



Natural Gas Methane Standards: An Overview

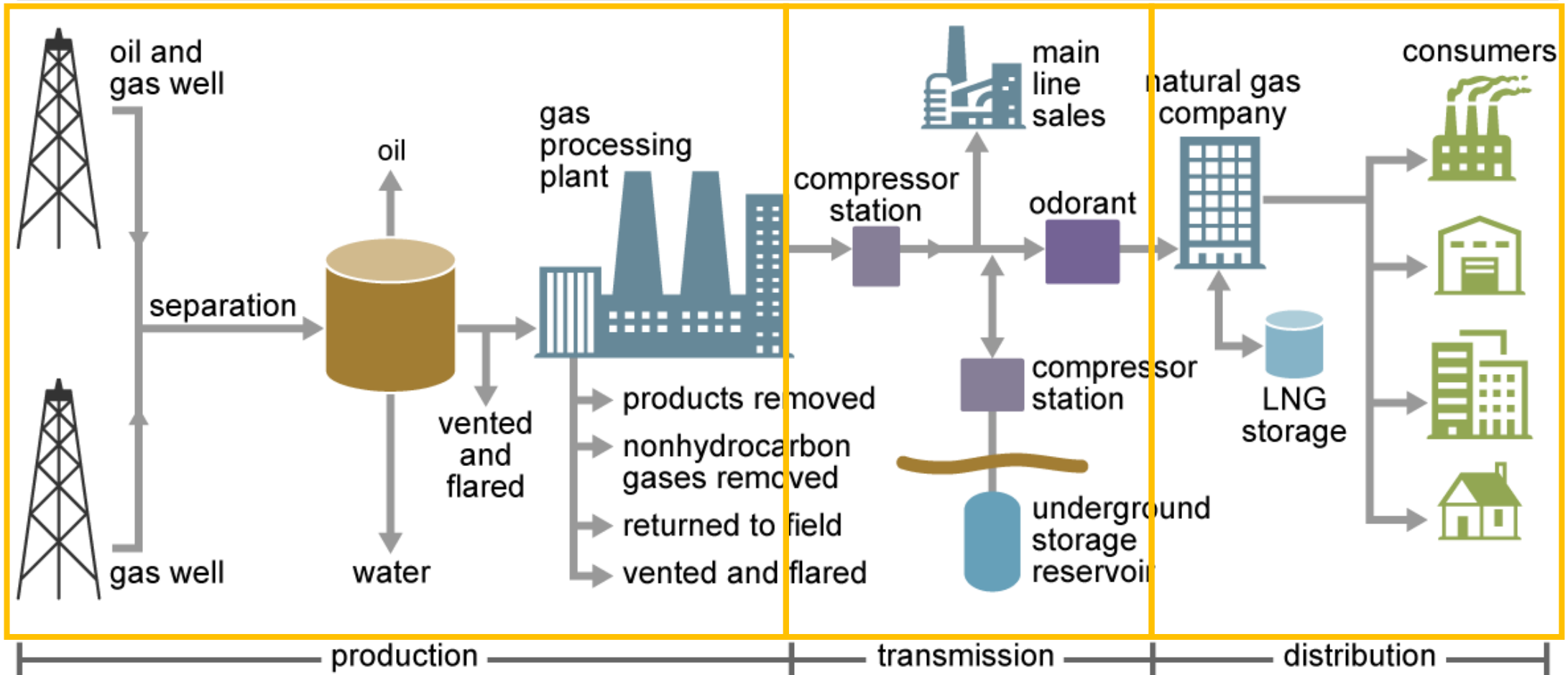
Midwest A&WMA Environmental Conference
April 22, 2025

Agenda

- Natural Gas Industry
- Recent Regulations
- OOOOb/c Requirements
- Super-Emitter Program
- Outlook



