

Impacts of Revised Annual $PM_{2.5}$ NAAQS – NSR Issues

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further insight.

Acknowledgement

To my colleague at EDGE who contributed to many of the analyses in this presentation

Emily Oxsheer

Thank You

Topics

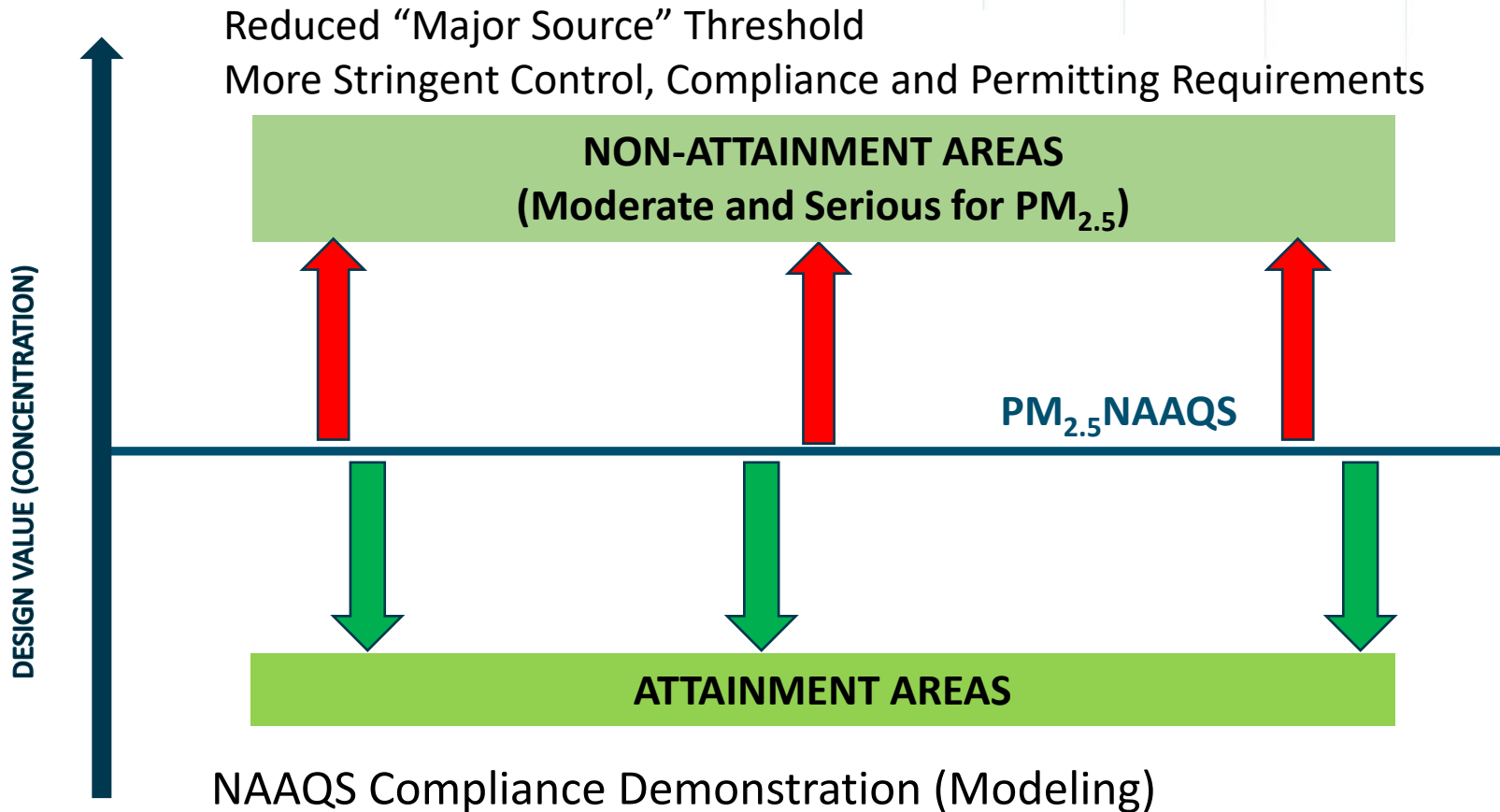
- PM_{2.5} NAAQS – Background & Recent Developments
- Impacts – Nationwide Texas LA
- NA and Attainment Area Issues
- Permitting in the Interim
- Take-aways

PM_{2.5} NAAQS - Background

Definitions – PM_{2.5} and NAAQS

- PM_{2.5} – Particulate Matter with aerodynamic diameter of 2.5 microns and less
 - Filterable and condensable
 - Precursors (NO_x, SO₂, VOC, and Ammonia)
- NAAQS – National Ambient Air Quality Standard
 - Ambient concentration to protect public health (primary) and environment (secondary)
 - Averaging times for PM_{2.5} – Annual and 24-hour
 - Reviewed every 5 years

Role of NAAQS in Air Permitting and Compliance



6 years and 10 years to attainment for PM_{2.5} "Moderate" and "Serious" NA area, respectively

Final Rule – Published February 7, 2024

Primary Annual Average PM_{2.5} Standard

Reduced from 12 ug/m³ to 9 ug/m³

24-hour Average PM_{2.5} Standard

35 ug/m³

Remains Unchanged

Secondary Annual Average PM_{2.5} Standard

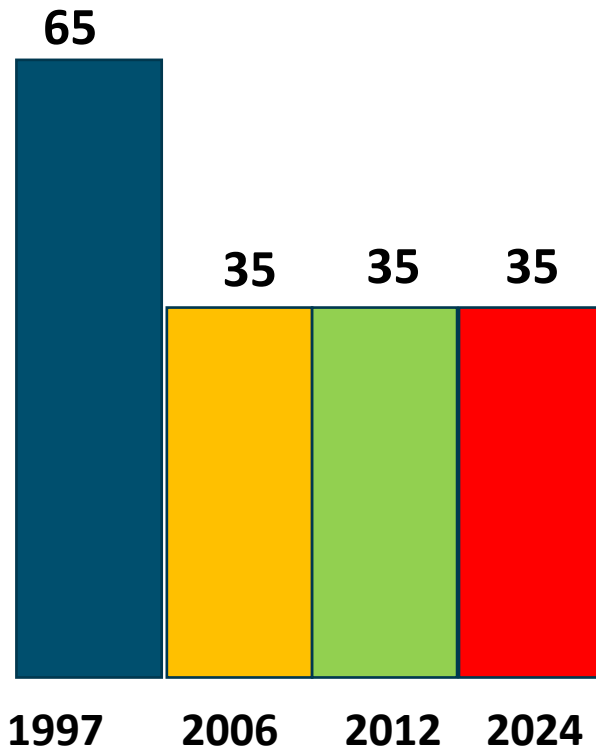
15 ug/m³

Remains Unchanged

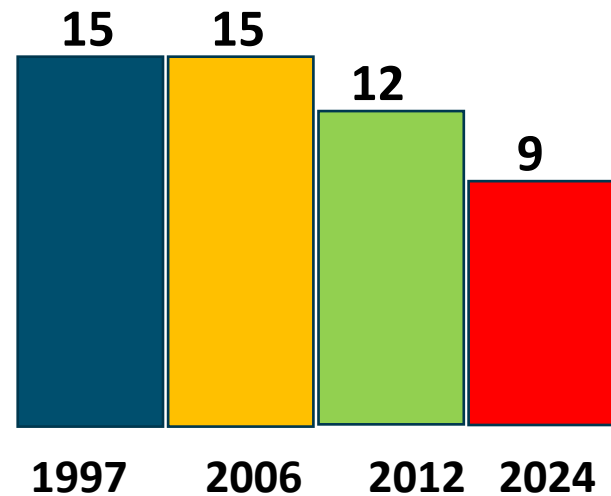
Revised Annual PM_{2.5} NAAQS is Effective within 60 days of Publishing in
Federal Register – Expected Effective Date in May 2024

