High-paying, high-quality American manufacturing jobs
- #102 in FORTUNE 500 list of largest public U.S. companies (2023)

- Produces ~1/4 of all steel in US
- Market cap is greater than the next 3 US producers **combined**

- 79% average recycled content
- Among Top 5 recyclers globally
- GHG's 60% lower than global avg

- 3-year avg. teammate pay (not including officers): **\$125k+/yr.**
- \$959M was returned to our teammates in 2022 profit sharing

- #1 Metals Company: Fortune's Most Admired Companies
- Manufacturing & Production: Fortune's Best Workplaces



NUCOR TODAY

26
STEEL MILLS

300+
TOTAL FACILITIES

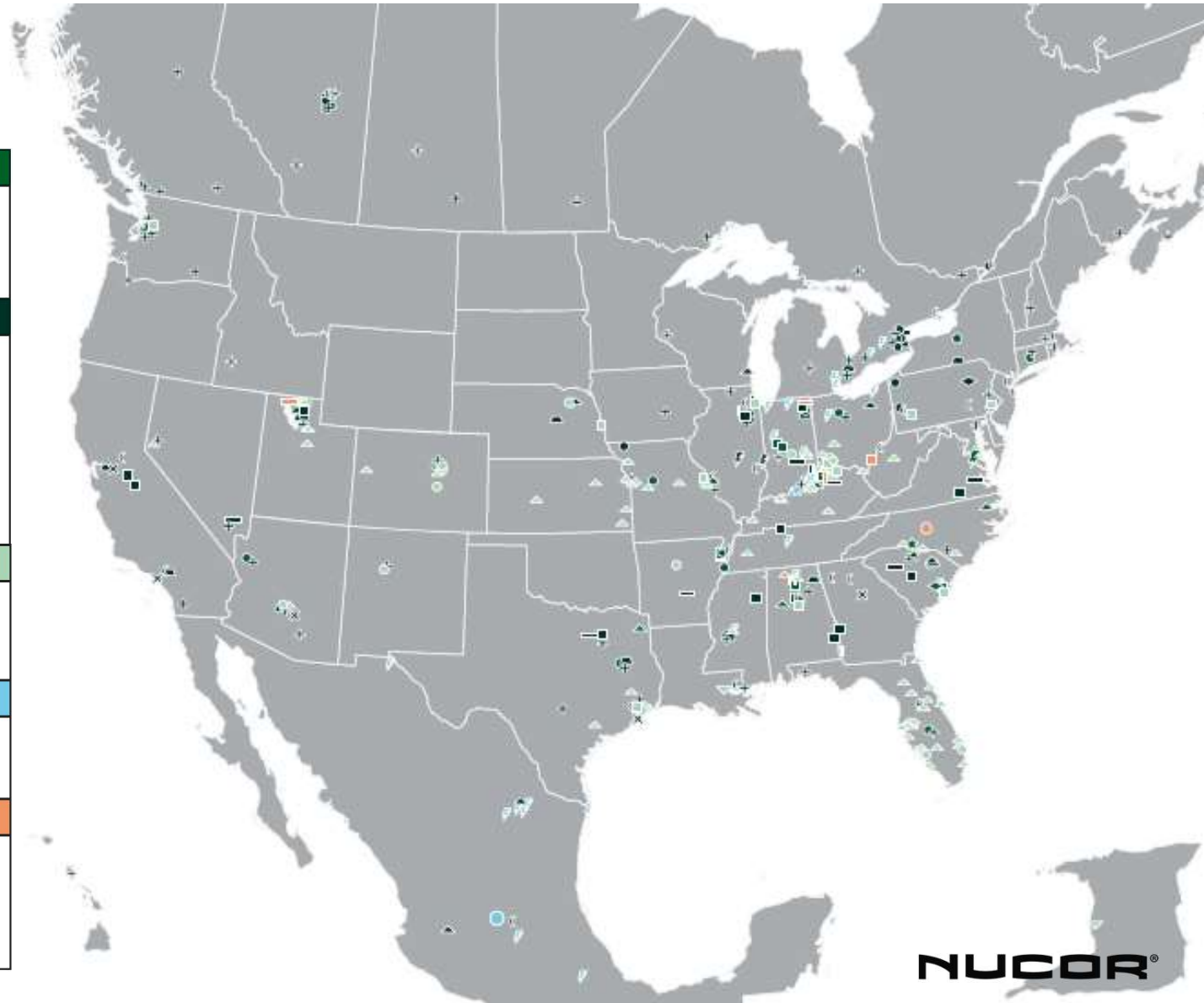
20M+
TONS RECYCLED/YEAR

25.2M
TONS SHIPPED (2023)

32,000
TEAMMATES

\$34.7B
NET SALES (2023)

