Tennessee Air Quality Update

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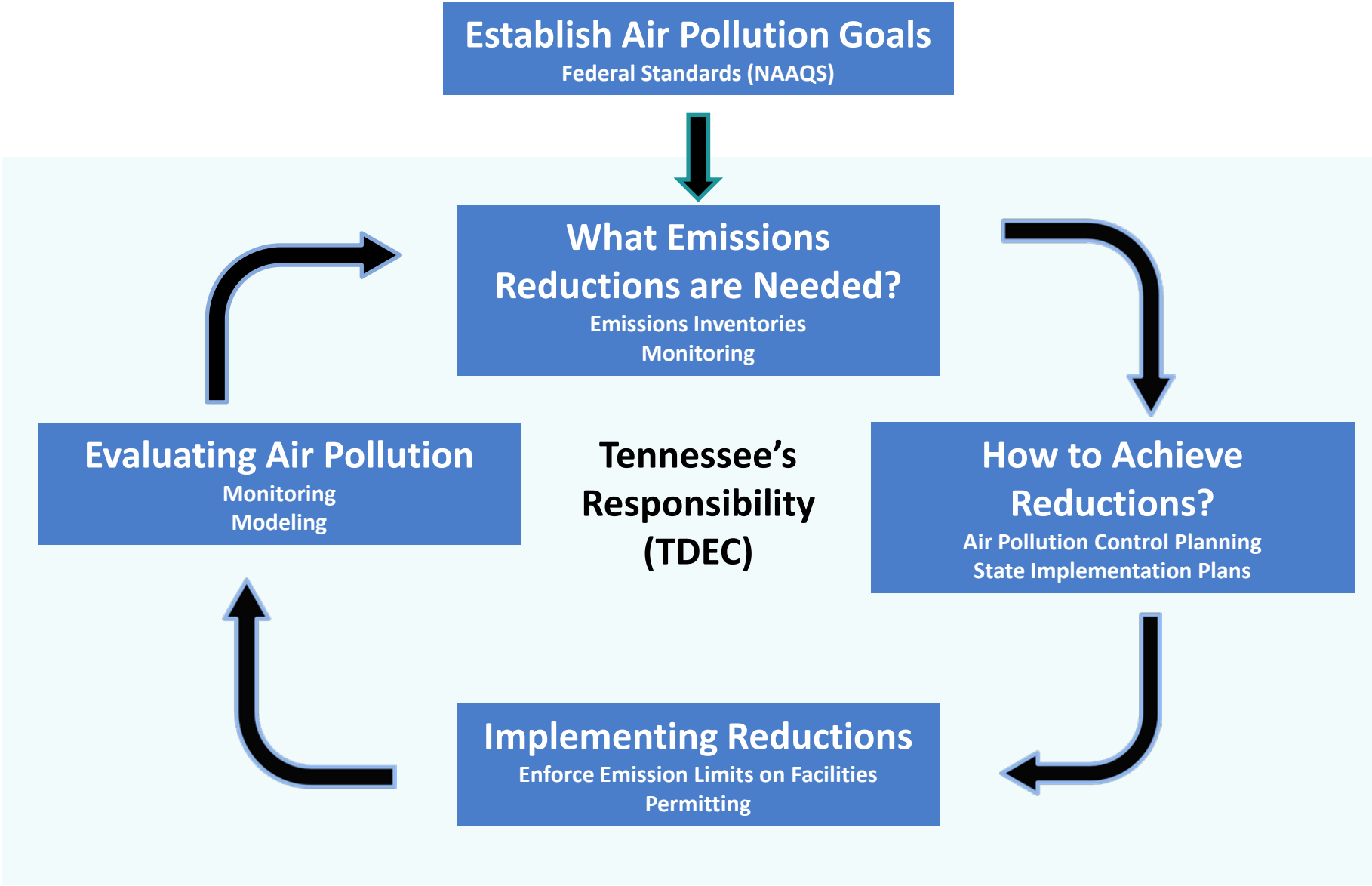
Tennessee Dept of Environment and Conservation
Division of Air Pollution Control

Air Permitting Workshop, August 20, 2024

Air Quality Management in a Nutshell



National Ambient Air Quality Standards (NAAQS)

The Clean Air Act requires the Environmental Protection Agency (EPA) to set **National Ambient Air Quality Standards (NAAQS)** for six criteria pollutants, which can be harmful to public health and the environment.