Evolution of Primary PM_{2.5} NAAQS (ug/m³)

24-hr Average Standard



Annual Average Standard



Source: EPA

Other Impacts in Future PM_{2.5} SILs and Increments

- PM_{2.5} SIL is a screening criteria to rapidly assess “cause or contribute” criteria of NAAQS compliance
 - Project Impact < SIL avoids cumulative impact analysis
- SILs are Interconnected with NAAQS – so lower PM_{2.5} NAAQS may also lead to lower SIL
 - USEPA recommendations expected before effective date of NAAQS
 - More projects are expected to require cumulative modeling
- PSD increments are not health-based and therefore unlikely to be affected
 - Current annual average PM_{2.5} Increment in Class I and Class II areas are 1.0 ug/m³ and 4.0 ug/m³, respectively

Next Steps for PM_{2.5} NAAQS Revision

States to Submit Designation Recommendation to USEPA within 4-12 months from Effective Date*



Infrastructure SIP Submittal within 3 years of Effective Date



Initial Area Designations Completed within 2 years from Effective Date*



SIP Development for Nonattainment Areas within 18 months from Area Designations

** Additional 1 year extension allowed.*

Source: EPA

Lower PM_{2.5} NAAQS Key Issues for Air Permitting

Which Areas Likely Will Be Designated Non-Attainment?
So, What?

How Difficult Will Air Permitting Be in Attainment Areas?

PM_{2.5} NAAQS Revision Impact - Nationwide

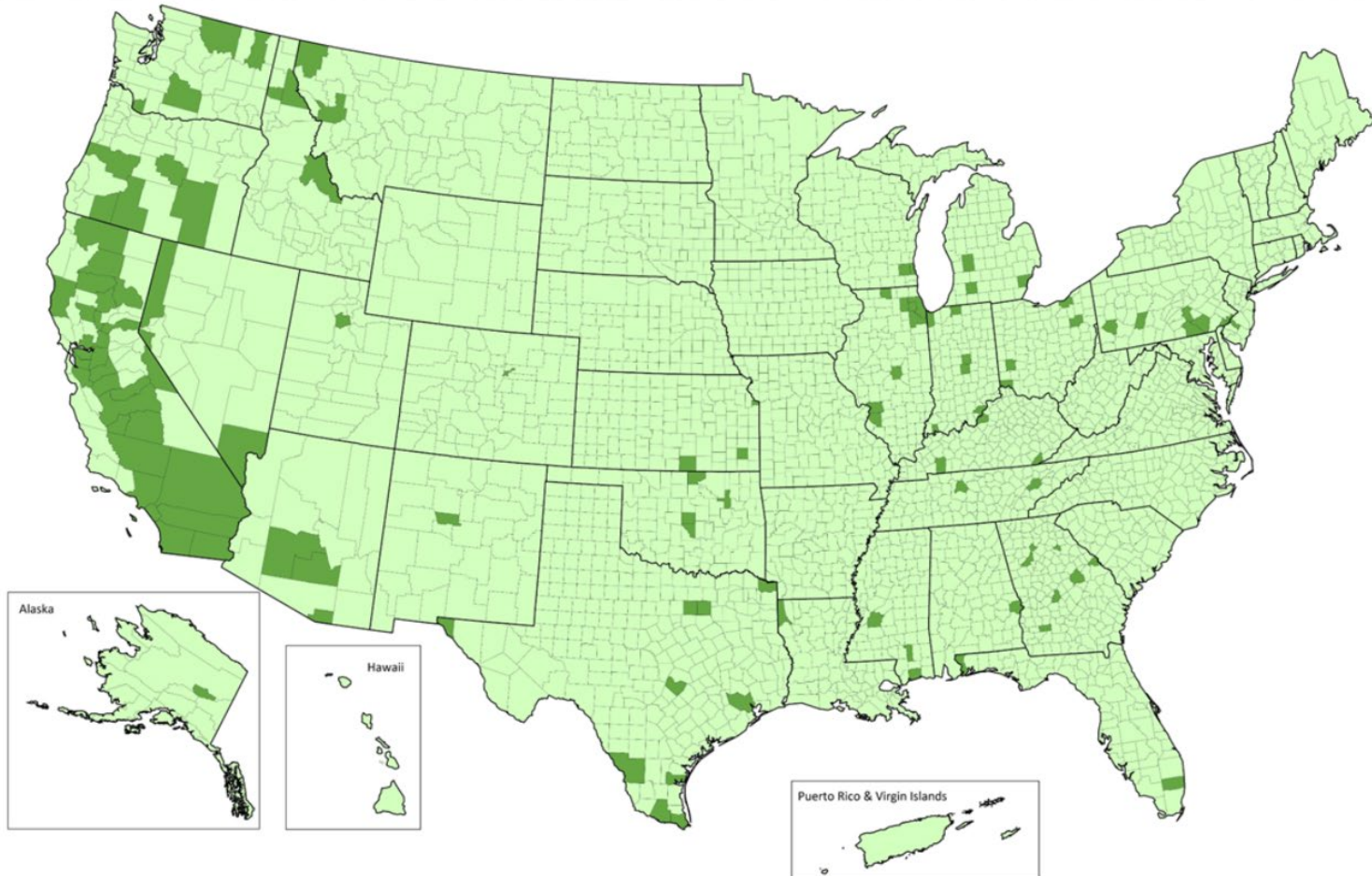
PM_{2.5} Monitors – Nationwide



Total 580 active PM_{2.5} Monitors nationwide

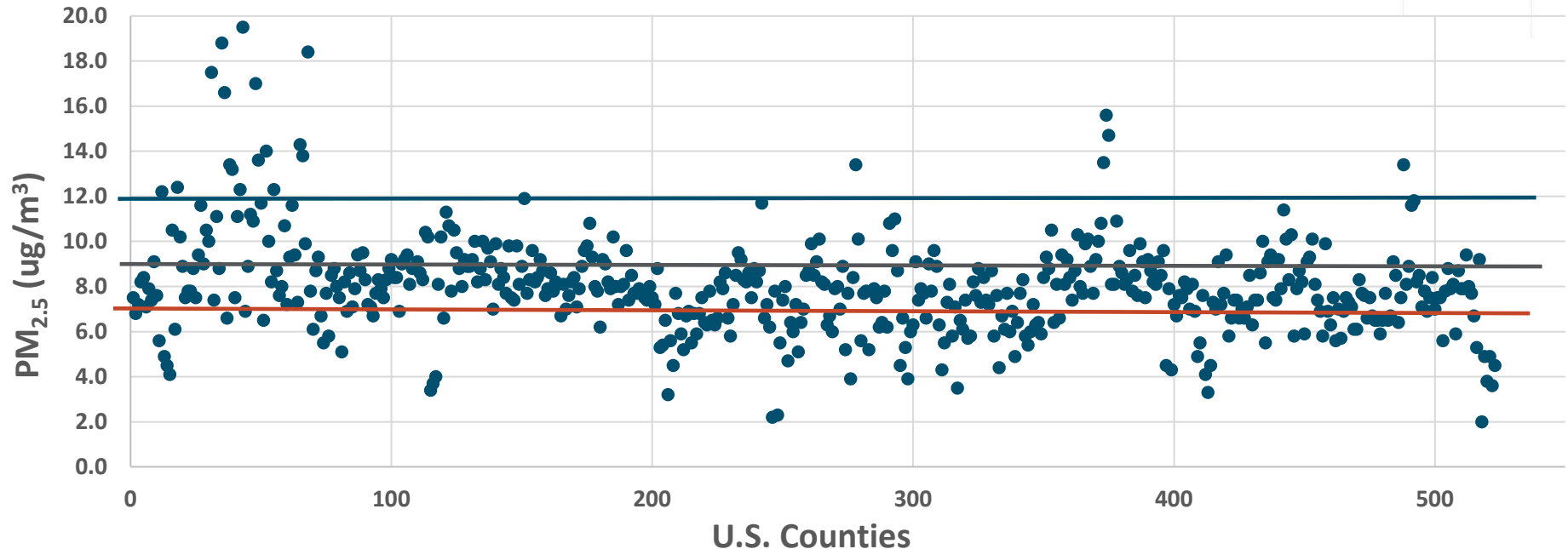
Monitoring data for last 3 years will be used for Nonattainment designations

