



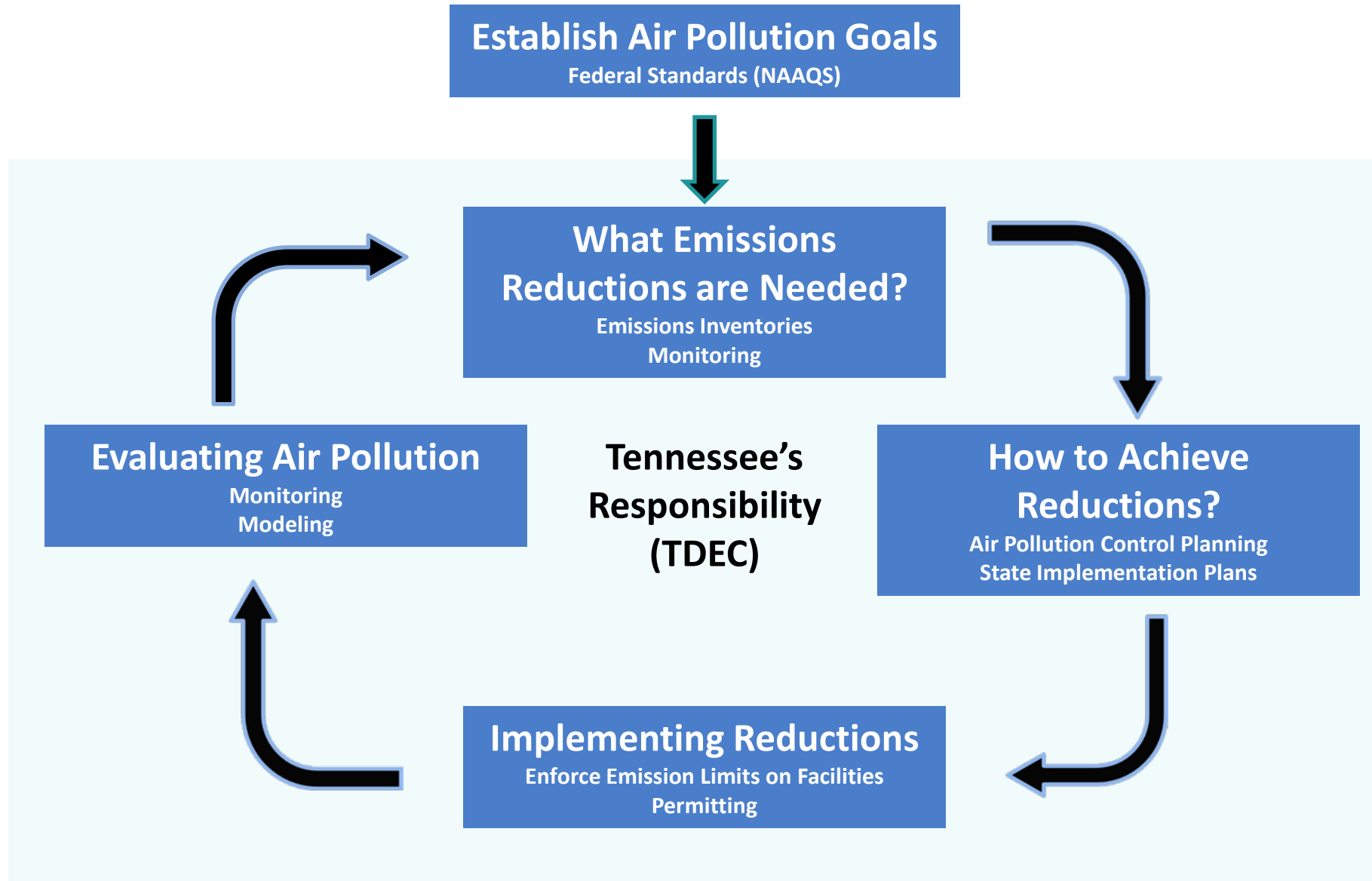
Department of
**Environment &
Conservation**

Air Quality Update

Permitting Workshop

Jimmy Johnston, P.E., August 20, 2025

Air Quality Management in a Nutshell



National Ambient Air Quality Standards (NAAQS)

- Air quality standards for human health and environmental protection
- 6 criteria pollutants
- Types of NAAQS
 - Primary: Health-based
 - Secondary: Welfare-based
- Characteristics of NAAQS
 - Avg time: Annual vs. short term
 - Concentration level
- Reviewed by EPA every 5 years

Six Criteria Air Pollutants

- Particulate Matter
- Ozone
- Carbon Monoxide
- Lead
- Sulfur Dioxide
- Nitrogen Dioxide

Sulfur Dioxide (SO₂)



Formed during the combustion of sulfur-bearing fuels.

What are the health effects of SO₂?