Two Types of NAAQS:

- **Primary Standards**: Provide **public health** protection, including safeguarding sensitive populations such as asthmatics, children, and the elderly.
- **Secondary Standards**: Provide **public welfare** protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

Six Criteria Air Pollutants

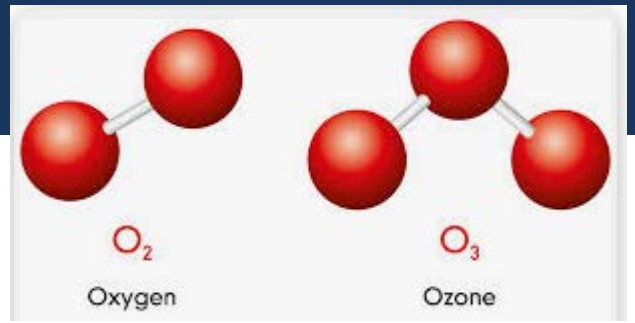
- Particulate Matter
- Ozone
- Carbon Monoxide
- Lead
- Sulfur Dioxide
- Nitrogen Dioxide

Status of NAAQS Reviews (April 2024)

	Lead	Ozone	PM[1]	Secondary (Ecological) NO_2, SO_2, PM[2]	Primary NO_2	Primary SO_2	CO
Last Review Completed (final rule signed)	Sept 2016	Dec 2020	Dec 2020/Feb 2024	Mar 2012	April 2018	Feb 2019	Aug 2011
Recent or Upcoming Major Milestone(s)	Feb 7, 2024 Final ISA[3] released Fall 2024 Draft PA[3]	Aug 25, 2023 Call for Info. on the ISA[3] Spring 2024 Science Policy Workshop Fall 2024 Draft IRP[3] Volume 1 and 2	January 2023 Proposed Rulemaking February 2024 Final Rule, effective May 6, 2024	April 3, 2024 Proposed Rulemaking Dec. 10, 2024 Final Rulemaking (consent decree)	Mar. 18, 2024 Draft IRP[3] Vol. 1 & 2 released for CASAC consultation on 4/16/2024	TBD[4]	TBD[4]
Additional information regarding current and previous NAAQS reviews is available at: http://www.epa.gov/ttn/naaqs/							

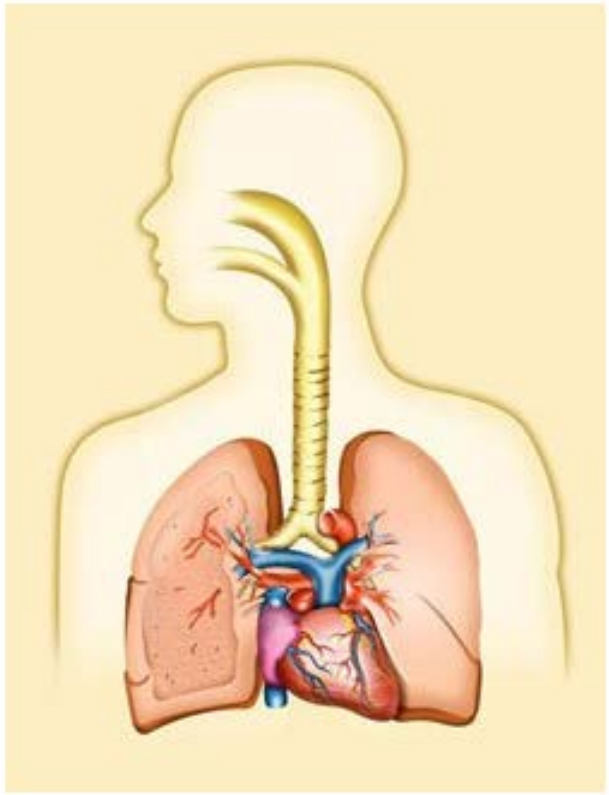
[1] Combined primary and secondary (non-ecological effects) review of PM
[2] Combined secondary (ecological effects only) review of NO_2, SO_2, and PM
[3] PA – Policy Assessment; REA – Risk and Exposure Assessment; IRP – Integrated Review Plan; ISA – Integrated Science Assessment
[4] TBD = To be determined

Ozone (O_3)



Stratospheric ozone is "good" because it protects living things from ultraviolet radiation from the sun.

Ground-level ozone is "bad" because it can trigger a variety of health problems.



Ozone is a powerful oxidant that can irritate the airways.