U.S. Counties in NA for Annual PM_{2.5} Background Design Values (2020-2022)



2023 Data will be finalized by May 2024

Annual PM_{2.5} Background Design Values in U.S. Counties from 2020-2022



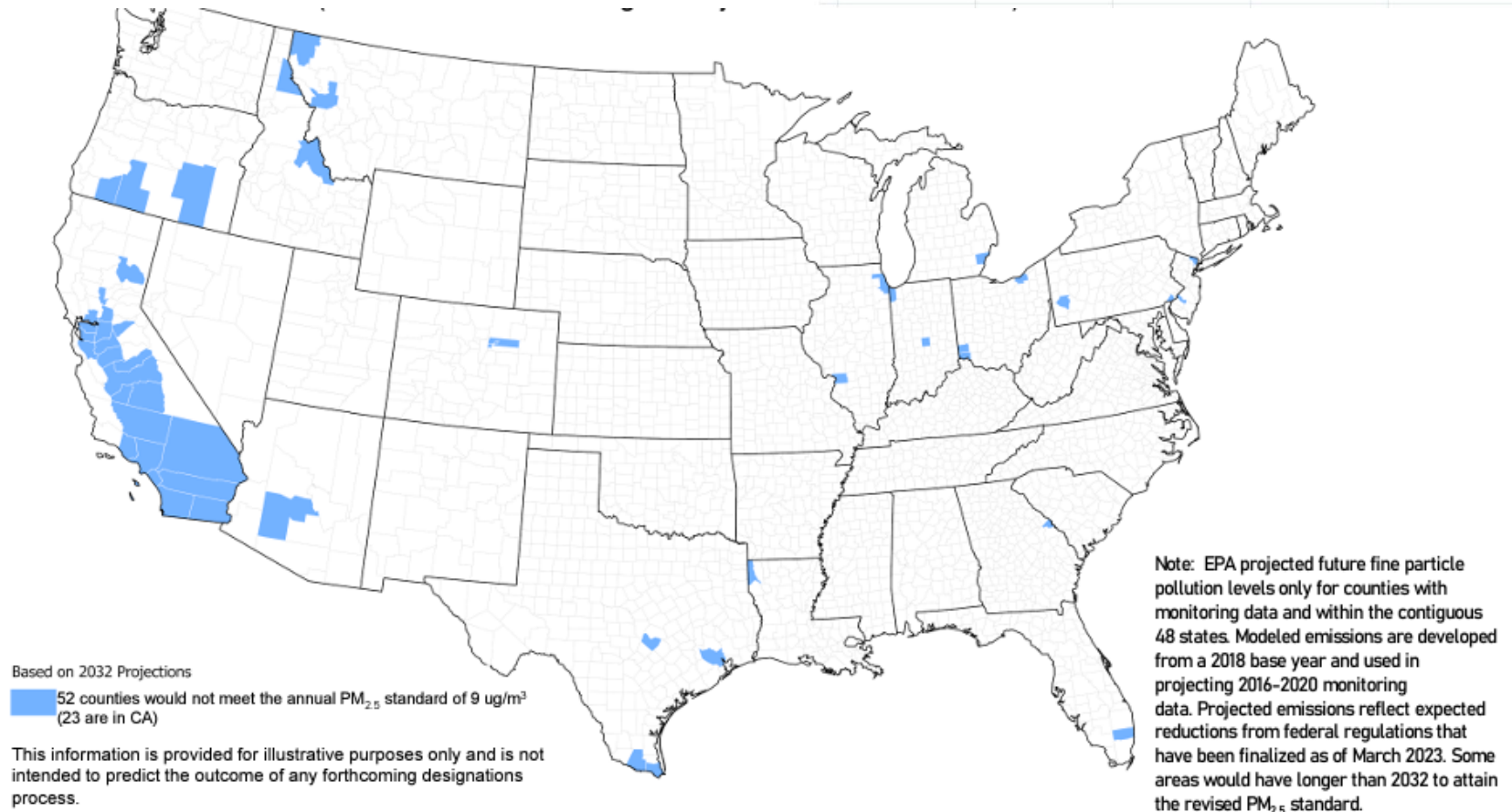
21 Counties > 12 ug/m³ - Currently NA Areas

102 Counties between 9 ug/m³ and 12 ug/m³ – New NA Areas

257 Counties between 7 ug/m³ and 9 ug/m³ – Vulnerable Areas

2023 DVs will be finalized by May 2024

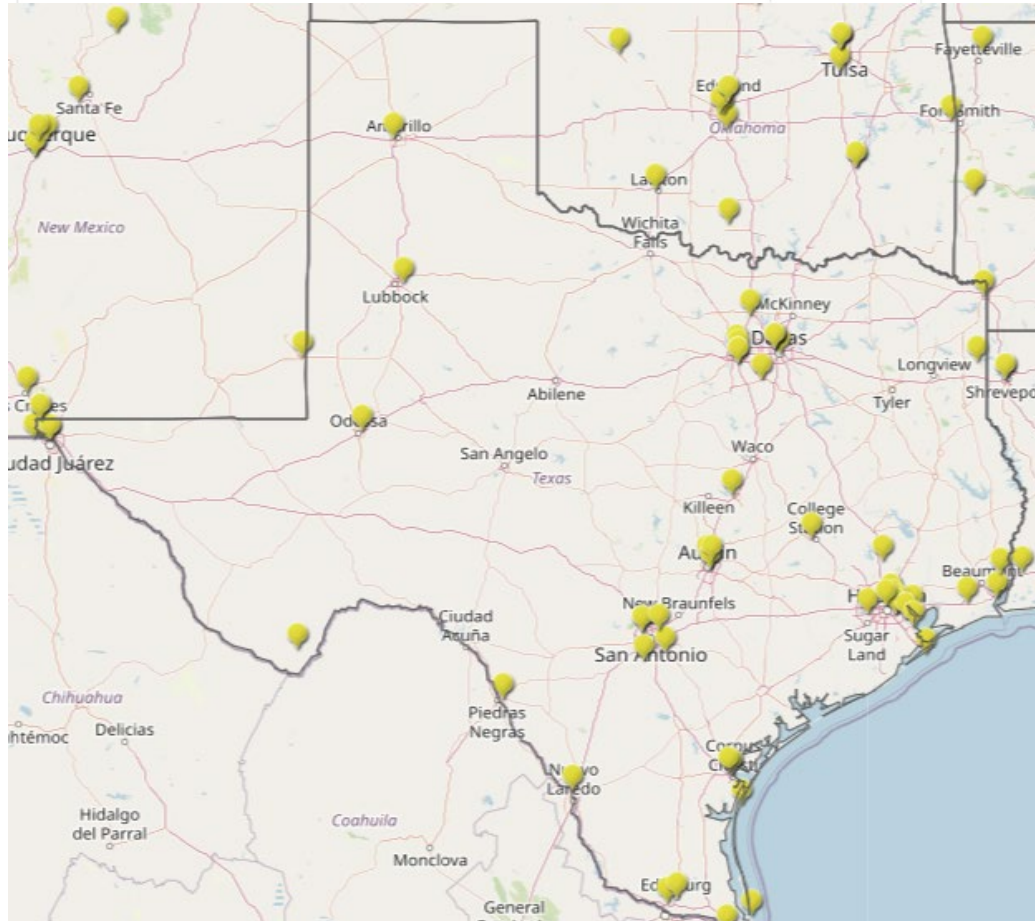
USEPA Projection of Counties in Annual PM_{2.5} NA in 2032



