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# **Gas Compressor Association 20<sup>th</sup> Annual Expo & Conference**

## **General Air Permitting for O&G**

**Galveston, TX ■ April 20, 2015**

**Presented by: Whitney Boger**

# Agenda

- > Introduction to Air Quality Regulations
- > Permitting Introduction
- > Federal Regulations
- > Future Regulations



# Environmental Quality is a Dynamic, Changing Field



*Always be certain to obtain the latest forms, policies, and regulations from the appropriate regulatory authority before determining permitting and compliance needs for your site. The information provided herein is subject to change as regulatory authorities update forms, policies and regulations. This is not a substitute for independent research and verification, and the application of sound professional judgment and analysis in real-time permitting and compliance situations.*

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## Section 1

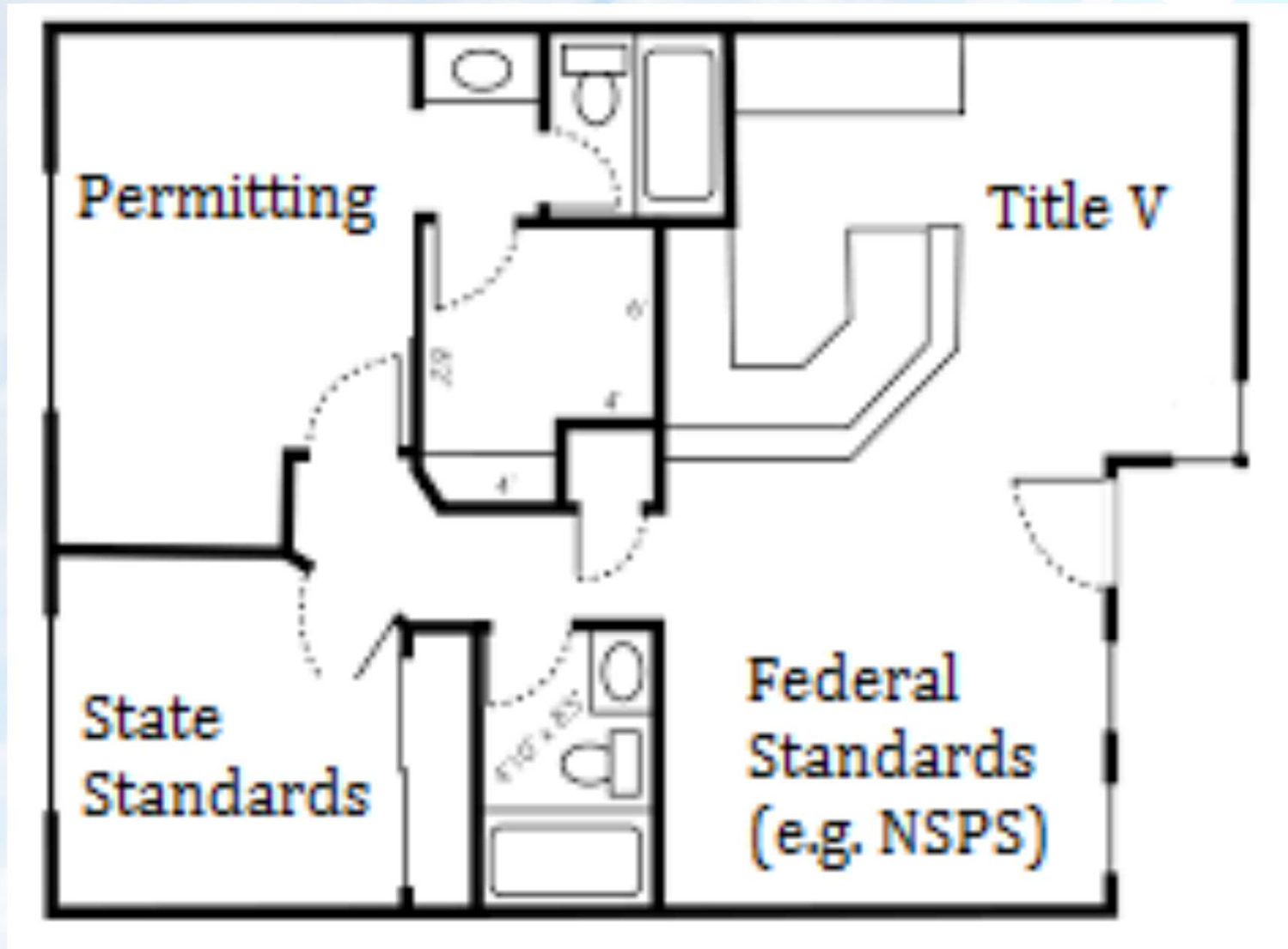
# Introduction to Air Quality Regulations