Short-term exposures to SO₂ can harm the human respiratory system and make breathing difficult. People with asthma, particularly children, are sensitive to these effects of SO₂.

SO₂ emissions that lead to high concentrations of SO₂ in the air generally also lead to the formation of other sulfur oxides (SO_x). SO_x can react with other compounds in the atmosphere to form small particles. These particles contribute to particulate matter (PM) pollution. Small particles may penetrate deeply into the lungs and in sufficient quantity can contribute to health problems.

What are the environmental effects of SO₂ and other sulfur oxides?

At high concentrations, gaseous SO_x can harm trees and plants by damaging foliage and decreasing growth.

SO₂ and other sulfur oxides can contribute to acid rain which can harm sensitive ecosystems.

Sullivan County Nonattainment Area Primary SO₂ Standard

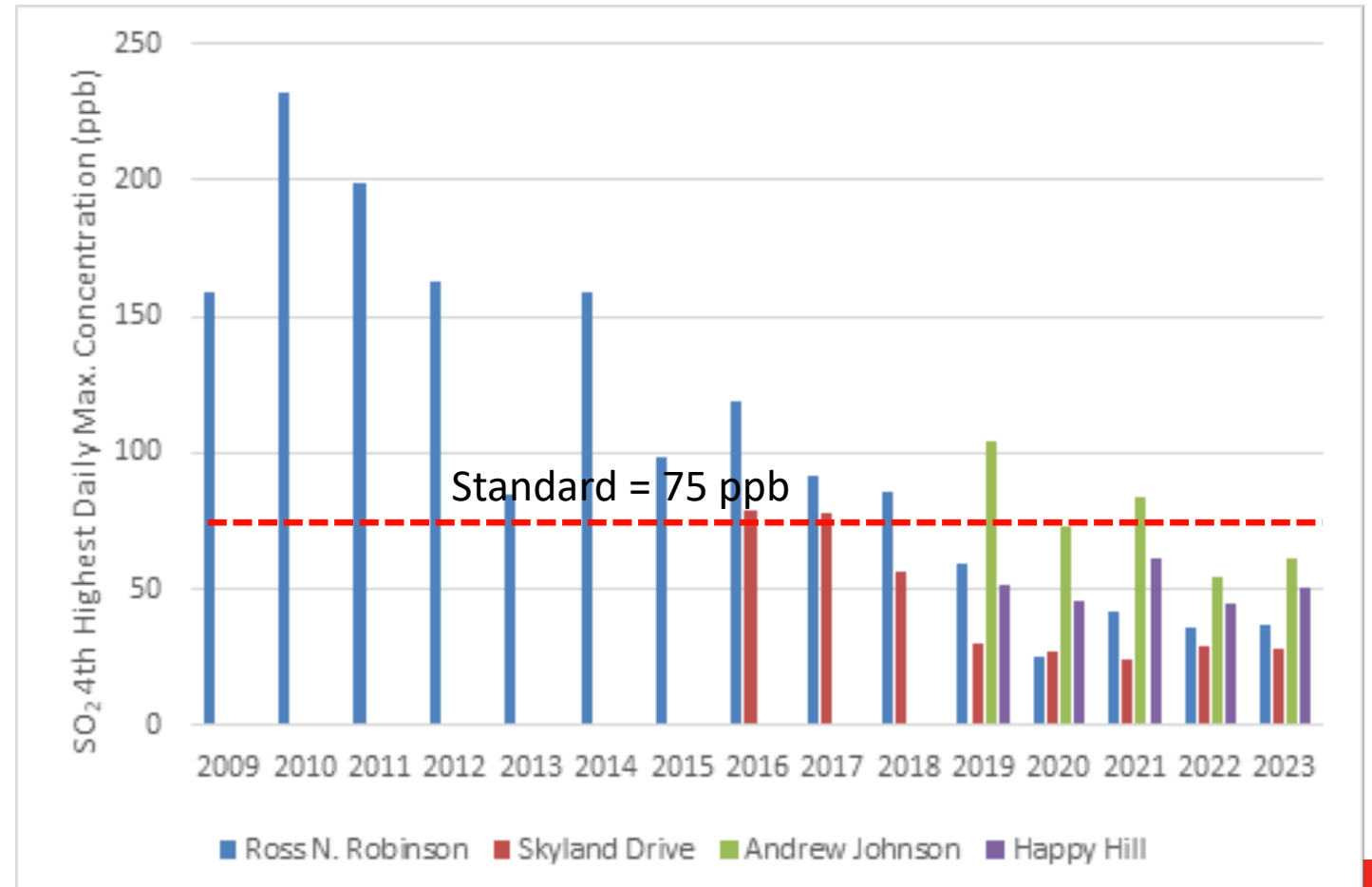


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Eastman Chemical Company



Sullivan County Nonattainment Area Primary SO₂ Standard

- SO₂ emission reduction measures implemented 2014 to 2021
- All monitors attaining NAAQS since 2022
- TDEC submitted redesignation request and maintenance plan to EPA on 6/18/2025