6 years and 10 years to attainment for PM_{2.5} “Moderate” and “Serious” NA area, respectively

PM_{2.5} NAAQS Revision Impact - Texas

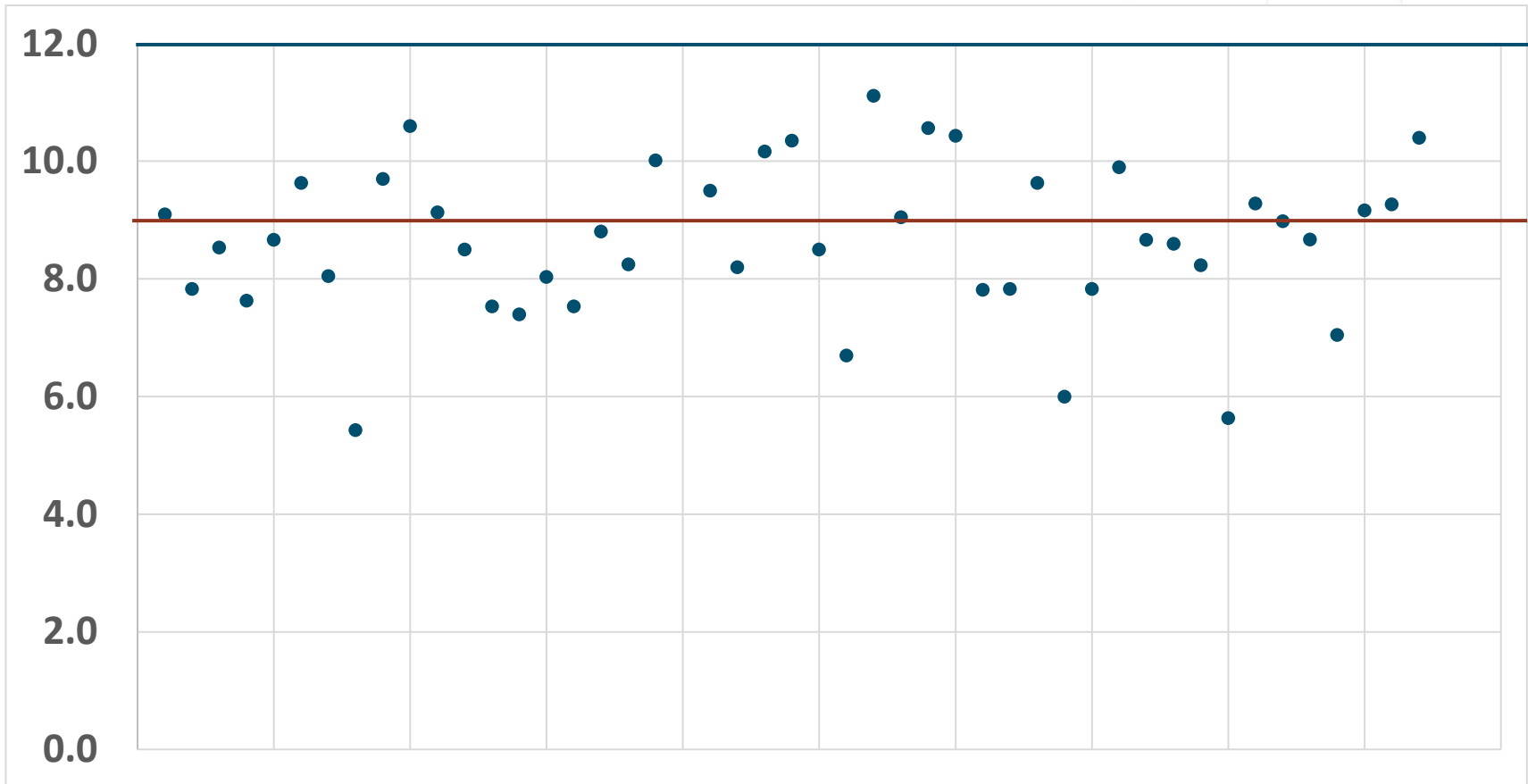
PM_{2.5} Monitors in Texas



- Total 60 active PM_{2.5} Monitors
- TCEQ plans to add 8 new PM_{2.5} monitors by December 2024
 - Houston (4)
 - Corpus Christi (1)
 - San Antonio (2), and
 - El Paso (1)

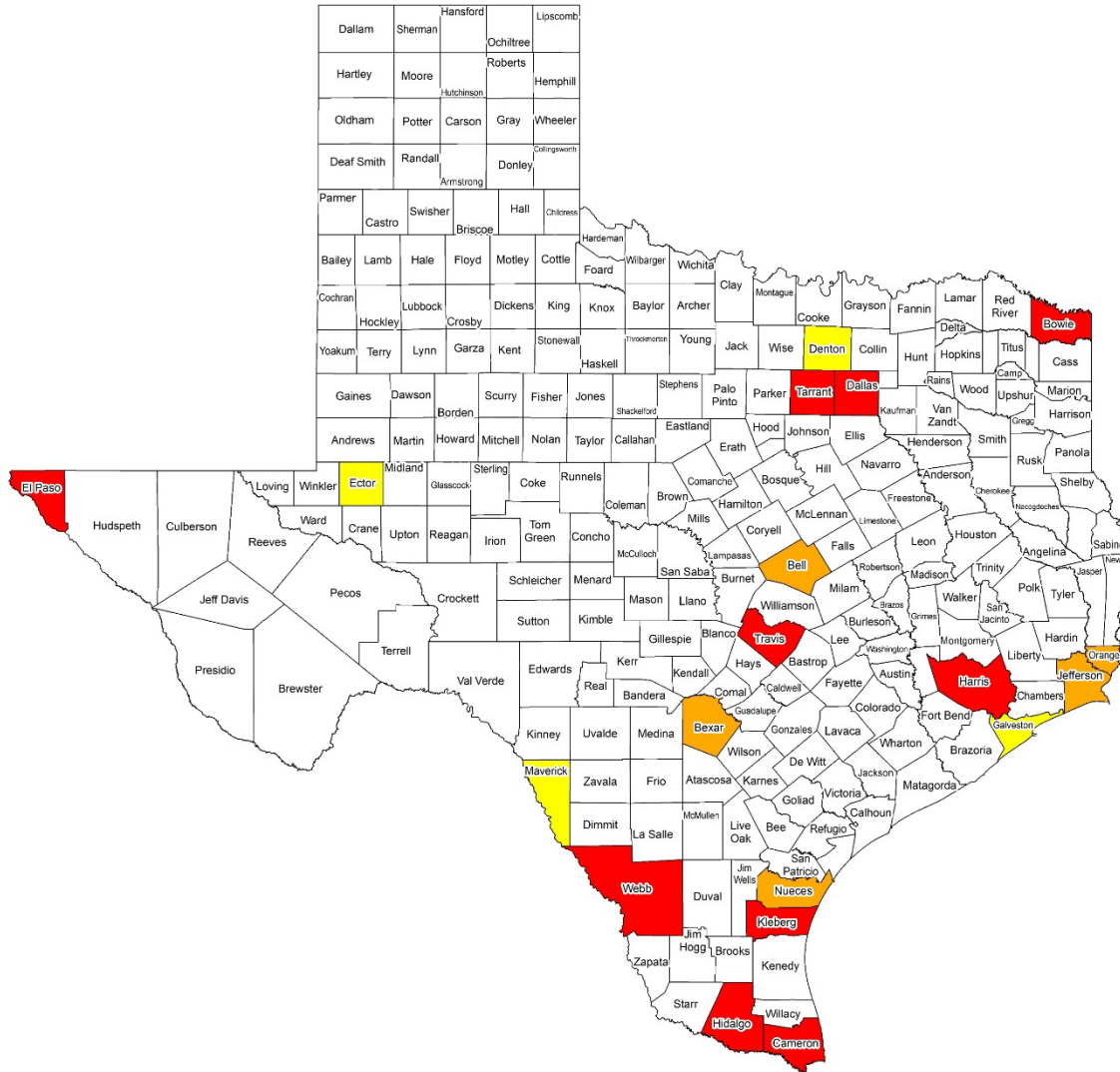
Monitoring data for last 3 years will be used for Nonattainment designations