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# Types of Air Quality Rules

- > Pre-Construction/pre-modification Permits
  - ❖ Permitting path varies by state
- > Title V Operating Permits
- > State Emission Standards
- > Federal Emission Standards
  - ❖ New Source Performance Standards (NSPS)
  - ❖ National Emission Standards for Hazardous Air Pollutants (NESHAP) / Maximum Achievable Control Technology (MACT)
- > Emissions Reporting

# Types of Air Quality Rules



# Regulated Pollutants

## > Criteria Pollutants

- ❖ Nitrogen oxides ( $\text{NO}_x$ )
- ❖ Ozone (VOC and  $\text{NO}_x$  as precursors)
- ❖ Carbon monoxide (CO)
- ❖ Particulate matter < 10 microns in diameter ( $\text{PM}_{10}$ )
- ❖ Particulate Matter < 2.5 microns in diameter ( $\text{PM}_{2.5}$ )
- ❖ Sulfur dioxide ( $\text{SO}_2$ )
- ❖ Lead

Regulated through ambient air quality standards, NSPS, state standards, and air permitting.

# Regulated Pollutants (cont.)

## > Hazardous Air Pollutants

- ❖ 187 listed HAPs (e.g., benzene, toluene, formaldehyde)
- ❖ Regulated through NESHAPs, air permitting

## > CFC and HCFC

- ❖ Regulated through leak detection and repair

## > Greenhouse Gas (GHG) Pollutants

- ❖ Federal NSR Permitting (BACT) - PSD Tailoring Rule
- ❖ Mandatory Reporting Rule
- ❖ Emission standards (pending)

## > Welfare Pollutants

- ❖ Hydrogen sulfide (H<sub>2</sub>S), Total reduced sulfur (including H<sub>2</sub>S), Halons, etc.



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## Section 2

# Permitting Introduction

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# Regulations vs. Permits

- > Permits are required by the regulations
- > Air quality permit = “license” to build and operate a facility
- > Permit will outline specific regulations and operating conditions that apply to the site
  - ❖ However, there are air quality regulations that may apply to the site that are not expressly included in the permit.
- > Typically, a site must apply for a permit

# Construction Permits

- > Each state has different permitting mechanisms and levels available
- > Every emissions source must have some kind of authorization but may not require submittal
- > Major federal permitting may be required (PSD and NNSR)