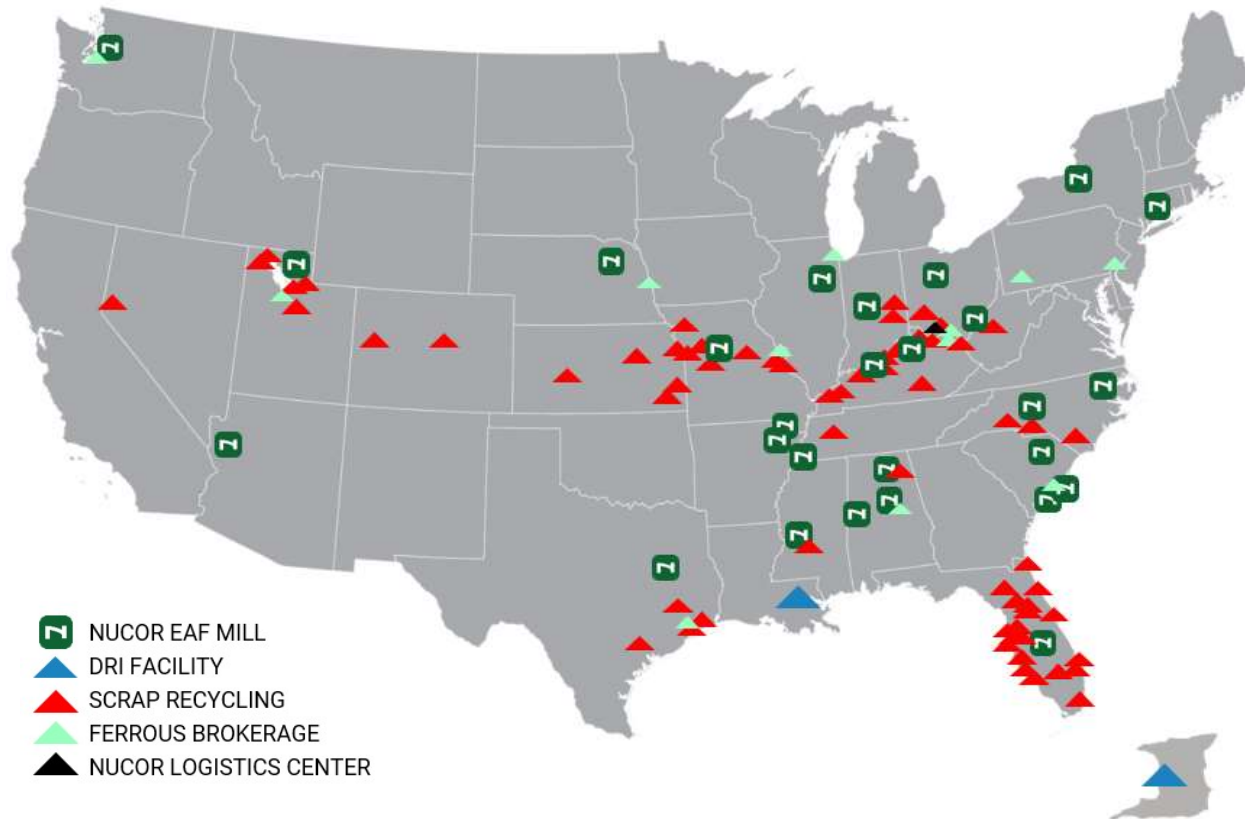
STEEL MILLS
● BAR MILLS
■ SHEET MILLS
◆ BEAM MILLS
▲ PLATE MILLS
⚡ NUCOR PUBLIC AFFAIRS OFFICE
★ NUCOR CORPORATE OFFICE
STEEL PRODUCTS
⊕ REINFORCING PRODUCTS
■ BUILDINGS GROUP
■ VULCRAFT & VERCO
▲ COLD FINISH
● STEEL MESH, GRATING, & FASTENERS
⚡ HARRIS CORPORATE OFFICE
⊕ SKYLINE FACILITIES
★ SKYLINE CORPORATE OFFICE
⊕ TUBULAR PRODUCTS
— INSULATED PANEL GROUP
⊕ RACKING
⚡ OVERHEAD DOORS
⚡ TOWERS & STRUCTURES
RAW MATERIALS
▲ SCRAP PROCESSING
■ BROKERAGE OFFICE
▼ DRI PLANTS
○ OTHER
⊕ DJJ CORPORATE OFFICE
STEEL PRODUCTS JOINT VENTURE
⚡ STEEL TECHNOLOGIES LLC
★ STEEL TECHNOLOGIES LLC CORPORATE OFFICE
⊕ NUCOR-JFE STEEL MEXICO
UNDER CONSTRUCTION
▲ TOWERS & STRUCTURES DECATUR
— NUCOR INSULATED PANELS FACILITIES - INDIANA AND UTAH
⊕ NUCOR TUBULAR GALLATIN
■ NUCOR STEEL WEST VIRGINIA SHEET MILL
○ NUCOR STEEL LEXINGTON BAR MILL



NUCOR®

NUCOR RAW MATERIALS

- Nucor is the largest recycler of any material in North America
- Nucor steel produced from nearly 80% recycled content, with some products containing close to 100% recycled content



SCRAP RECYCLING & FERROUS BROKERAGE

- 70 full-service scrap recycling facilities strategically located to offer regional advantages in sourcing a wide range of ferrous and nonferrous metals

DIRECT REDUCED IRON (DRI)

- 2 facilities producing up to 4Mtpa of high-quality DRI, a key raw material for Nucor's steelmaking operations

UNIVERSAL INDUSTRIAL GASES (UIG)

- 5 industrial gas plants currently in operation, with more in various stages of development