Natural gas production and delivery



Source: U.S. Energy Information Administration

Recent O&G Requirements

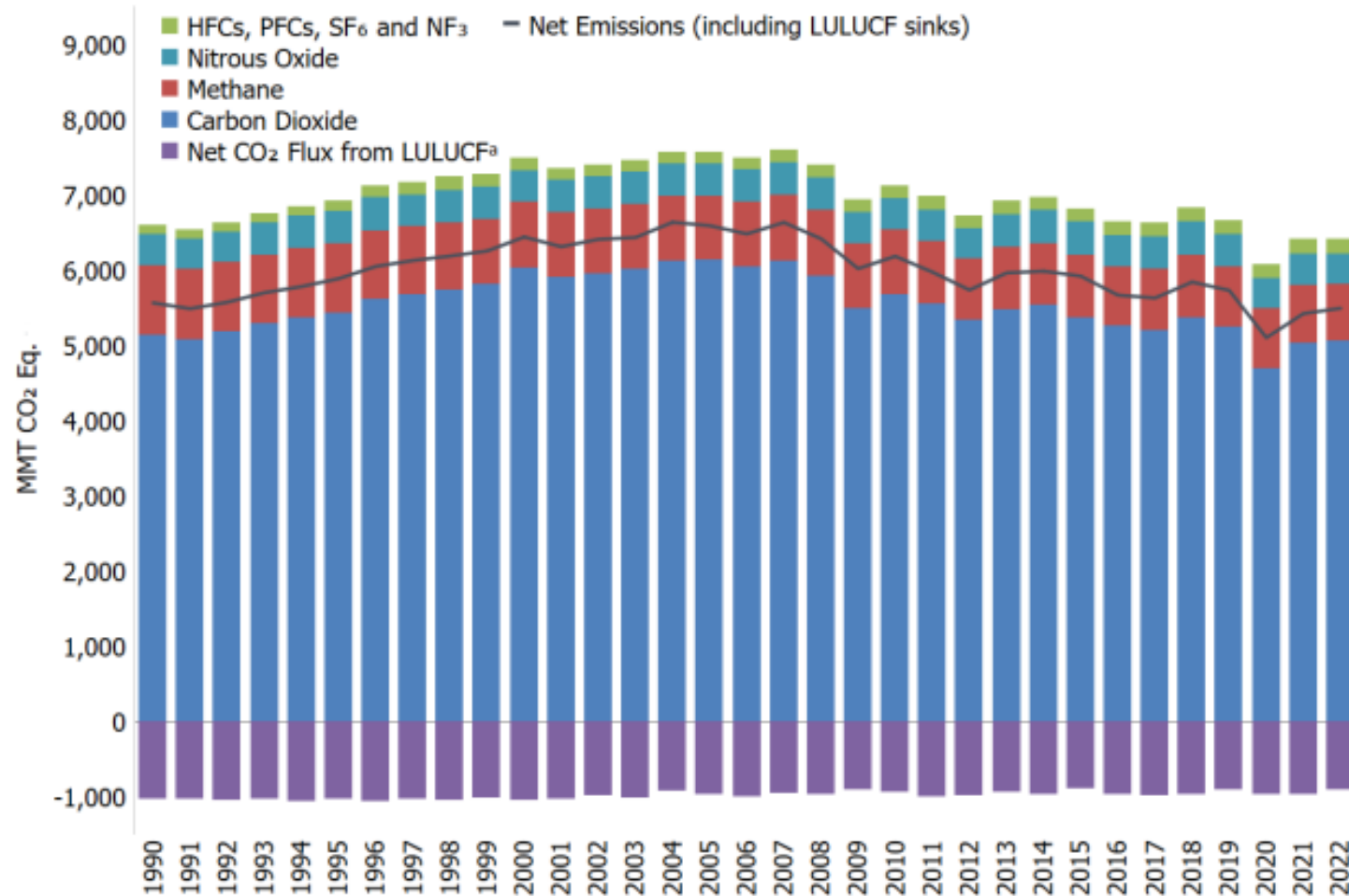
Legislation/Regulation	Emissions Target	Current Status
Ozone Good Neighbor Rule	NOx	Implementation stayed
Inflation Reduction Act	Methane	Implementing regulations overturned via CRA
Waste Emission Fee Regs	Methane	Overturned via CRA, Feb 2025
NSPS 0000b – New Oil & Gas Facilities	VOC and Methane	In effect, being reconsidered by EPA
EG 0000c – Existing Oil & Gas Facilities	Methane	In effect, being reconsidered by EPA
GHG Reporting – Subpart W Revisions	CO2 and Methane	In effect, being reconsidered by EPA

Why Methane and the Oil & Gas Industry?