Depending on the level of exposure, ozone can:

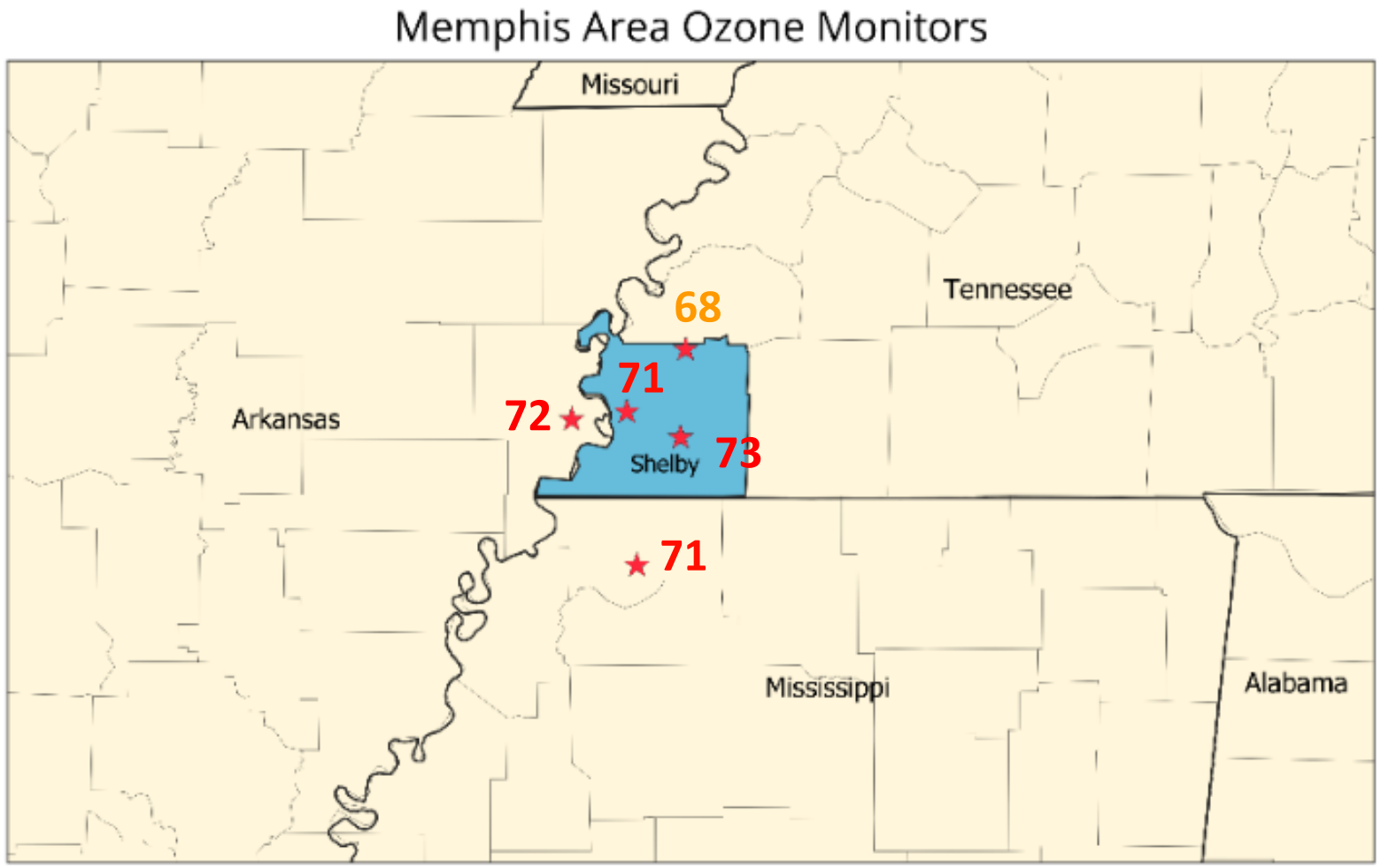
- Cause coughing and sore or scratchy throat.
- Make it more difficult to breathe deeply and vigorously and cause pain when taking a deep breath.
- Inflame and damage the airways.
- Make the lungs more susceptible to infection.
- Aggravate lung diseases such as asthma, emphysema, and chronic bronchitis.
- Increase the frequency of asthma attacks.

2015 Ozone NAAQS

- 10/1/2015 – EPA lowered ozone NAAQS from 75 to 70 parts per billion

- 11/6/2017 – EPA designated all areas of Tennessee as attainment

Preliminary 2024 Memphis Area Ozone Design Values



TN Department of Environment & Conservation

Advance Program

Sulfur Dioxide (SO_2)

Formed during the combustion of sulfur-bearing fuels.

What are the health effects of SO_2?

Short-term exposures to SO_2 can harm the human respiratory system and make breathing difficult. People with asthma, particularly children, are sensitive to these effects of SO_2.