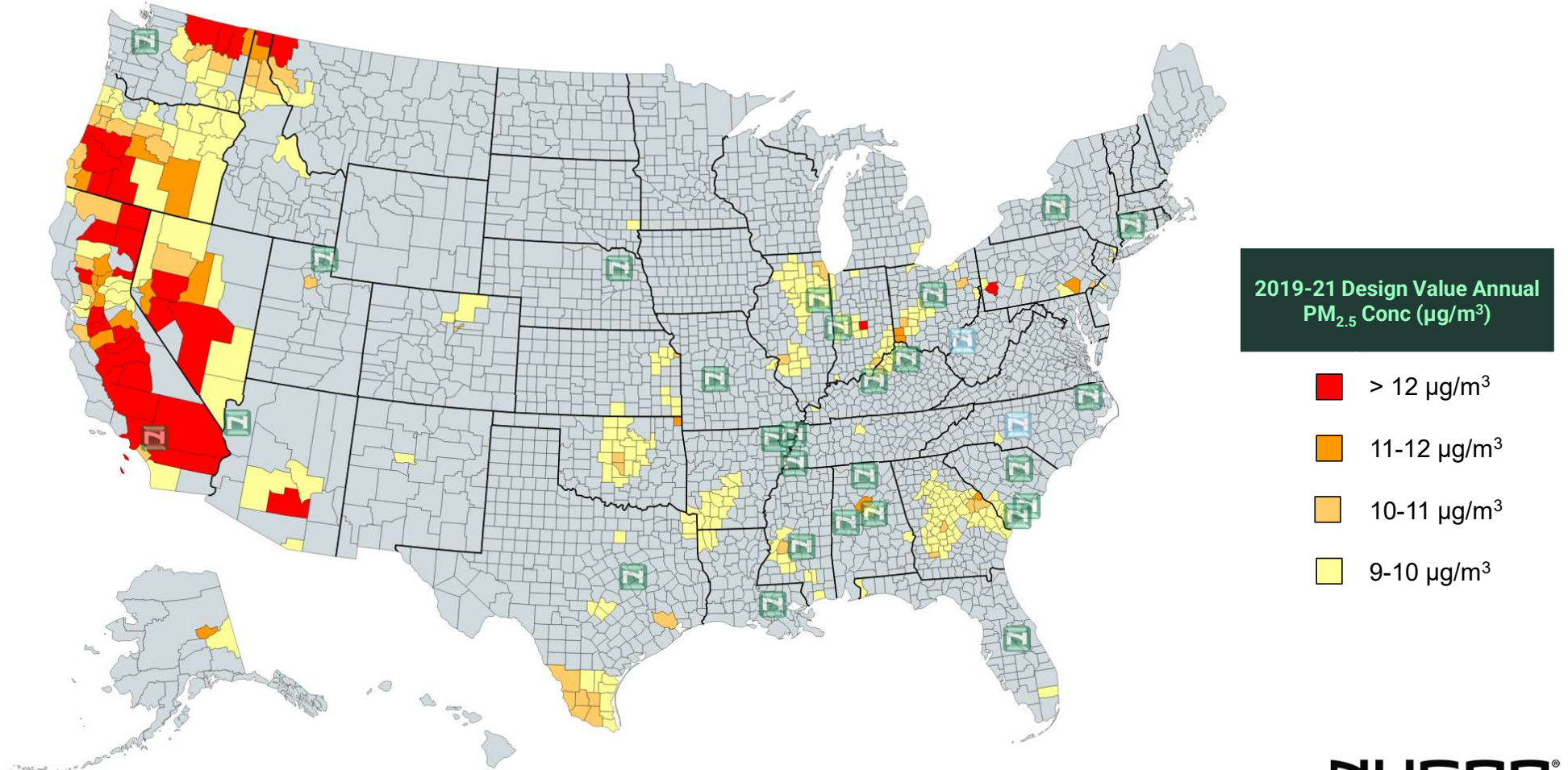
LOGISTICS TEAM

- 30 teammates with expertise in barge, rail and truck – all geared to deliver raw materials to Nucor mills in most efficient manner

NUCOR[®]