US GHG Emissions & Sinks 1990-2022

Figure ES-1: U.S. Greenhouse Gas Emissions and Sinks by Gas



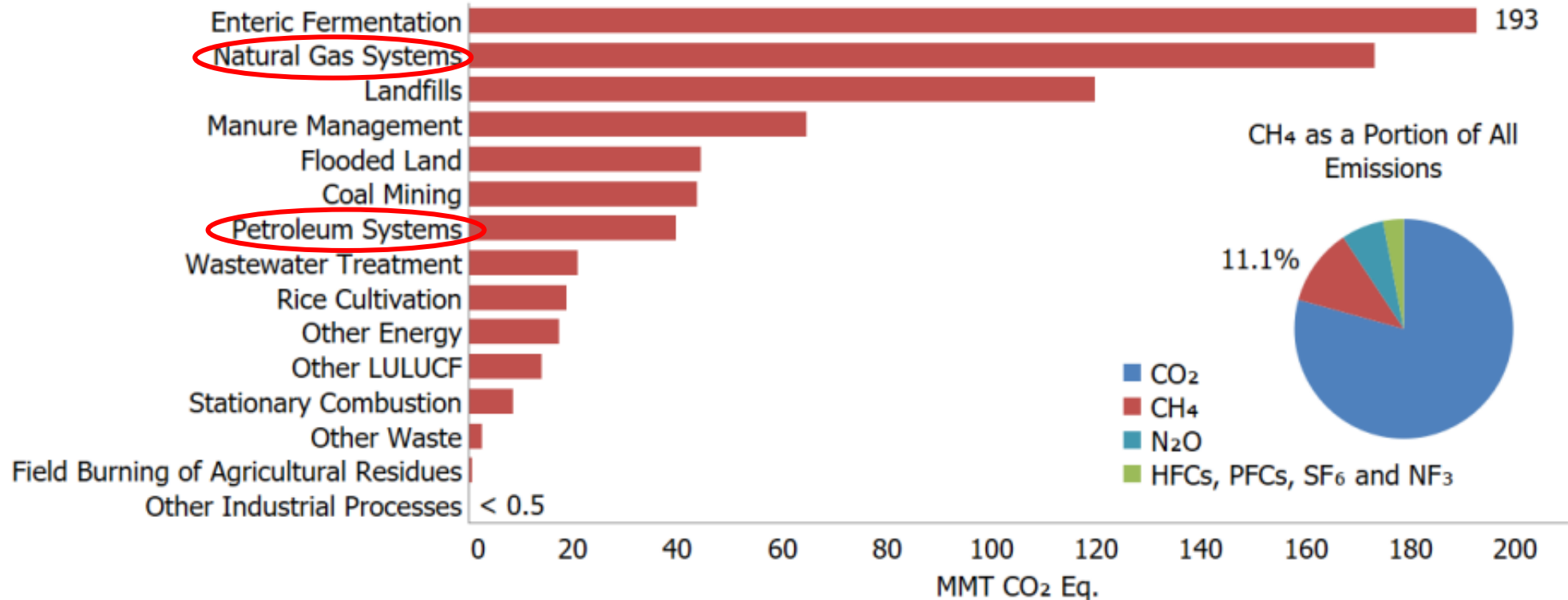
Methane = ~11% of annual CO₂e

1 ton reduction Methane =
28 ton CO₂e reduction

^a The term "flux" is used to describe the exchange of CO₂ to and from the atmosphere, with net flux being either positive or negative depending on the overall balance. Removal and long-term storage of CO₂ from the atmosphere is also referred to as "carbon sequestration."