PM_{2.5} Ambient Monitoring Data Annual Average (2020-2022)



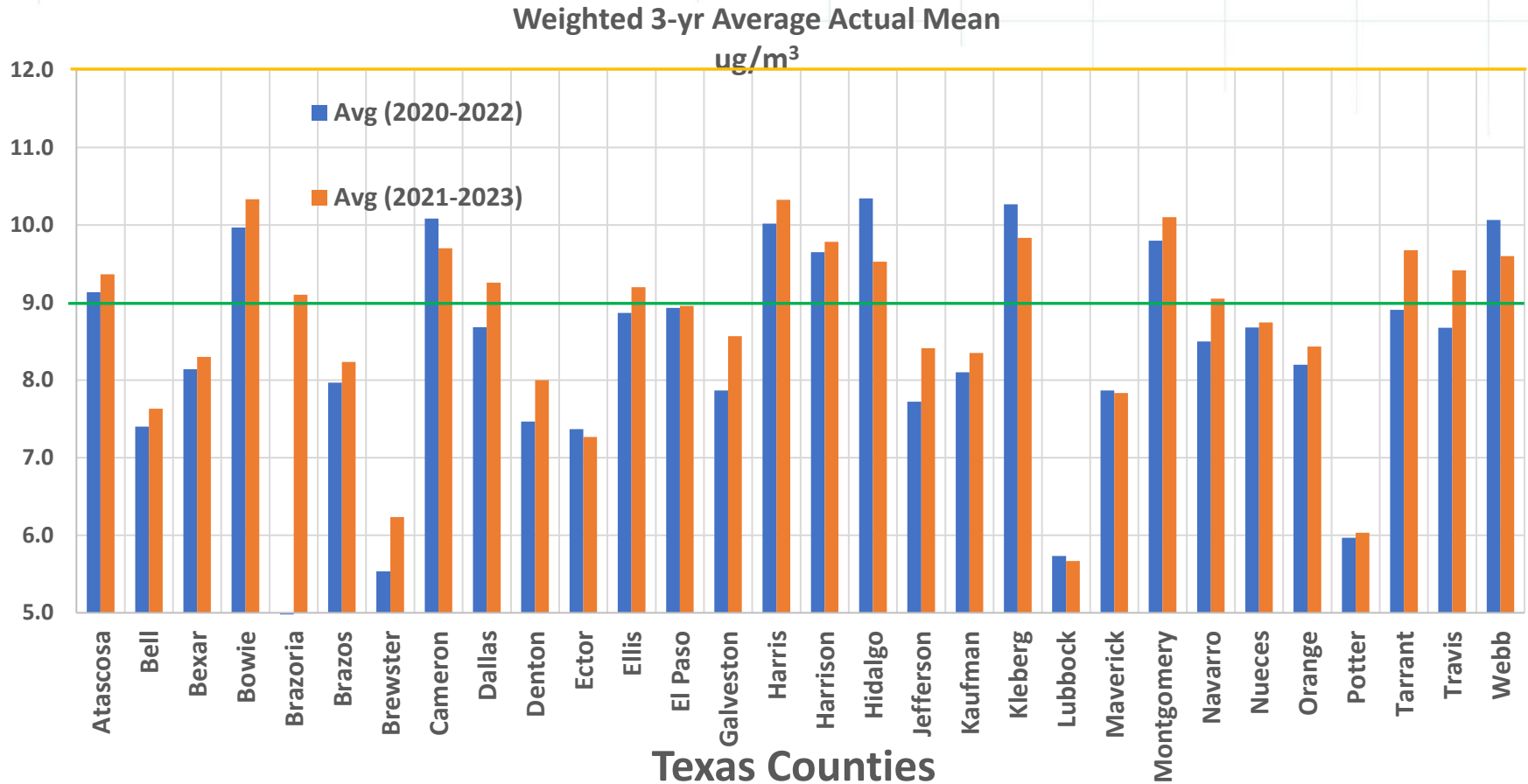
2023 Data will be finalized by May 2024

Impact in Texas Counties



- **Red:** 10 counties will be in NA
- **Yellow:** 4 counties will be within <math><1 \text{ ug/m}^3</math> of NAAQS
- **Orange:** 6 counties will be within $1\text{-}2 \text{ ug/m}^3$ of NAAQS
- 2021: 4,820 tpy primary PM_{2.5} Emissions in 10 NA counties from 457 sources
 - 16% of Statewide PM_{2.5} emissions)
- 2021: 53,268 tpy of precursor emissions (NO_x/SO₂/VOC)

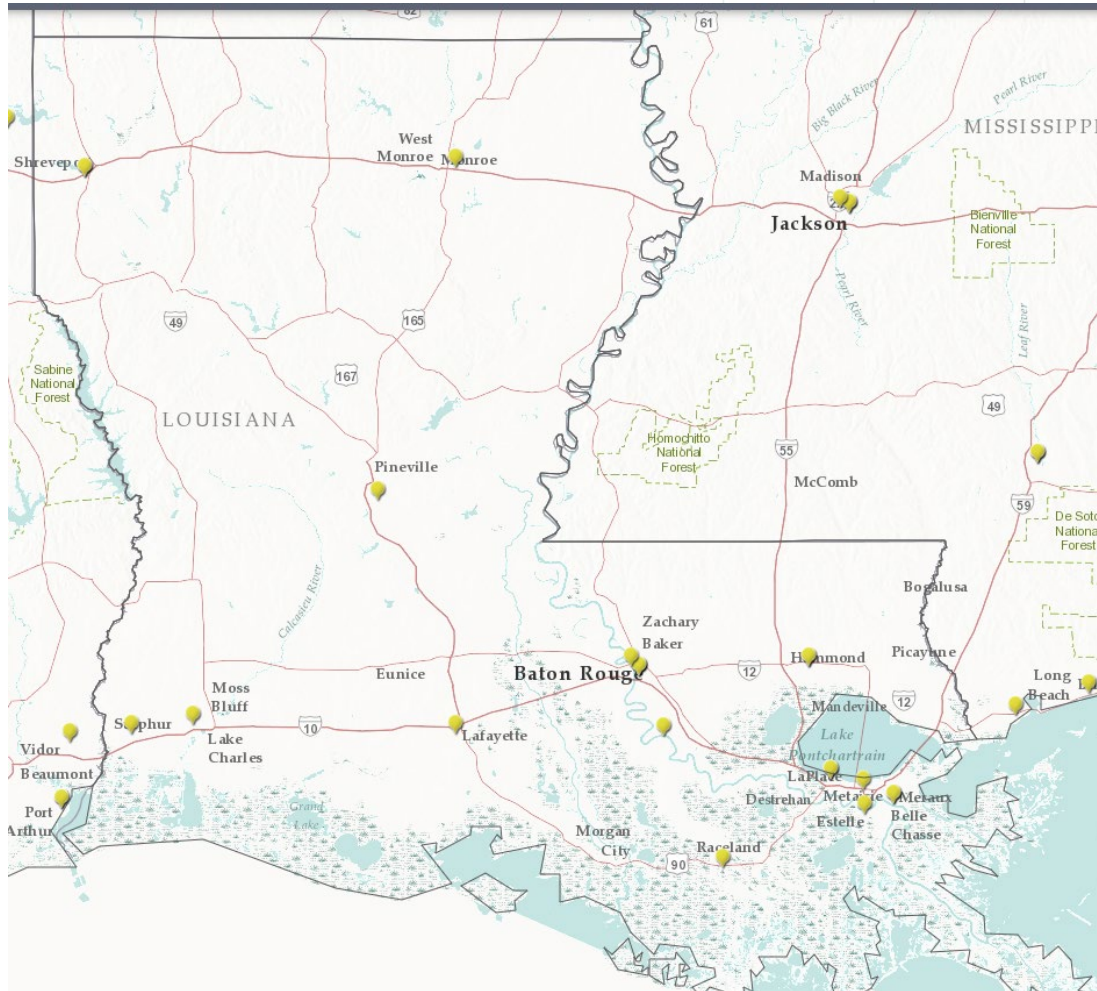
Impact in Texas Counties with 2021-2023 DVs