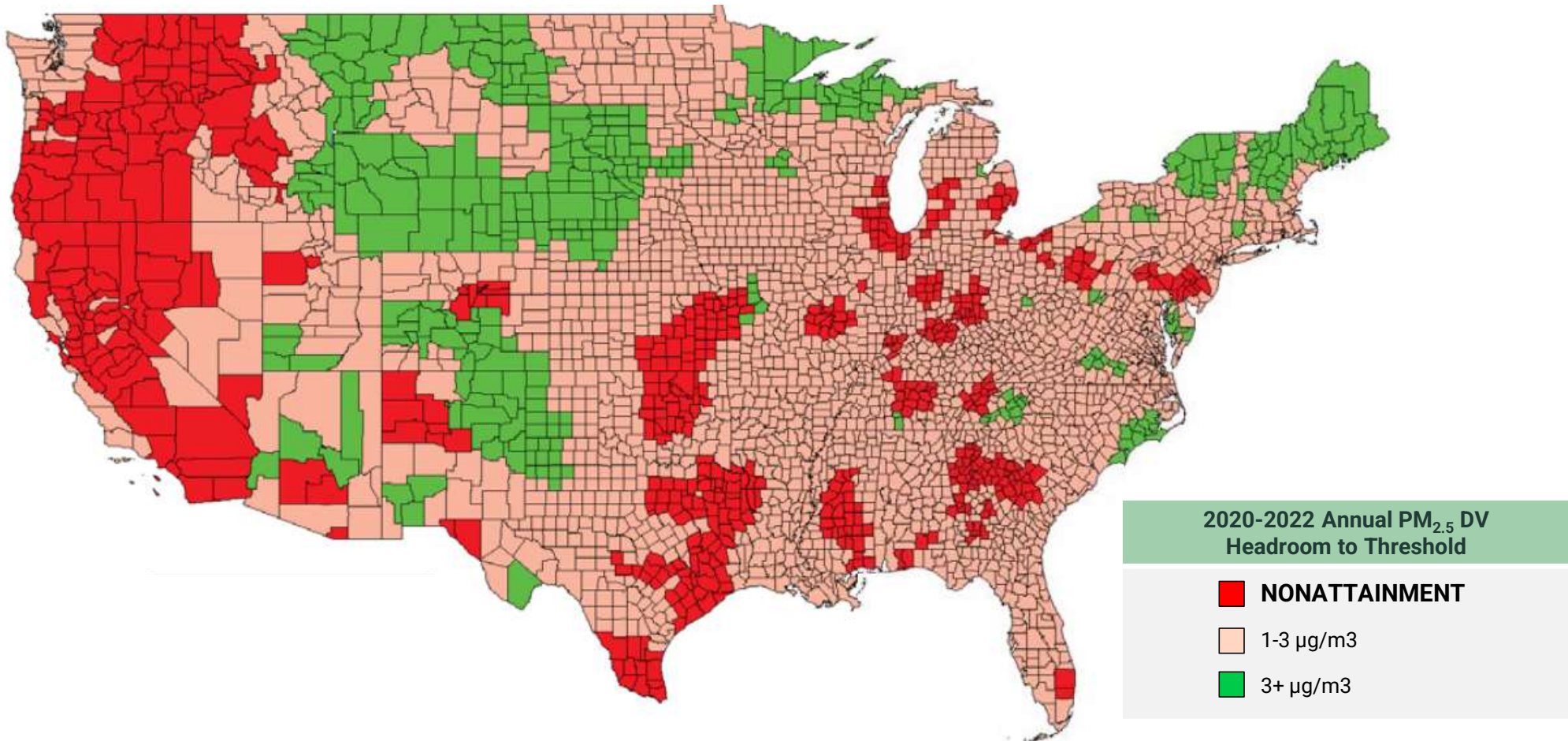
PM_{2.5} IMPACTS

ANNUAL AVERAGE PM_{2.5} DESIGN VALUES



IMPACT OF REVISION

ANNUAL AVERAGE PM_{2.5} DESIGN VALUE $\geq 9 \mu\text{g}/\text{m}^3$



EPA PM_{2.5} RULE UPDATE - IMPACTS

IMMEDIATE IMPACTS

- To receive a new PSD air permit (and minor permits in some areas):
 - ✓ Facilities must demonstrate compliance with the new PM_{2.5} standard through an air dispersion model in PSD applications
 - ✓ Timing: May 6, 2024 (effectively **now**, unless a draft permit is already issued – No Grandfather provisions)

LONG-TERM IMPACTS

- Governors are required to submit initial designation recommendations no later than 1 year of promulgation, or by February 7, 2025.
- EPA has two years to designate non-attainment areas and there will be an opportunity to influence process with states – February 6, 2026
 - ✓ Ambient data spikes due to wildfires will be challenging
- To obtain a permit in a non-attainment area, **lowest available emission reduction technology (LAER)** must be employed, and **offsets** must be available in the area
- States will have 18 months to develop plans to bring non-attainment areas into attainment that will include emission reduction plans for existing sources
- Court challenges anticipated; Political climate/election could change course
- https://www.epa.gov/system/files/documents/2024-02/pm-naaqs-designations-memo_2.7.2024-_jg-signed.pdf

PM_{2.5} PERMITTING STRATEGIES

EPA PM_{2.5} PERMITTING STRATEGIES

APPLICABILITY

Emissions Increases Below PSD Thresholds:

- Keep emissions below the PSD thresholds (Engineering Design)
- Evaluate federally-enforceable emission limitations.
- Plant-wide Applicability Limits (PALs)
- Consider net emissions decreases related to the project or offsetting new emissions with reductions elsewhere (Proposed PEA Rule)

Aggregation Rules:

- Understand how emissions are aggregated for PSD purposes
- In some cases, emissions from multiple sources within a contiguous area can be considered as a single project (Nested sources)

Consult with Regulatory Agencies Early:

- Engage with regulatory agencies during project planning
- Seek their guidance on avoiding PSD requirements
- Early collaboration can lead to effective strategies

EPA PM_{2.5} PERMITTING STRATEGIES




MODELING

Air Dispersion Modeling Considerations

- **Air Quality Dispersion Models:**
- **Emission Inventory and Source Characterization:**
- **Model Selection and Calibration:**
- **Meteorological Data Input:**
- **Spatial and Temporal Resolution:**
- **Sensitive Receptor Locations:**
- **Control Measures and Mitigation Options:**
- **Risk Assessment and Health Impact Analysis:**
- **Documentation and Transparency:**
- **Consultation with Regulatory Agencies:**

FEDERAL INITIATIVES AND GOALS

FEDERAL INITIATIVES REQUIRE STEEL

KEY INITIATIVES	FEDERAL FUNDING PROGRAMS	EST. INCREMENTAL ANNUAL STEEL*	TIMING CONSIDERATIONS
 <p>INFRASTRUCTURE</p>	IIJA includes <u>new</u> funding of \$550 for transportation & core infrastructure projects	3-5 Mtpa	<ul style="list-style-type: none"> • First wave of new bridge projects is underway • IIJA allocates transportation funding through 2026
 <p>CLEAN ENERGY</p>	IRA includes ~\$370 billion in clean energy tax incentives	2-3 Mtpa	<ul style="list-style-type: none"> • Onshore and offshore wind, solar and power transmission/grid • Most large utilities have 2030 emission reduction goals; net-zero by 2050
 <p>RESHORING</p>	CHIPS and Science Act includes ~\$55 billion to reshore U.S. manufacturing	~0.5 Mtpa	<ul style="list-style-type: none"> • Expect funding for over 30 advanced mfg. projects over next decade • Steel intensive projects with average cost of ~\$10 billion
~\$975 BILLION		~5-8 Mtpa	Incremental annual steel demand over next decade

Our modern economy will continue to be built with steel, and the steel it is built with **matters**. The bottom line is that customers using American steel from a recycled source are choosing to reduce the world's greenhouse gas emissions **by a factor of two to four**.