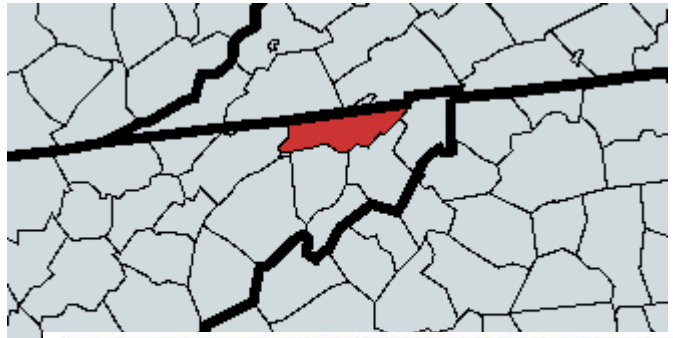
SO_2 emissions that lead to high concentrations of SO_2 in the air generally also lead to the formation of other sulfur oxides (SO_x). SO_x can react with other compounds in the atmosphere to form small particles. These particles contribute to particulate matter (PM) pollution. Small particles may penetrate deeply into the lungs and in sufficient quantity can contribute to health problems.

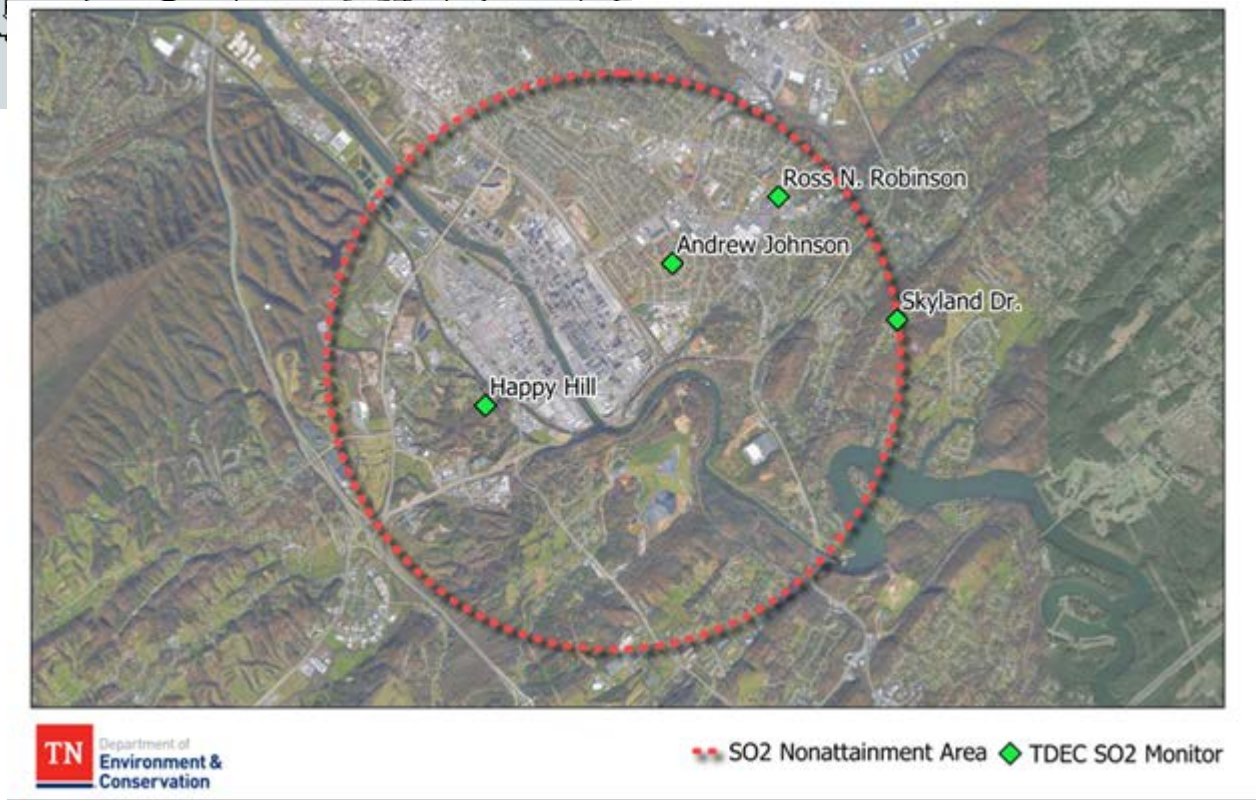
What are the environmental effects of SO_2 and other sulfur oxides?

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

SO_2 and other sulfur oxides can contribute to acid rain which can harm sensitive ecosystems.