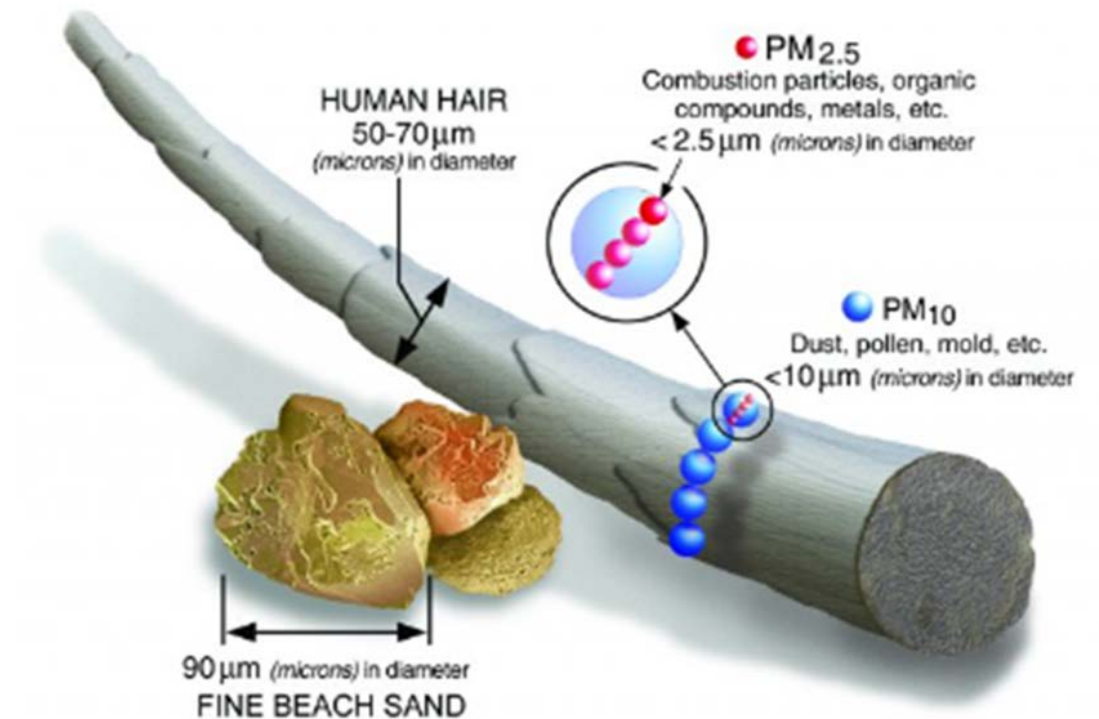


Secondary SO₂ Standard

- 12/10/2024 – EPA Final Decision to Revise Secondary SO₂ NAAQS and Retain Secondary NO₂ and PM NAAQS
- New Secondary SO₂ Standard
 - 10 ppb annual average – based on 3-year average
- State Recommendations Due 12/11/2025
 - Based on 2022-2024 Data
 - All Tennessee Monitors Attaining Standard with zero to 2 ppb design values
- EPA Finalized Designations – 12/11/2026
 - Based on 2023-2025 Data

What is Particulate Matter (PM)?

- Solid particles and liquid droplets suspended in the air
- $PM_{2.5}$: < 2.5 micrometers and smaller
- $PM_{2.5}$ can enter the respiratory tract and go deep into the lungs
- Can affect other organ systems
- Associated with cardiovascular and respiratory health outcomes
 - Rationale for PM NAAQS



Size comparisons for PM particles

2024 PM_{2.5} NAAQS

- On February 7, 2024, EPA strengthened the primary, annual PM_{2.5} National Ambient Air Quality Standard (NAAQS) from 12.0 µg/m³ to 9.0 µg/m³.
- Within two years of this NAAQS revision, states work with EPA to designate areas as attaining or violating the NAAQS.
- If areas are designated as non-attainment/violating the NAAQS, additional permitting, emission control measures, etc., will be required to bring the area back to attainment.

Designations Timeline

Milestone	Date
Revised PM NAAQS Finalized	February 7, 2024
State Designations Recommendations (based on 2021-2023 data)	No later than February 7, 2025
EPA Notification of Modifications to State Designation Recommendations (120-day letter)	No later than October 9, 2025
States and Tribes submit additional information, if any, to respond to the EPA's modification	Mid-December 2025
Final Area Designations by EPA (based on 2022-2024 data)	February 6, 2026

2021-2023 Monitored Design Values

Area	Max PM _{2.5} County	2021-2023 Design Value (µg/m ³)
Nashville	Davidson-TN	9.6
Chattanooga	Walker-GA	9.3*
Knoxville	Knox-TN	9.1
Memphis	Shelby-TN	8.9
Clarksville	Christian-KY	8.6
Jackson	Madison-TN	8.1
Kingsport	Bristol City-VA	7.3

*Value is 2022-2023 (2-year) design value.