* Estimated incremental steel demand measured in million of tons per annum (Mtpa)

U.S. ADVANCED MANUFACTURING & INFRASTRUCTURE RENAISSANCE IS STEEL INTENSIVE

PHARMACEUTICALS



EV/BATTERY



SEMICONDUCTORS



GRID MODERNIZATION



ROADS & BRIDGES



CLEAN ENERGY





NUCOR®

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PM_{2.5} (and Ozone) Permit Modeling Guidance

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Tony Schroeder, CCM, QEP – Principal Consultant



trinityconsultants.com

The Revised NAAQS and Modeling for Permitting

- ▶ Two main potential pathways, each with differing challenges
 - New Source Review/PSD permitting exercises
 - ◆ PSD permit applications in progress/submitted “soon”
 - ◆ PSD permit extensions
 - State/permitting authority driven minor source permit modeling requirements
 - ▶ PSD procedures/timing considerations well defined – minor source permit modeling requirements could be very case-by-case
 - ▶ Coordination with permitting authority contacts regarding minor source permitting requirements will be important, as well as PSD considerations
-

Primary PSD Permitting Based Implications (1 of 3)

- ▶ How will this rulemaking impact current/near term PSD permitting actions?
 - No grandfathering provisions
 - This means any PSD permit not **final** on the effective date of the NAAQS, is required to evaluate compliance with the NAAQS
 - ◆ No draft permit, no submitted application by date, no grandfathering of any kind – permit must be “final” before the effective date of the revised NAAQS
 - So, if you submitted a PSD application showing PM_{2.5} impacts of 9.4 µg/m³, and the NAAQS becomes effective prior to final permit issuance, the permitting authority cannot issue the permit until a complaint modeling demonstration at a level of 9 µg/m³ is provided
 - ◆ A significant risk factor for PSD applications/review in progress
-

Primary PSD Permitting Based Implications (2 of 3)

2019).²²⁵ Based on that court decision, the EPA is not establishing any PSD permitting exemption provision in this action. Some commenters requested that the EPA provide the same kind of relief for pending PSD permit applications by extending the effective date of this new revised NAAQS beyond the 60 days that the EPA has traditionally used for such rules. Such comments are addressed in the Response to Comments portion of this action. The EPA is making this revised primary annual PM_{2.5} NAAQS effective in 60 days.

From February 7, 2024 pre-publication version

Primary PSD Permitting Based Implications (3 of 3)

- ▶ You've got a PSD permit, but you need to extend the permit....
 - Not uncommon to request at least a first-time extension of the 18-month PSD permit construction window – but now the NAAQS are proposed to be updated...
 - ◆ Addressed in PSD 2014 permit extension guidance
 - ◆ <https://www.epa.gov/nsr/guidance-extension-prevention-significant-deterioration-psd-permits>
 - ◆ EPA addresses on page 6 of the referenced guidance
 - ◆ Indicated as a case-by-case evaluation – no definitive statements one way or the other
 - ◆ Magnitude of emissions, prior modeling results, influence of precursor pollutants, etc. could all play a part in any case-by-case determination
 - ◆ Definitive risk factor to outline/discuss with clients that may be seeking an extension of the PSD permit, which triggered PSD for PM_{2.5} (or its precursors)
-

States with Minor Source Permit Modeling Requirements

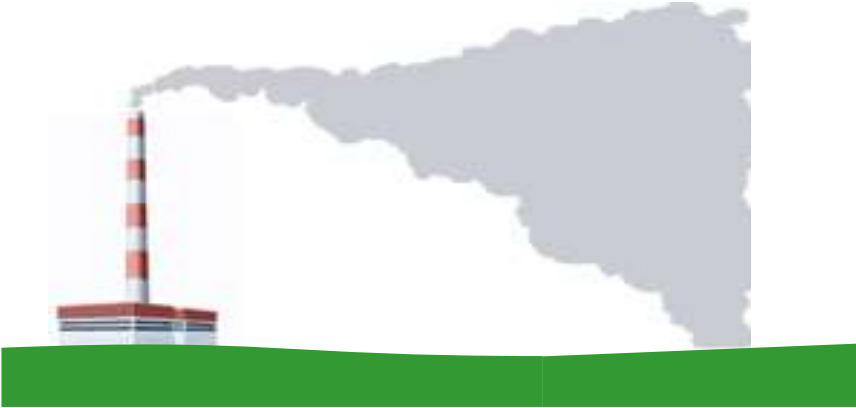
- ▶ Case-by-Case Situation (depending on the agency, how State NAAQS were established, etc.)
 - With a revised NAAQS, agency may not be comfortable issuing even a minor source permit for a project that exceeds Federal NAAQS (before State NAAQS/regulatory updates)
 - Incorporation by reference – do State NAAQS become effective at same time?
 - As with PSD, confer with the local permitting authority for any modeling evaluations for ongoing/planned permit applications
 - Some States have no permit modeling requirements for minor sources (e.g. Indiana, Kentucky, etc.), whereas others do (e.g., Ohio, etc.)
 - ◆ Be sure to confer with the local agency!
-