Sullivan County Nonattainment Area

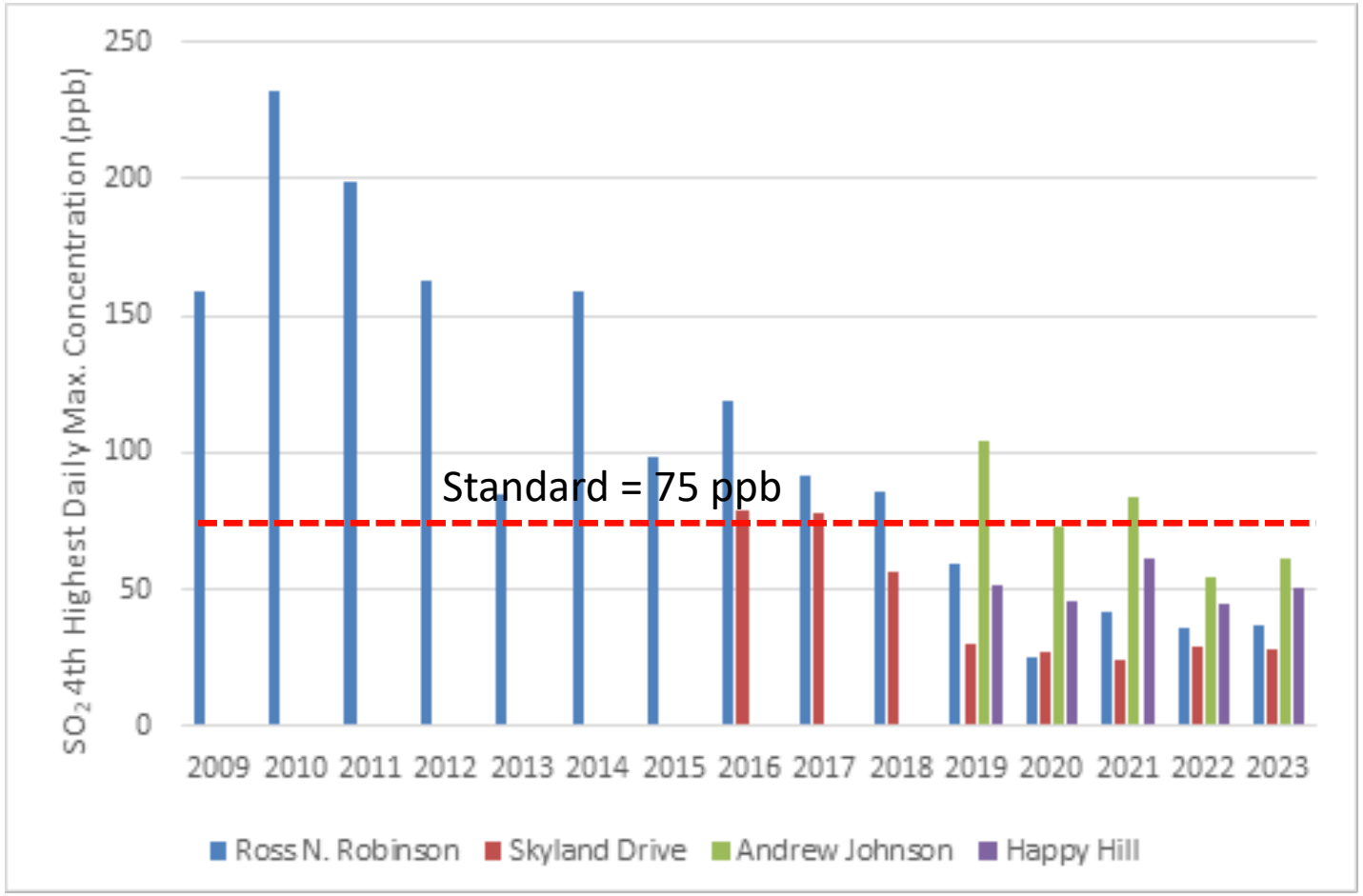




EASTMAN
Eastman Chemical Company

Sullivan County Nonattainment Area

- SO2 emission reduction measures implemented 2014 to 2021
- All monitors attaining NAAQS since 2022
- TDEC working with EPA and Eastman to prepare redesignation request and maintenance plan



Particulate Matter (PM)