Outstanding Factors Affecting Designations

- Exceptional Events
 - Rare or natural occurring events, not easily controlled
 - TN was significantly impacted by Canadian wildfires in 2023
 - Petitioning EPA to exclude Canadian wildfire data from DV calculations
- 2024 Data Certification
 - Final Designations are based on 2022-2024 data
- EPA must issue formal decisions on Exceptional Events exclusion and 2024 data certification before designations are final.
- **NAAQS attainment status may change!**

2023 Design Values, excluding Exceptional Events

Area	2021-2023 Design Value ($\mu\text{g}/\text{m}^3$)	2021-2023 Design Value ($\mu\text{g}/\text{m}^3$), Excluding Exceptional Events From Canadian Wildfires
Nashville	9.6	9.0 ↓ (Now Attaining, if Approved)
Chattanooga	9.3*	9.0 ↓ (Now Attaining, if Approved)
Knoxville	9.1	9.0 ↓ (Now Attaining, has been Approved)
Memphis	8.9	Exceptional Events not Needed
Clarksville	8.6	Exceptional Events not Needed
Jackson	8.1	Exceptional Events not Needed
Kingsport	7.3	Exceptional Events not Needed

*Value is 2022-2023 (2-year) design value.

Tennessee's Designations Recommendations

- TDEC submitted designations for all counties in Tennessee in February 2025.
- Recommended attainment for all counties in Tennessee
 - Including, areas with attaining data, AND
 - Areas with violating data, assuming EPA approves EEDs
- Indicated that designation recommendations may change upon EED approval status and 2024 data certification.

2024 PM_{2.5} Data Outlook in TN

Area	Max PM _{2.5} County	2022-2024 Preliminary Design Value (µg/m ³)
Memphis	DeSoto-MS	9.1 ↑ (Now Violating)
Nashville	Davidson-TN	9.3
Knoxville	Knox-TN	8.6 ↓ (Now Attaining)
Chattanooga	Walker-GA	9.0 ↓ (Now Attaining)
Clarksville	Christian-KY	7.9
Jackson	Madison-TN	7.6
Kingsport	Bristol City-VA	7.0

2024 PM2.5 Data, excluding Exceptional Events

Area	2022-2024 Preliminary Design Value ($\mu\text{g}/\text{m}^3$)	2022-2024 Preliminary Design Value ($\mu\text{g}/\text{m}^3$) Excluding Exceptional Events from Canadian Wildfires
Memphis	9.1	9.0 ↓ (Now Attaining, if Approved)*
Nashville	9.3	9.0 ↓ (Now Attaining, if Approved)
Knoxville	8.6	Exceptional Events not Needed
Chattanooga	9.0	Exceptional Events not Needed
Clarksville	7.9	Exceptional Events not Needed
Jackson	7.6	Exceptional Events not Needed
Kingsport	7.0	Exceptional Events not Needed

*EED will be submitted by Mississippi DEQ

Potential EPA Actions Affecting PM NAAQS

- March 12, 2025, EPA Announcement
- Revisiting PM_{2.5} NAAQS
 - Until a new standard is final, the current NAAQS is effective.



New PSD Modeling Requirements

- EPA revised PM_{2.5} modeling thresholds for Prevention of Significant Deterioration (PSD) permit applicants.
- PSD permits only apply to sources in attainment and unclassifiable area.
- PSD projects must show compliance with the new NAAQS by not exceeding Significant Impact Levels (SILS).
- Revised annual PM_{2.5} SILs
 - New SIL Level: 0.13 ug/m³
 - In Class I areas: 0.03 ug/m³
 - In Class II and III areas: 0.13 ug/m³

What if my PSD Project Exceeds the SILs?

- More rigorous modeling is required.
- Total PM impact, including **source + background impacts**, must not exceed the new NAAQS.
 - Total PM impact = source (AERMOD) + background impacts (monitor)
- If background PM is close to the NAAQS, the capacity for additional PSD source impacts is limited.
- New methods for background PM are being explored.
 - Flexibility with monitor selection
 - Exclusion of impacts from exceptional events (wildfires) and nearby sources from background monitor

Key Items to Keep an Eye on

- EPA actions on exceptional event demonstrations and 2024 data certification.
 - Timeline: Spring/Summer 2025
- Final area designations by EPA on February 6, 2026.
- EPA announcements on Revisiting PM NAAQS
- Reminder: Work closely with TDEC APC staff (or your local air quality authority) on potential projects that may be impacted by the new NAAQS.

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TN

Questions?