Permit Modeling Guidance

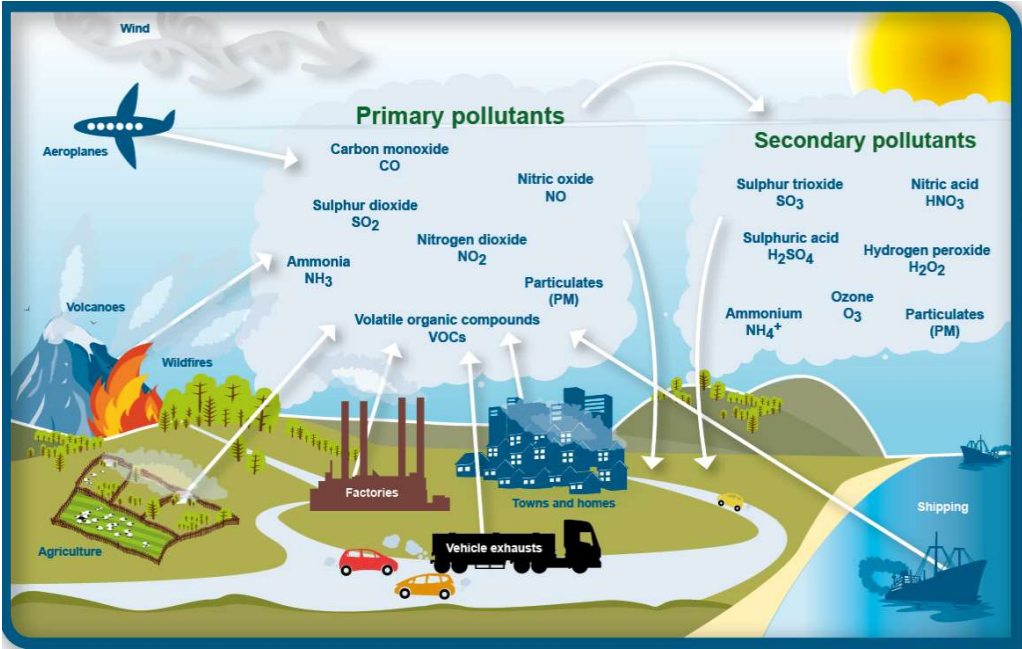
- ▶ *“Guidance for Ozone and Fine Particulate Matter Permit Modeling”*
 - Released by U.S. EPA in final form on July 29, 2022
 - <https://www.epa.gov/scram/guidance-ozone-and-fine-particulate-matter-permit-modeling>
 - ▶ Reflects U.S. EPA’s recommendations for PM_{2.5} and ozone modeling under the PSD program
 - Certain states also rely on this guidance for state-level permit modeling assessments
 - ▶ Ozone and PM_{2.5} are unique because they can form due to chemical reactions in atmosphere
 - Cannot be addressed using AERMOD or its predecessor, ISC
-

AERMOD vs. Photochemical Grid Modeling

AERMOD



PGM



PM_{2.5} NAAQS and Surrogate Policy

- ▶ PM_{2.5} NAAQS first promulgated in 1997
 - ▶ Also in 1997, U.S. EPA released the PM₁₀ surrogate policy
 - If PSD requirements (modeling, BACT) are met for PM₁₀, they are assumed to be met for PM_{2.5}
 - Originally enacted because of various technical issues associated with undertaking a PM_{2.5} analysis
 - ◆ For example, issues with secondary formation, quantification of condensables, etc.
 - ▶ Surrogate policy began to be phased out in late 2000s
 - Modeling and BACT required for project at LG&E Trimble County in Kentucky in 2009
 - Officially ended in 2011
-

Initial Guidance on PM_{2.5} Permit Modeling

- ▶ In 2010, U.S. EPA granted a petition from Sierra Club to develop new analytical techniques for secondary PM_{2.5}
 - ▶ U.S. EPA released *Guidance on PM_{2.5} Permit Modeling* in 2014
 - Recommended that an assessment be completed for direct PM_{2.5} or precursors if exceeding PSD Significant Emission Rate (SER)
 - ◆ E.g., if direct PM_{2.5} > 10 tpy, NO_x < 40 tpy, and SO₂ < 40 tpy, address impacts from direct PM_{2.5} only
 - Also provided three options to address secondary formation:
 - ◆ Qualitative (narrative),
 - ◆ Hybrid qualitative/quantitative (calculations using existing photochemical model data), and
 - ◆ Quantitative (project-specific photochemical grid modeling)
-

2014 Guidance on PM_{2.5} Permit Modeling

Assessment Case	Description of Assessment Case	Primary Impacts Approach	Secondary Impacts Approach
Case 1: No Air Quality Analysis	Direct PM _{2.5} emissions < 10 tpy SER NO _x and SO ₂ emissions < 40 tpy SER	N/A	N/A
Case 2: Primary Air Quality Impacts Only	Direct PM _{2.5} emissions ≥ 10 tpy SER NO _x and SO ₂ emissions < 40 tpy SER	Appendix W preferred or approved alternative dispersion model	N/A
Case 3: Primary and Secondary Air Quality Impacts	Direct PM _{2.5} emissions ≥ 10 tpy SER NO _x and/or SO ₂ emissions ≥ 40 tpy SER	Appendix W preferred or approved alternative dispersion model	<ul style="list-style-type: none"> • Qualitative • Hybrid qualitative / quantitative • Full quantitative photochemical grid modeling
Case 4: Secondary Air Quality Impacts Only	Direct PM _{2.5} emissions < 10 tpy SER NO _x and/or SO ₂ emissions ≥ 40 tpy SER	N/A	<ul style="list-style-type: none"> • Qualitative • Hybrid qualitative / quantitative • Full quantitative photochemical grid modeling