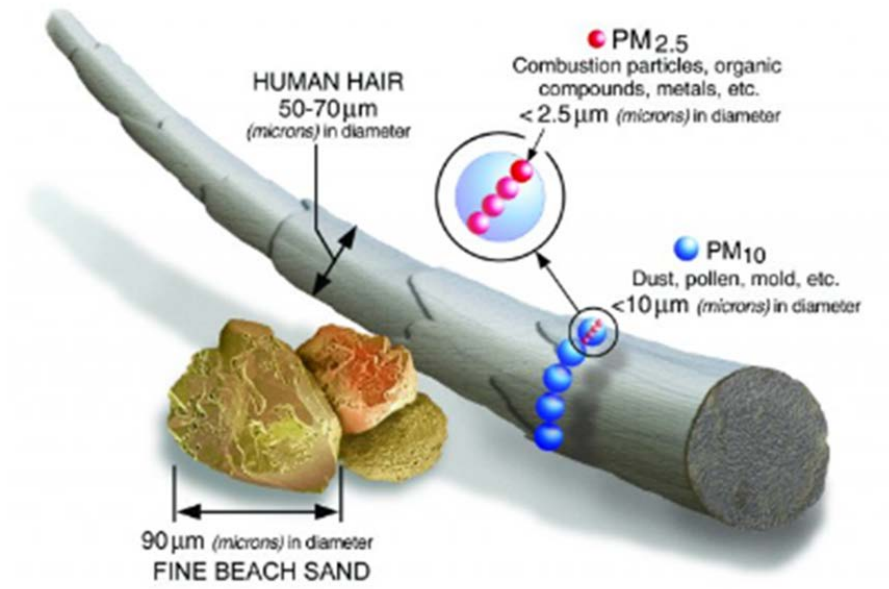
Particulate Matter (PM) is a mixture of solid particles and liquid droplets. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope.

PM2.5 : fine inhalable particles, with diameters that are 2.5 micrometers and smaller.

How small is 2.5 micrometers? Think about a single hair from your head. The average human hair is about 70 micrometers in diameter – making it 30 times larger than the largest fine particle.

Fine particles (PM2.5) are of greatest health concern

- PM2.5 can enter the respiratory tract and make its way into the lower parts of the lungs
- Some particles can move out of the respiratory system and affect other organ systems



Size comparisons for PM particles

Final PM Rule

On February 7, 2024, EPA changed the level of the primary (health-based) annual standard for fine particles ($PM_{2.5}$) from **12.0** to **9.0 micrograms per cubic meter (µg/m3).**

EPA is not changing all other PM standards:

- The primary (health-based) and secondary (welfare-based) 24-hour $PM_{2.5}$ standards stay at the level of 35 µg/m3
- The primary and secondary 24-hour PM10 standards stay at the level of 150 µg/m3
- The secondary annual $PM_{2.5}$ standard stays at the level of 15.0 µg/m3

EPA is also:

- Revising the Air Quality Index (AQI) to improve public communications about the risks from $PM_{2.5}$ exposures
- Making changes to the monitoring network to enhance protection of air quality in communities overburdened by air pollution

Preliminary 2021-2023 $PM_{2.5}$ Design Values (AQS data as of 8/8/2024)