2023 DVs will be finalized in May 2024

PM_{2.5} NAAQS Revision Impact - Louisiana

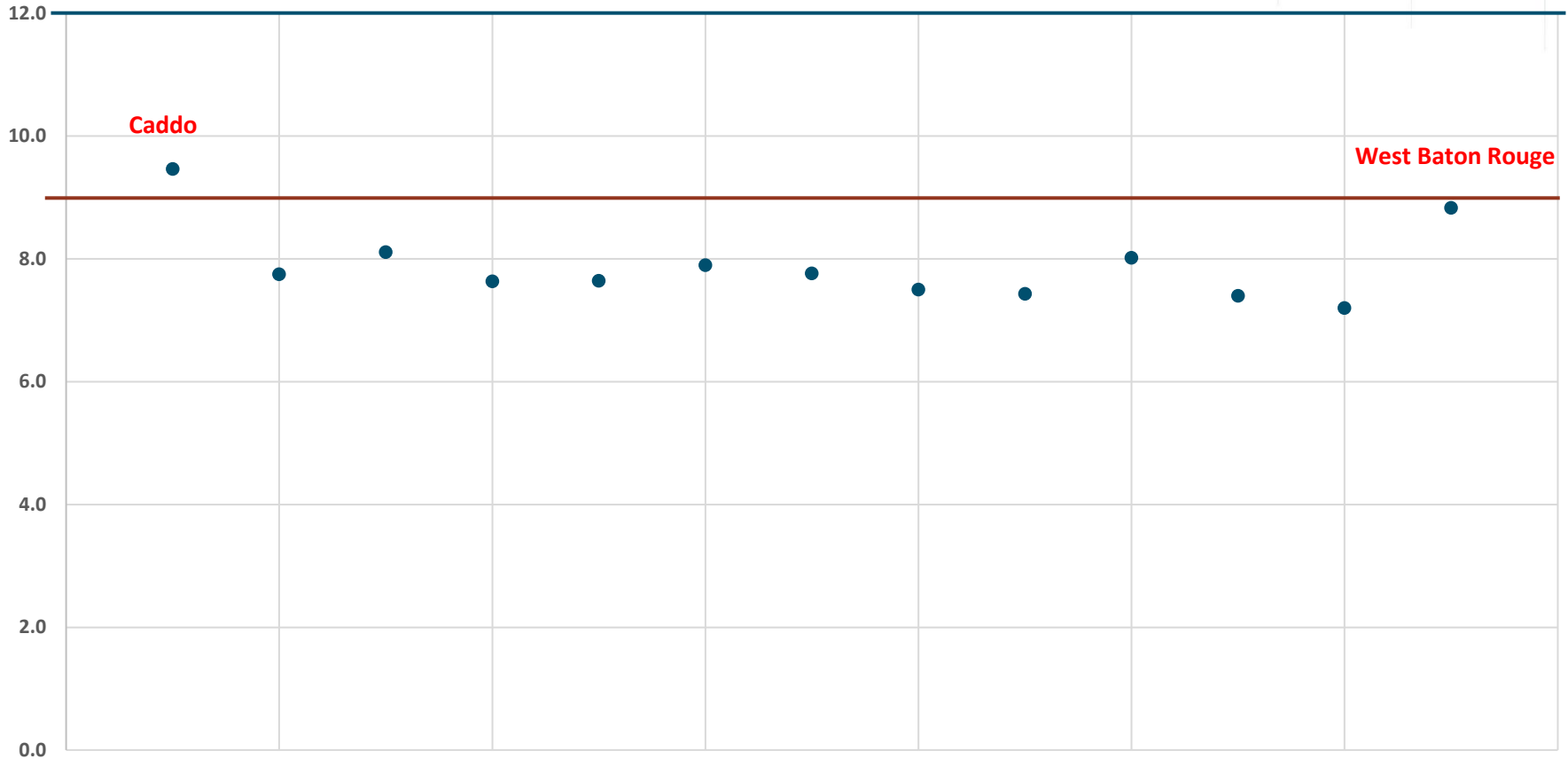
PM_{2.5} Monitors in Louisiana



- Total 15 active PM_{2.5} Monitors

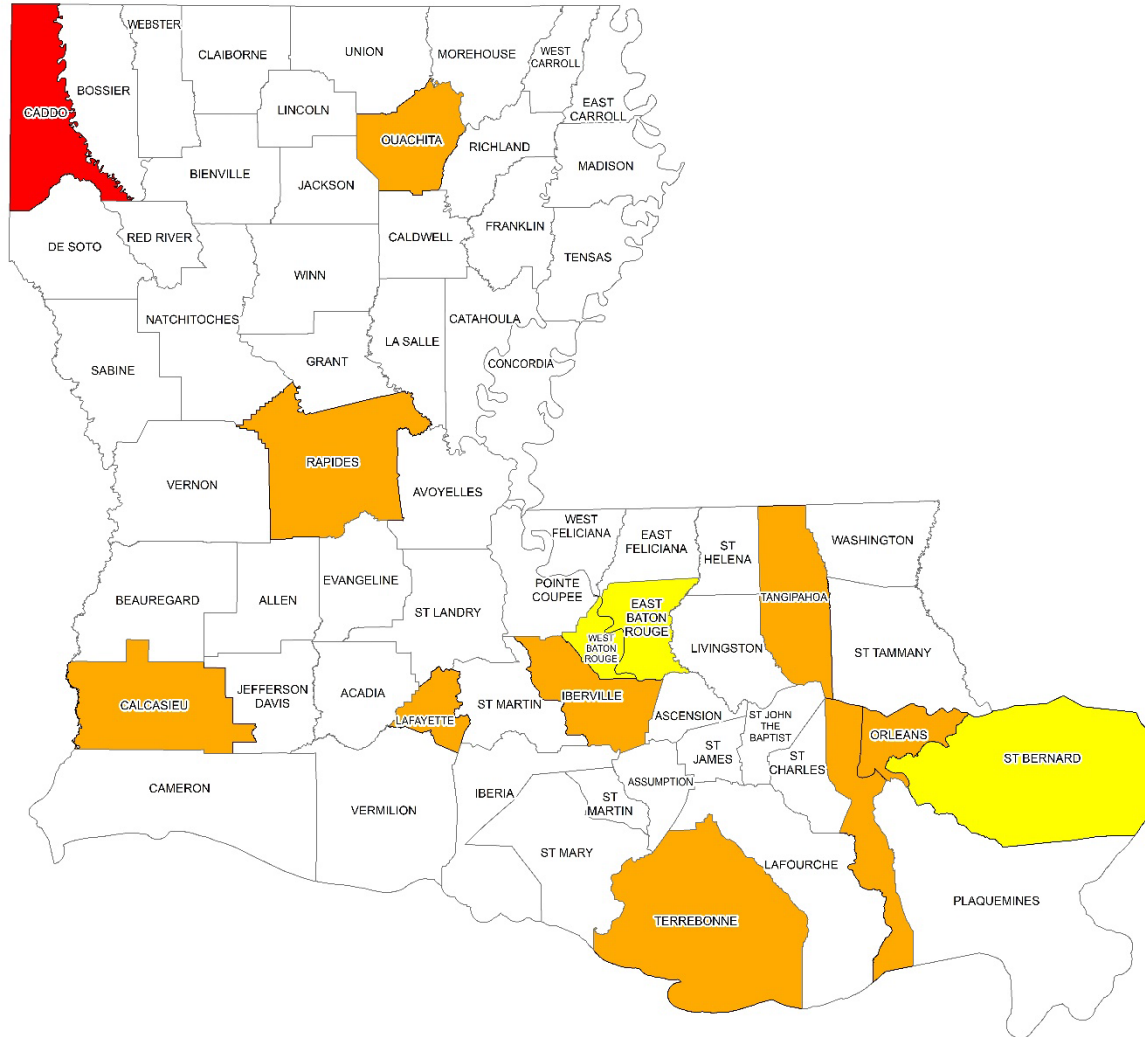
Monitoring data for last 3 years will be used for Nonattainment designations