Sources of Methane

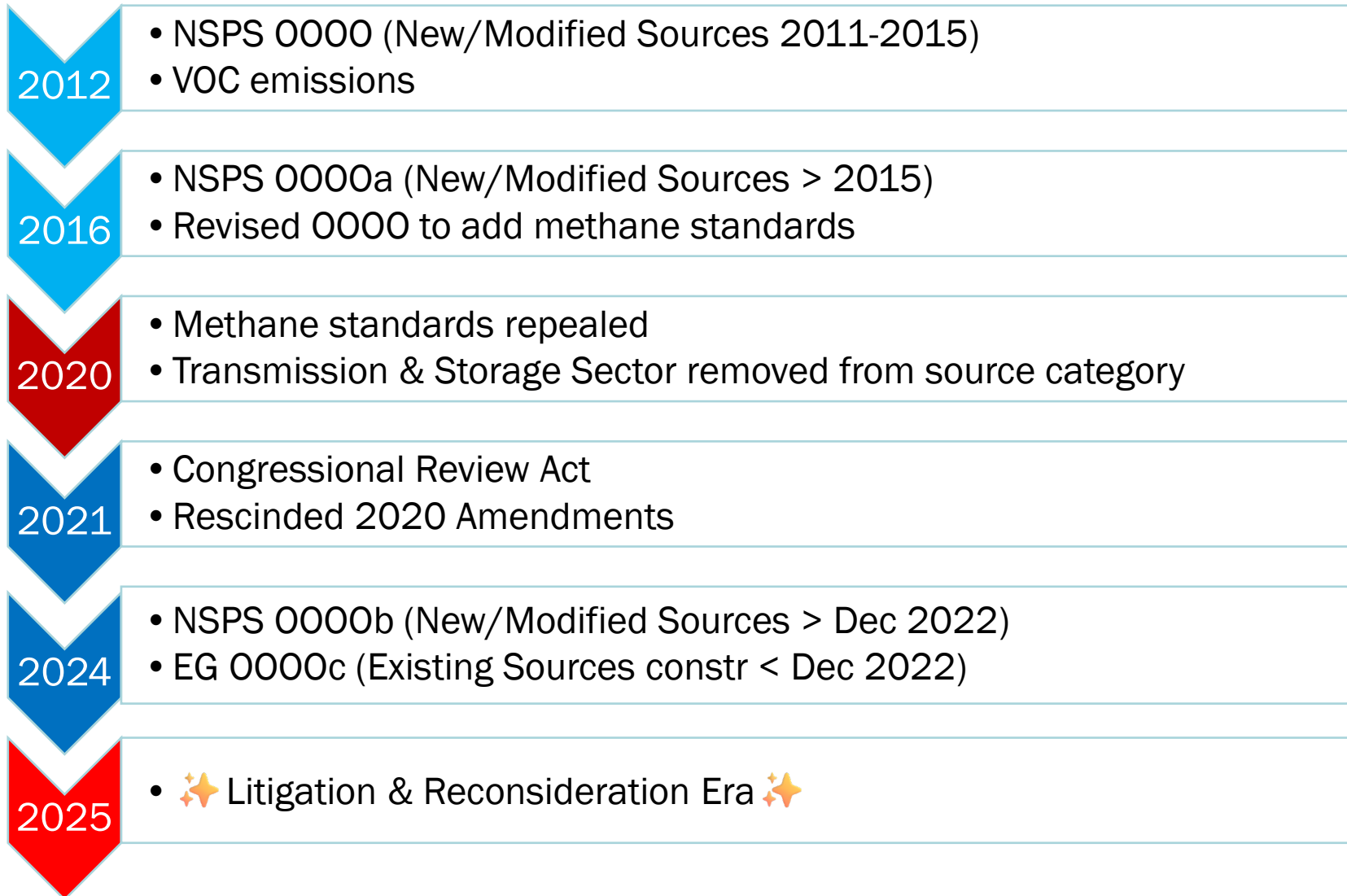
■ Figure ES-8: 2022 Sources of CH₄ Emissions