State	County	AQS ID	Address	Preliminary 2021-2023 Daily DV (Standard = 35)	Valid	Preliminary 2021-2023 Annual DV (Standard = 9.0)	Valid
Arkansas	Crittenden	05-035-0005	LH POLK AND COLONIAL DRIVE	19	Y	8.2	Y
Georgia	Walker	13-295-0004	301 Williams St., Rossille, GA 30741	26	N	10.0	Y
Kentucky	Bell	21-013-0002	1420 DORCHESTER AVENUE	22	Y	9.1	Y
Kentucky	Christian	21-047-0006	WILLIAMSON RESIDENCE, 10800 PILOT ROCK ROAD	22	Y	8.6	Y
Mississippi	DeSoto	28-033-0002	5 EAST SOUTH ST. (HERNANDO)	21	Y	8.7	Y
Tennessee	Blount	47-009-0011	2007 SEQUOYAH AVENUE MARYVILLE TN 37803	20	Y	7.4	Y
Tennessee	Davidson	47-037-0023	105 SOUTH 17TH ST @ LOCKELAND SCHOOL	23	Y	9.4	Y
Tennessee	Davidson	47-037-0040	1113 Elm Hill Pike	22	Y	9.6	Y
Tennessee	Dyer	47-045-0004	175-B GREENWAY STREET, DYERSBURG TN 38024	20	Y	7.7	Y
Tennessee	Hamilton	47-065-0031	1517 TOMBRAS AVENUE, EAST RIDGE	21	N	8.3	N
Tennessee	Hamilton	47-065-4002	RIVERSIDE SUBSTATION 911 SISKIN DR	22	Y	8.4	Y
Tennessee	Knox	47-093-1013	939 Stewart St. Knoxville, TN 37917	21	Y	8.5	Y
Tennessee	Knox	47-093-1017	1613 VERMONT AVENUE	23	Y	9.1	Y
Tennessee	Knox	47-093-1020	4625 MILDRED DRIVE	23	Y	8.8	Y
Tennessee	Lawrence	47-099-0003	60 Busby Road	16	Y	6.8	Y
Tennessee	Loudon	47-105-0109	2175 ROBERTS RD Loudon TN 37774	17	Y	6.9	Y
Tennessee	McMinn	47-107-1002	707 NORTH JACKSON ST. Athens TN 37303	19	Y	7.8	Y
Tennessee	Madison	47-113-0010	210 Demonbreun Drive	19	Y	8.1	Y
Tennessee	Maury	47-119-2007	1600 NASHVILLE HWY Columbia TN	19	Y	7.3	Y
Tennessee	Montgomery	47-125-2001	1200 West Creek Coyote Trail	19	Y	7.2	Y
Tennessee	Putnam	47-141-0005	630 EAST 20TH STREET Cookeville TN 38501	18	Y	7.2	Y
Tennessee	Roane	47-145-0004	HARRIMAN HIGH 1002 N. ROAN ST Harriman TN 37748	18	Y	7.3	Y
Tennessee	Shelby	47-157-0024	416 ALABAMA AVENUE	19	Y	8.9	Y
Tennessee	Shelby	47-157-0075	6388 Haley Rd. (Shelby Farms NCORE site)	20	Y	8.3	Y
Tennessee	Shelby	47-157-0100	5767 Macon Cove (Near Road Site)	19	Y	8.4	Y
Tennessee	Sullivan	47-163-1007	1649 D STREET Kingsport TN 37664	18	Y	6.7	Y
Tennessee	Sumner	47-165-0007	ROCKLAND RECREATION AREA	21	Y	7.6	Y
Virginia	Bristol City	51-520-0006	EADS STREET	17	Y	7.3	Y

Notes:

1. The daily design value (DV) standard is 35 ug/m3.
2. The annual DV standard is 9.0 ug/m3.
3. Invalid DVs may become valid upon further loading or additional analysis.
4. DVs are a snapshot of the data at the time the report was run (may not be all data for year).
5. Validity = 'N' may indicate quality issues or lack of completeness.

Exceptional Events

- Exceptional events are unusual or natural occurrences that can affect air quality but are not reasonably controllable or preventable (such as wildfires, dust storms)

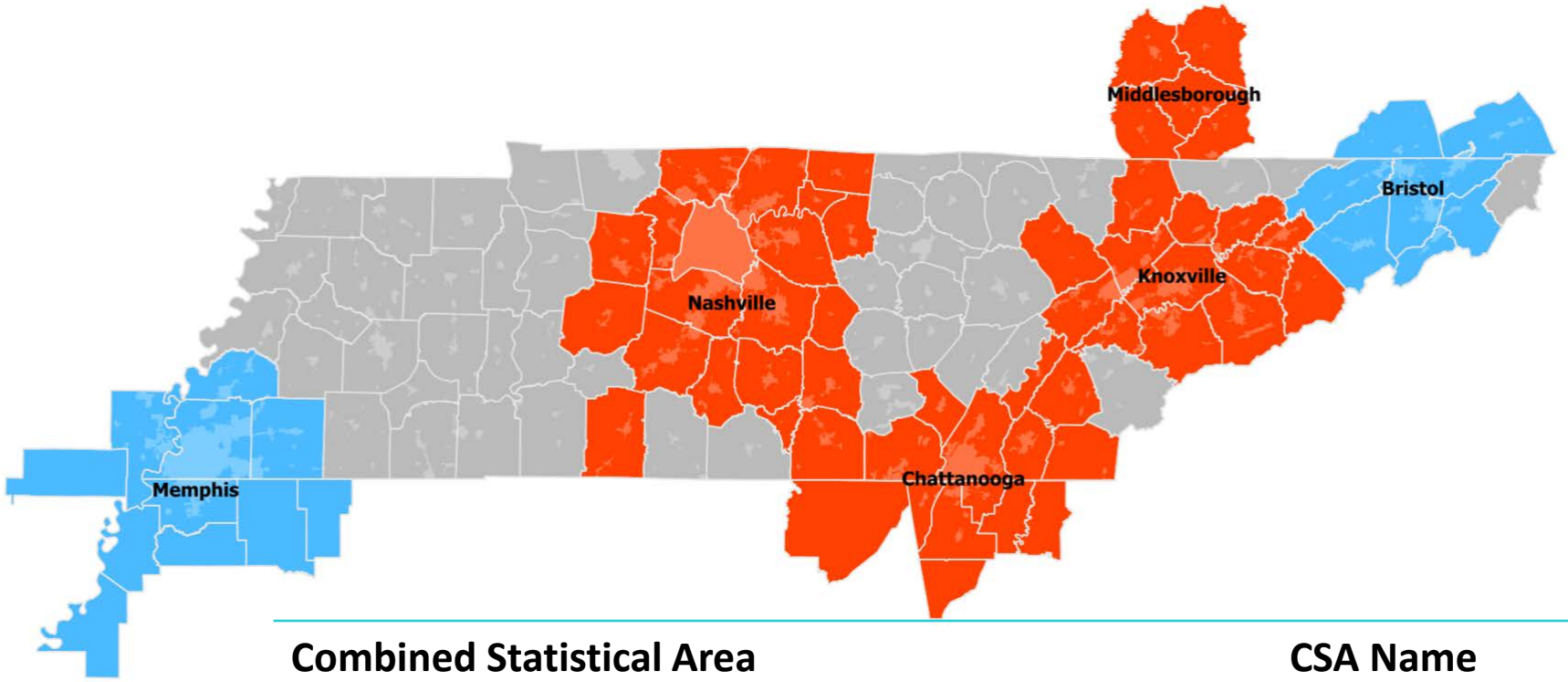
- State and local agencies may request exclusion of air quality data influenced by exceptional events when making NAAQS designations