PM_{2.5} Ambient Monitoring Data in LA Annual Average Design Values (2020-2022)



2023 Data will be finalized by May 2024

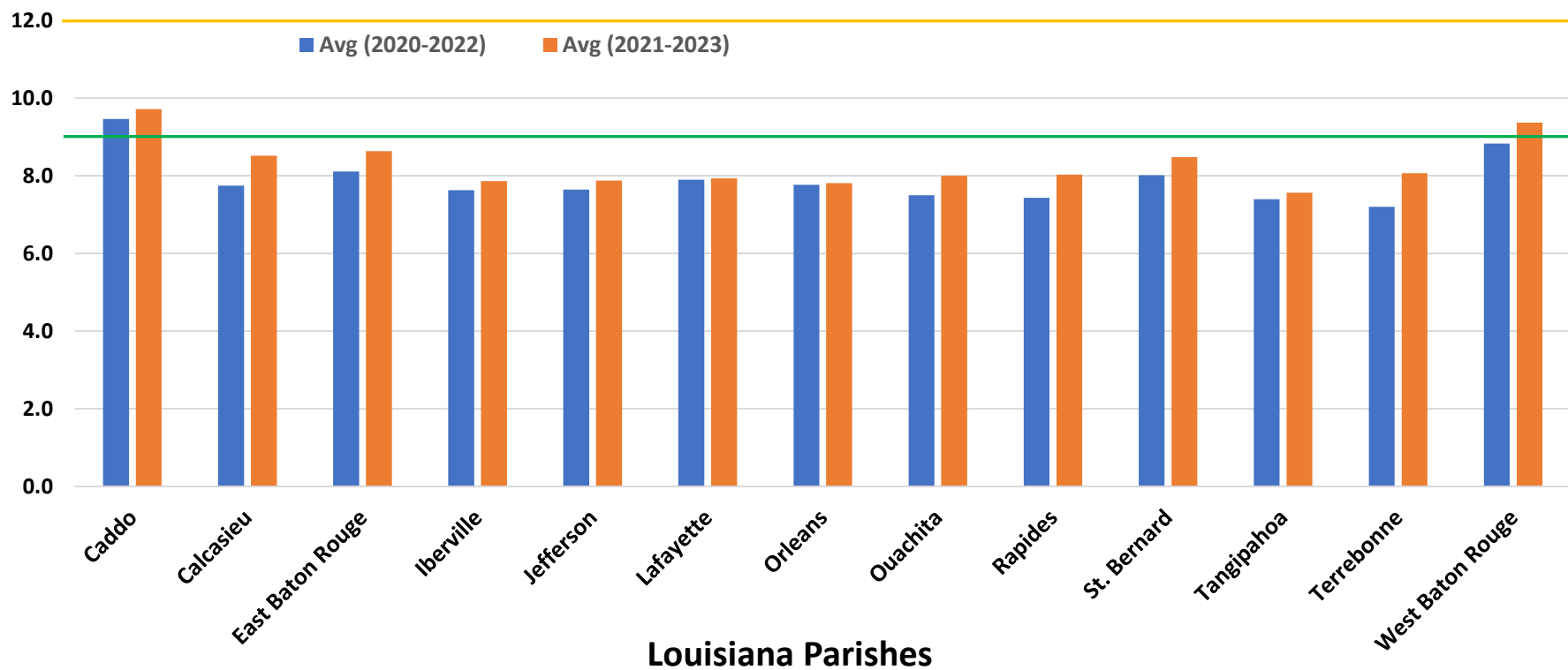
Impact in Louisiana Parishes



- **Red:** 1 Parish will be in NA (Caddo)
- **Yellow:** 3 Parishes will be within $<1 \text{ ug/m}^3$ of NAAQS
- **Orange:** 9 Parishes will be within $1\text{-}2 \text{ ug/m}^3$ of NAAQS
- Caddo Parish has few emission sources – potentially long-range transport from DFW area

Impact in Louisiana Parishes with 2021-2023 DVs

Weighted 3-yr Average Actual Mean ug/m³



2023 DVs will be finalized in May 2024

NA Area Issues

Impact on Stationary Source Air Permitting - Thresholds

Major Source Threshold Reduced in NA Areas

- 100 tpy of PM_{2.5} (including condensable) in Moderate NA area
- 70 tpy for PM_{2.5} (including condensable) in Serious NA area
- Includes precursors individually

Major Modification Threshold in NA Areas

- Major modification SER for PM_{2.5} remains at 10 tpy
- Includes precursors at individual SERs if the source is major for the same precursor – exemption possible for NO_x via demonstration by state

Impact on Stationary Source Air Permitting – Existing Sources

Existing Major Sources in New NA Areas

- Stricter PM_{2.5} control
 - “Moderate ” NA area: RACM/RACT
 - “Serious ” NA area: BACM/BACT
 - Could be more stringent control if attainment not achieved

Baseline NA Area Emission Inventory

- PM_{2.5} Baseline Emissions Inventory is part of NA SIP
 - Facilities need to report
 - PM_{2.5} includes precursors
 - PM_{2.5} includes condensable – difficult to quantify