2017 Guideline Revision

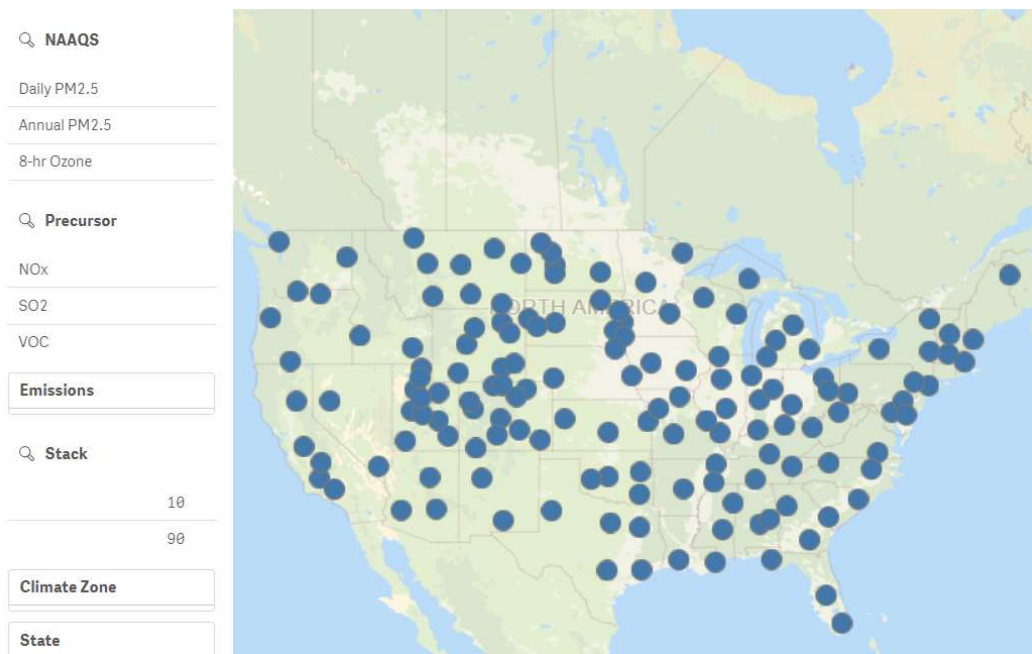
- ▶ In 2017, U.S. EPA revised the *Guideline on Air Quality Models* and included new recommendations for secondary PM_{2.5} and ozone permit modeling
 - Ozone added to guidance using techniques similar to secondary PM_{2.5}
 - ▶ Recommended two-tiered methodology to address secondary formation
 - First tier: technically credible relationships between precursor emissions and impacts
 - Second tier: case-specific photochemical grid model
 - ◆ Expected to be rarely needed
 - ◆ Many, many inputs and complications
-

The MERPs

- ▶ Tier 1 methodology: Modeled Emission Rates for Precursors (MERPs)
 - Initial guidance from U.S. EPA in 2016; revised in April 2019
 - ▶ MERPs are emission rate that results in maximum ambient concentration that equals the Significant Impact Level (SIL)
 - ▶ Project-specific concentrations can be calculated based on the ratio of the project emissions increase to the MERP
 - Project impact ($\mu\text{g}/\text{m}^3$) = SIL ($\mu\text{g}/\text{m}^3$) x Project Emissions Increase (tpy) / MERP (tpy)
 - ▶ Developed based on PGM modeling completed for hypothetical sources of emissions
-

The MERPs

- ▶ Ratios of NO_x , SO_2 , and VOC emissions to secondary $\text{PM}_{2.5}$ and ozone available on U.S. EPA's MERPs Qlik website
 - Ratios vary by location, stack height, and emission rate
 - ◆ Chose most appropriate value to represent your project



<https://www.epa.gov/scram/merps-view-qlik>

The MERPs

► Worst case MERPs

- Emission rates resulting in concentration equal to SIL

Pollutant/ Averaging Period	Precursor	Worst Case MERP (tpy)
PM _{2.5} – 24-hour	NO _x	1,073
PM _{2.5} – 24-hour	SO ₂	188
PM _{2.5} – Annual	NO _x	3,182
PM _{2.5} – Annual	SO ₂	859
Ozone – 8-hour	NO _x	125
Ozone – 8-hour	VOC	1,049

Ozone and PM_{2.5} SILs

- ▶ U.S. EPA released guidance on SILs in April 2018
 - Provided separate legal basis memorandum
 - Provided separate technical basis for SILs
 - ◆ Statistical analysis of air quality to justify insignificant concentration levels
 - ▶ Recommended SILs (NAAQS and Class II Increment)
 - Ozone 8-hour: 1.0 ppb
 - PM_{2.5} 24-hour: 1.2 µg/m³
 - PM_{2.5} Annual: 0.2 µg/m³ (may be revised though new guidance)
 - ◆ Note that some locations continue to use 0.3 µg/m³
 - ▶ Recommended SILs (Class I Increment)
 - PM_{2.5} 24-hour: 0.27 µg/m³
 - PM_{2.5} Annual: 0.05 µg/m³
-