40 CFR 60, Subpart 0000 series, a brief history



0000 Regulation Eras

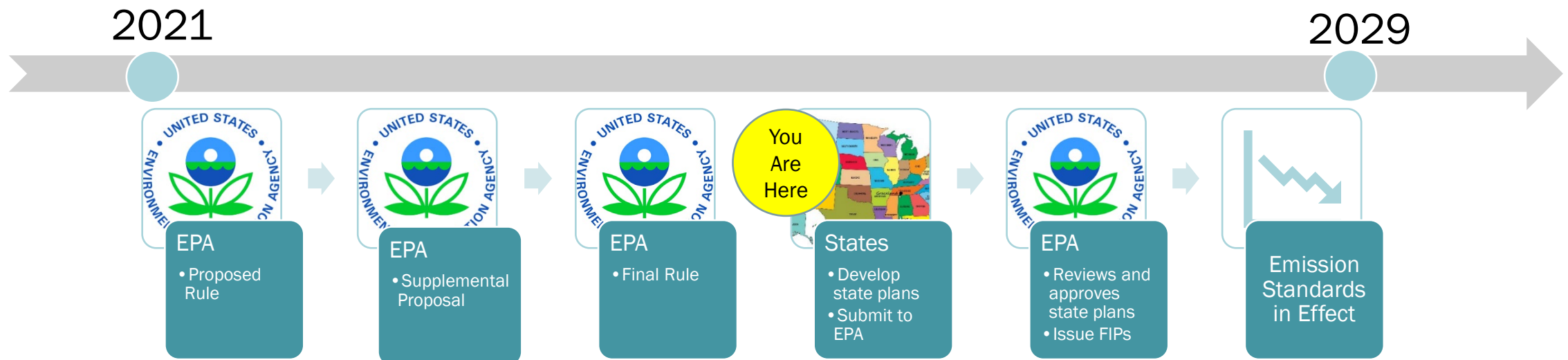


0000b/c Implementation Process

Final Rule – March 8, 2024

- 0000b Rules in effect for New/Modified Sources
- Starts timeline for States to develop state plans
- States have must develop and submit their state plans to EPA for approval by March 9, 2026

Estimate compliance date for sources: March 2029





What are the Rule Requirements?

NSPS vs. Emission Guidelines

NSPS – New Source Performance Standards

- Cutoff date for new vs. existing is based on when the regulation was originally proposed
- For 0000b/c – December 6, 2022

Emission Guidelines – set of standards for existing sources issued by EPA - States must adopt or develop equivalent regulations

- Once fully implemented, 0000c would apply to facilities previously regulated under 0000 and 0000a.

Affected Facilities

- One source may have multiple 0000b/c affected facilities.

Facility	Well Sites	Gathering & Boosting	Gas Processing	Transmission & Storage
Wells (completions/liquids unloading/associated gas)	X			
Centrifugal Compressors	X*	X	X	X
Reciprocating Compressors	X*	X	X	X
NG-Driven Process Controller	X	X	X	X
NG-Driven Pumps	X	X	X	X
Storage Vessels	X	X	X	X
Fugitive Emissions	X	X	X	X
Sweetening Units	X	X	X	X

* Centralized Production Facilities Only

The Curious Case of 0000b Modifications

- Modifications or reconstruction can trigger 0000b to existing sources.

Facility	Special Modification triggers
Each centrifugal compressor	--
Each reciprocating compressor	--
Collection of natural-gas driven pneumatic controllers at a station (ESD and zero emission do not count as part of the facility)	Increasing the number of NG-driven controllers by one or more
Each tank battery with >6 tpy VOC or 20 tpy methane emissions	Adding a tank, changing its contents, or increasing permitted throughput
Collection of natural gas-driven diaphragm and piston pumps at a station	Increasing the number of NG-driven pumps by one or more
The collection of fugitive emissions components at a station	<ul style="list-style-type: none">• A new compressor is installed, or• One or more compressors are replaced with larger HP compressors

0000b/c Requirements: Compressors

Compressor seal monitoring (every 8,760 hours of operation)

- Wet seal centrifugal compressors – 3 scfm per compressor seal
- Dry seal centrifugal compressors – 10 scfm per compressor seal
- Reciprocating compressors - 2 scfm per cylinder
- OR route seal vents to a control device or process with 95% control

Can use OGI to determine presence/absence of leak.

Repair/replacement must be completed within 90 days of measurement

Repair verification survey within 15 days of completion



0000b/c Requirements: Pneumatic Controllers and Pumps

- All process controllers and pumps must be “zero emissions”
 - Gas-driven, but no emissions
 - Emissions collected and controlled
 - Compressed air
 - Electronic
- Exemptions;
 - Emergency shutdown (ESD) devices
 - Pumps operating < 90 days/yr



0000b/c Requirements: Storage Vessels

0000b:

- Tank batteries > 6 tpy VOC OR > 20 tpy methane

0000c:

- Tank batteries > 20 tpy methane

Tanks with PTE above thresholds require 95% control



0000b/c Requirements: Leak Monitoring

- Monthly Audio, Visual, Olfactory (AVO) surveys
- Quarterly OGI or Method 21 Monitoring
- Provisions for alternative monitoring methods
- Annual Reports
- Repair schedule:
 - OGI – first attempt within 30 days, final repair within 30 days after that
 - AVO – first attempt within 15 days, final repair within 15 days after that
- Delay-of-Repair limited to 2 years