Impact on Stationary Source Air Permitting – New Projects

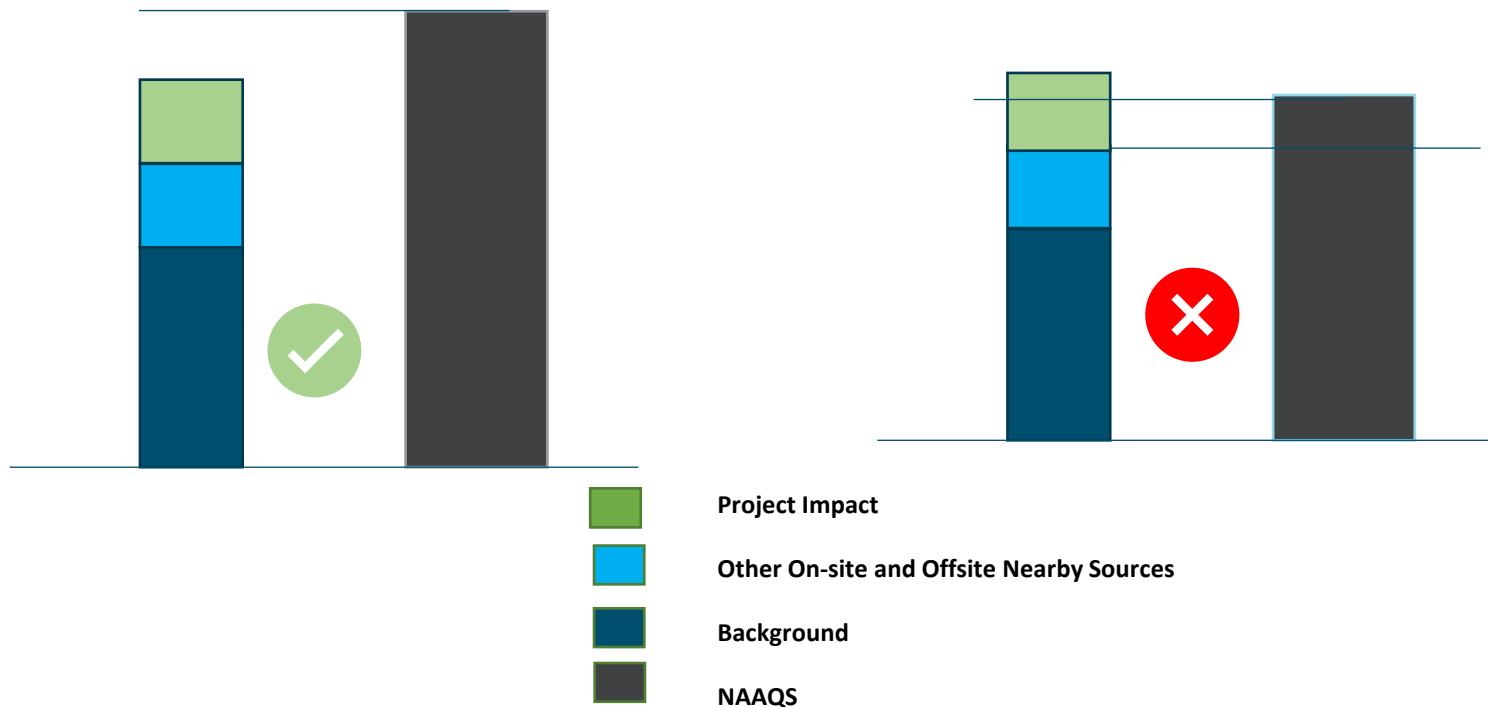
New Major Sources in New NA Areas

- Require LAER and Offsets
- Offset availability and price – Unknown at this time
- Offsets could include precursors at ratios agency will allow

Attainment Area Issues

Role of Monitored Background Concentration in Attainment Areas

NAAQS compliance demonstration for projects with increase in net $PM_{2.5}$ emissions and project impact > De Minimis (SIL)



$PM_{2.5}$ Annual Average De Minimis (SIL) is $0.3 \mu g/m^3$

Unit Impact Multiplier (UIM) Analysis

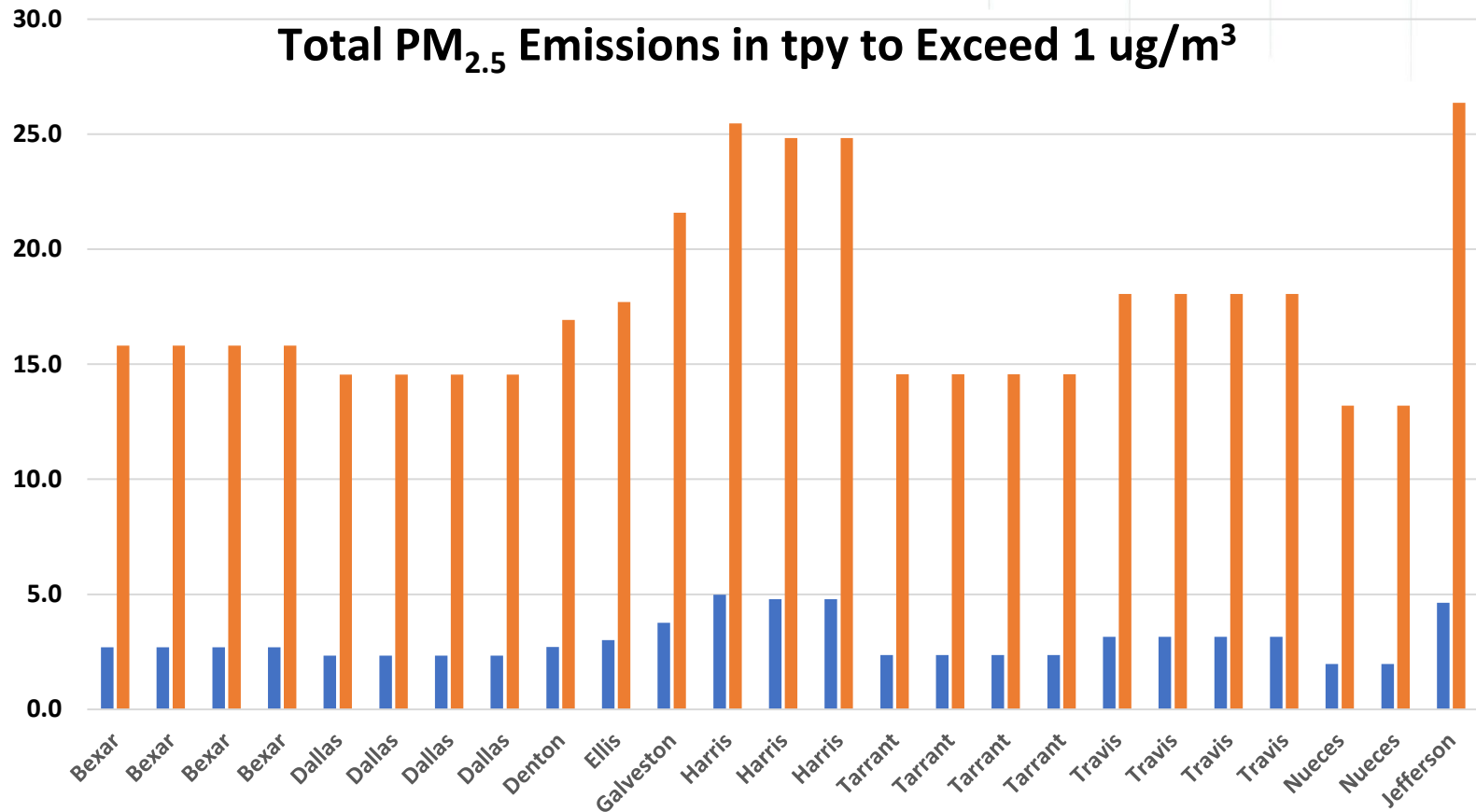
Parameter	Low Release Height (L)	High Release Height (H)
Stack Height (m)	10	30
Emission Rate (tpy)	1	1
Stack Diameter (m)	1.0	1.0
Stack Velocity (m/s)	10.0	10.0
Stack Temperature (Deg F)	300	300
Dispersion	Rural	Rural
Terrain	Flat	Flat

[1] No downwash considered;

[2] Pre-processed 5-yr meteorological data; and

[3] Medium surface roughness.

Compliance Demonstration Reality – TX³⁴



Blue: 10m Release Height; **Orange:** 30m Release Height

Permitting in the Interim

Permitting in the Interim Between NAAQS and Area Designation

- New or pending case-by-case new source review permits will be required to evaluate all new and increased emissions off-property concentrations against the new standard after the effective date
 - Grace period previously available in 2012 PM_{2.5} and 2015 Ozone NAAQS has been vacated by court in 2019
- For compliance demonstration where background monitor shows >9 ug/m³ - Options
 - Select with justification a different representative monitor (complicated);
 - Show that current project impacts are below existing PM_{2.5} annual SIL;
 - Reduce project impacts <existing PM_{2.5} annual SIL; or
 - Net out of emission increase of PM_{2.5} <SER

Permitting in the Interim Between NAAQS and Area Designation (Cont.)

- Consider Using Culpability Analysis
 - Show that the project is not contributing to the NAAQS exceedance via air dispersion modeling
- Problem will be that with the lower NAAQS, there may be large number of receptors that will show exceedance
 - Adds complexity – case by case basis determination by Agency
- If culpability with revised NAAQS is demonstrated, the facility will have to reduce PM_{2.5} emissions

Take-aways

- New PM_{2.5} NAAQS is expected to be effective in May 2024 and NA area designations expected by May 2026 or earlier
- Major sources in new NA areas will have to go through complex permitting decisions in the interim
- Several areas in TX and LA will have difficulty in demonstrating compliance with new PM_{2.5} annual standard due to high background concentration
- Run a baseline model with existing PM_{2.5} sources to see where the facility stands
- Keep an eye on SIL – it is expected to be reduced

Thanks For Your Time

Questions?

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