2022 Guidance on Ozone and PM_{2.5} Permit Modeling

- ▶ Intended to replace 2014 PM_{2.5} Permit Modeling Guidance
 - Issued as draft in February 2020
 - Issued as revised draft in September 2021
 - ◆ 2020 draft guidance was reconsidered in light of early 2021 Executive Order to review certain rulemaking and guidance
 - Finalized in July 2022
 - ▶ Incorporates concepts of SIL and MERPs
 - ▶ Major change between 2020 and 2021 drafts
 - Recommendation for “holistic” approach to applicability for secondary formation
 - Address all components of PM_{2.5} or ozone if triggering for any
-

2022 Guidance on Ozone and PM_{2.5} Permit Modeling

Table III-1. EPA Recommended Approaches for Assessing O₃ Impacts by Assessment Case

Assessment Case	Description of Assessment Case	Secondary Impacts Approach*
Case 1: No Air Quality Analysis	NO _x emissions and VOC emissions < 40 tpy SER	N/A
Case 2*: Secondary Air Quality Impacts	NO _x emissions or VOC emissions ≥ 40 tpy SER	<p>Include both precursors of O₃, see Section II.2.</p> <ul style="list-style-type: none"> • Tier 1 Approach (e.g., MERPs) • Tier 2 Approach (e.g., Chemical Transport Modeling)
<p>* In unique situations (e.g., in parts of Alaska where photochemistry is not possible for portions of the year), it may be acceptable for the applicant to rely upon a qualitative approach to assess the secondary impacts. Any qualitative assessments should be justified on a case-by-case basis in consultation with the appropriate permitting authority and the appropriate EPA Regional Office.</p>		

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Table III-2. EPA Recommended Approaches for Assessing Primary and Secondary PM_{2.5} Impacts by Assessment Case

Assessment Case	Description of Assessment Case	Primary Impacts Approach	Secondary Impacts Approach*
Case 1: No Air Quality Analysis	Direct PM _{2.5} emissions < 10 tpy SER and NO _x emissions and SO ₂ emissions < 40 tpy SER	N/A	N/A
Case 2*: Primary and Secondary Air Quality Impacts	Direct PM _{2.5} emissions ≥ 10 tpy SER or NO _x emissions or SO ₂ emissions ≥ 40 tpy SER	Appendix W preferred or approved alternative dispersion model	<p>Include both precursors of PM_{2.5}, see Section II.2.</p> <ul style="list-style-type: none"> • Tier 1 Approach (e.g., MERPs) • Tier 2 Approach (e.g., Chemical Transport Modeling)
<p>* In unique situations (e.g., in parts of Alaska where photochemistry is not possible for portions of the year), it may be acceptable for the applicant to rely upon a qualitative approach to assess the secondary impacts. Any qualitative assessments should be justified on a case-by-case basis in consultation with the appropriate EPA Regional Office or other applicable permitting authority.</p>			

2022 Guidance on Ozone and PM_{2.5} Permit Modeling

► Other topics covered

- SIL modeling approaches
 - ◆ Need to combine impacts of direct PM_{2.5} and secondary before comparing with SIL
 - Cumulative impact analyses
 - ◆ NAAQS
 - Combine project, nearby sources, background, and secondary impacts to compare with NAAQS
 - If exceed SIL for ozone, add impact to representative background and compare with NAAQS
-

2022 Guidance on Ozone and PM_{2.5} Permit Modeling

► Other topics covered

- Cumulative impact analyses
 - ◆ PSD increment
 - Combine increment affecting direct and secondary impacts
 - ◆ Guidance discusses “cause or contribute” analysis showing project is less than SIL at time/location of NAAQS/increment exceedances
 - Uses MAXDCONT output option in AERMOD
 - Note that some states are receiving pressure to not issue permits with exceedances

► Guidance is specifically for PSD permit modeling, but many states consider this guidance for state-required permit modeling

- E.g., some do not require secondary analysis for PM_{2.5} for state modeling
 - States may use concepts for EJ modeling where required
-

U.S. EPA Says: It's Only Guidance

“This guidance does not create any rights or obligations enforceable by any party or impose binding, enforceable requirements on any PSD permit applicant, PSD permitting authority, the EPA, or any other person. Since each permitting action will be considered on a case-by-case basis, this document does not limit or restrict any particular justifiable approach that permit applicants and permitting authorities may take to conduct the required compliance demonstrations. Each individual decision to issue a PSD permit must be supported by a record sufficient to demonstrate that the proposed construction and operation of a stationary source will not cause or contribute to a violation of the applicable NAAQS and PSD increments.”

- ▶ In practice...
 - Many permitting authorities are reluctant to diverge from approaches in U.S. EPA guidance
 - ▶ If novel approach is desired, communicate early with permitting authority, EPA Region, and EPA OAQPS to avoid later delays
 - Submit and get approval for a modeling protocol
-

Summary

- ▶ July 2022 guidance is latest from U.S. EPA on Ozone and PM_{2.5} Permit Modeling
 - ▶ Previous PM_{2.5} and ozone guidance is replaced
 - E.g., 2014 PM_{2.5} and 2020/2021 draft PM_{2.5}/ozone
 - ▶ Biggest change from prior guidance is “holistic” approach
 - Trigger AERMOD modeling for direct PM_{2.5} even if project only triggers PSD for NO_x or SO₂ emissions
 - ▶ Reduction to PM_{2.5} NAAQS may result in need for further refinements to guidance
 - Modeling guidance tends to lag NAAQS revisions
 - ◆ E.g., 1-hour NO₂/SO₂ and PM_{2.5} guidance in 2010s
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Questions?

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