- Tennessee working with local agencies in Tennessee and with neighboring states to assist with exceptional event demonstrations

Area Designations: Categories

- Nonattainment Area: An area that does not meet NAAQS OR that contributes to an area that does not meet the NAAQS
  - Boundaries based of 5 factors:
    - Air Quality
    - Emissions and Emissions-Related Data
    - Meteorology
    - Geography/topography
    - Jurisdictional Boundaries
  - Can include whole or partial counties
- Attainment Area: An area that is meeting the NAAQS AND is not contributing to an area that does not meet the NAAQS
- Unclassifiable – An area that cannot be designated based on available information as meeting or not meeting the NAAQS
- TDEC APC must make recommendations for every county in Tennessee.

Combined Statistical Areas (CSAs)



CSAs in Red have violating monitors

Combined Statistical Area	CSA Name	# of Counties
Memphis–Clarksdale-Forrest City, TN–MS–AR	MCF	11
Nashville-Davidson-Murfreesboro, TN	NDM	20
Chattanooga–Cleveland–Dalton, TN–GA–AL	CCD	14
Knoxville-Morristown-Sevierville, TN	KMS	13
Johnson City-Kingsport-Bristol, TN-VA	JKB	9
Middlesborough-Corbin, KY	MC	5

Impact on Industrial Facilities

- Facilities within Nonattainment Areas:
  - RACT
  - Nonattainment NSR
  - May impact industrial growth
- Facilities NOT in a Nonattainment Area
  - Lower PSD SIL
  - PSD Cumulative Modeling
    - Background Concentrations close to Standard
    - May be difficult to model attainment
  - Good Neighbor Provision

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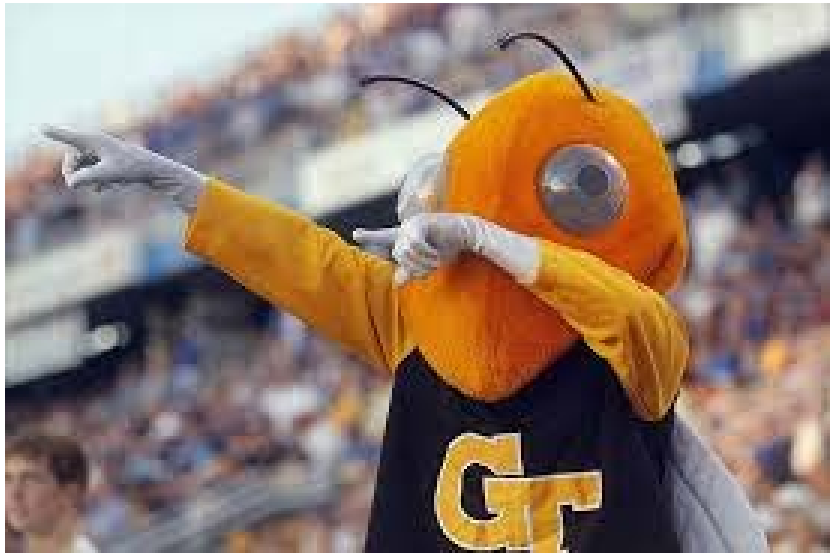

Questions?