0000b/c Requirements: Other Equipment

- **Sweetening Units**
 - Facilities with sulfur production ≥ 5 LT/D
 - reduce SO₂ emissions by 99.9%.
 - Initial performance test and daily efficiency monitoring
- **Wells**
 - Recover associated gas and route to sales, onsite fuel, or other useful purpose, or reinject
 - Minimize venting for liquids unloading (BMPs or reduce VOC by 95%)
- **Control Devices**
 - Demonstrate that they meet 95%, additional parametric monitoring requirements

Super-Emitter Response Program

Per EPA: “Super Emitting” events account for ~50% of O&G emissions

Emission events with methane emissions ≥ 100 kg/hr (220 lb/hr)

Regulators or approved third-parties would notify EPA of methane events measured by

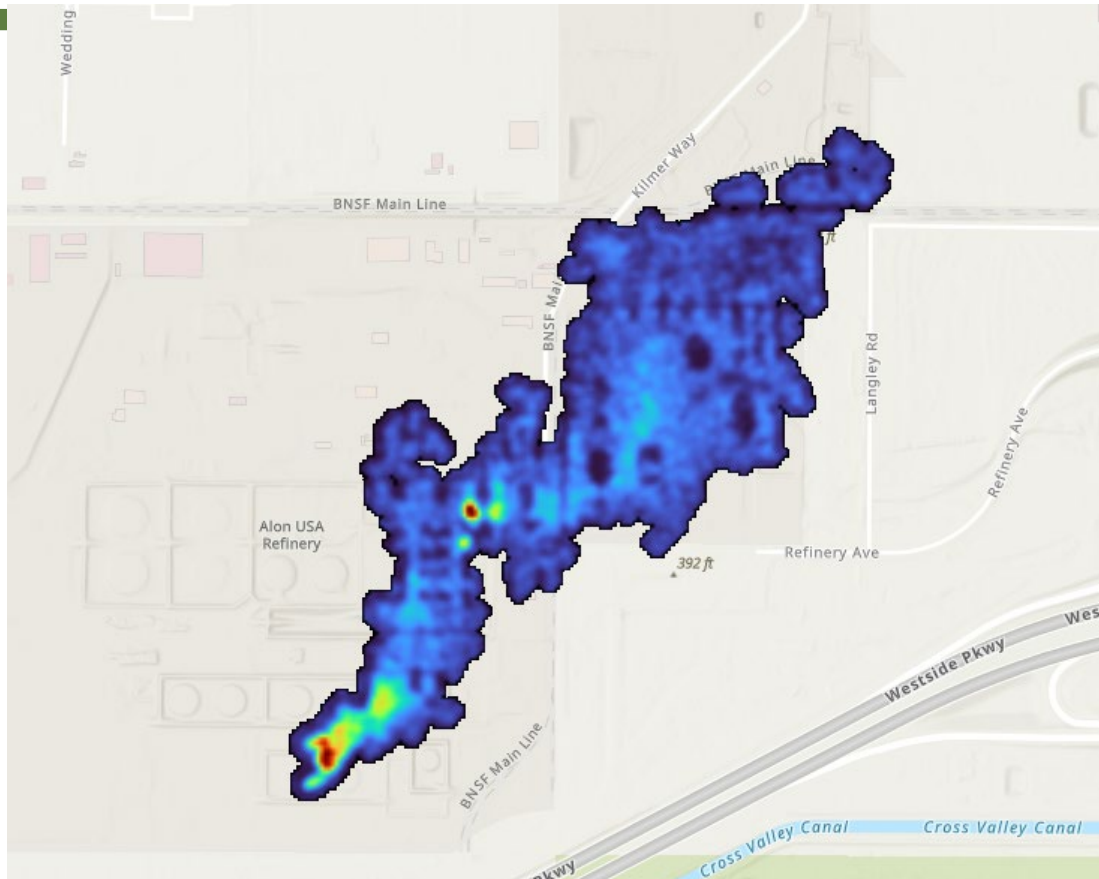
- Satellites
- Aircraft
- Vehicle-mounted devices

Notified parties will have 15 days to investigate and respond (including repairing leaking equipment, if practicable)

Notices, event data, and responses would be posted to a public website



Super Emitter Program Website



Example Plume

<https://echo.epa.gov/trends/methane-super-emitter-program/data-explorer>

Outlook



REPLY
HAZY
TRY AGAIN

Thank you