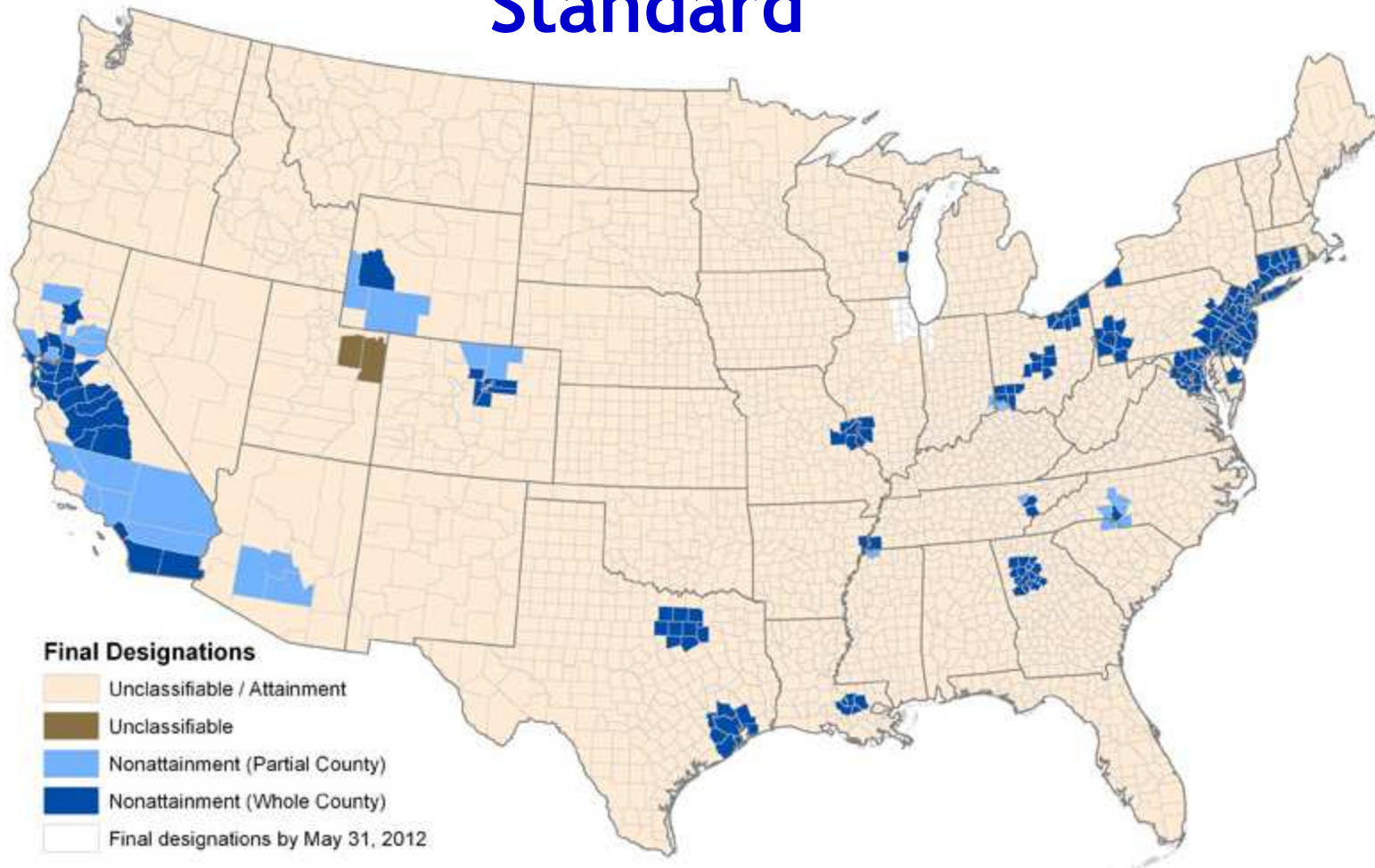
# Title V Permits

- > Required for large emitting sources
- > Emission Levels Triggering Title V
  - ❖ 100 tpy of any criteria pollutant
    - ◆ Lower thresholds for sites in nonattainment areas\*
  - ❖ 10 tpy of a single HAP
  - ❖ 25 tpy of total HAP
- > Consolidates all applicable regulations into one permit

# NAAQS - Attainment Status

- > Areas that have achieved the NAAQS are said to be in **Attainment**
- > Areas that violate the standard for a criteria pollutant are in **Non-Attainment**
- > Areas that go from Non-Attainment to Attainment retain many of the more stringent rules and are **Maintenance Areas**
- > **Unclassifiable Areas** (areas with no data on air quality) are treated as Attainment

# Map Nonattainment Areas for 2008 Ozone Standard



**Notes:**

EPA does not intend to designate as nonattainment any areas outside the Continental US.

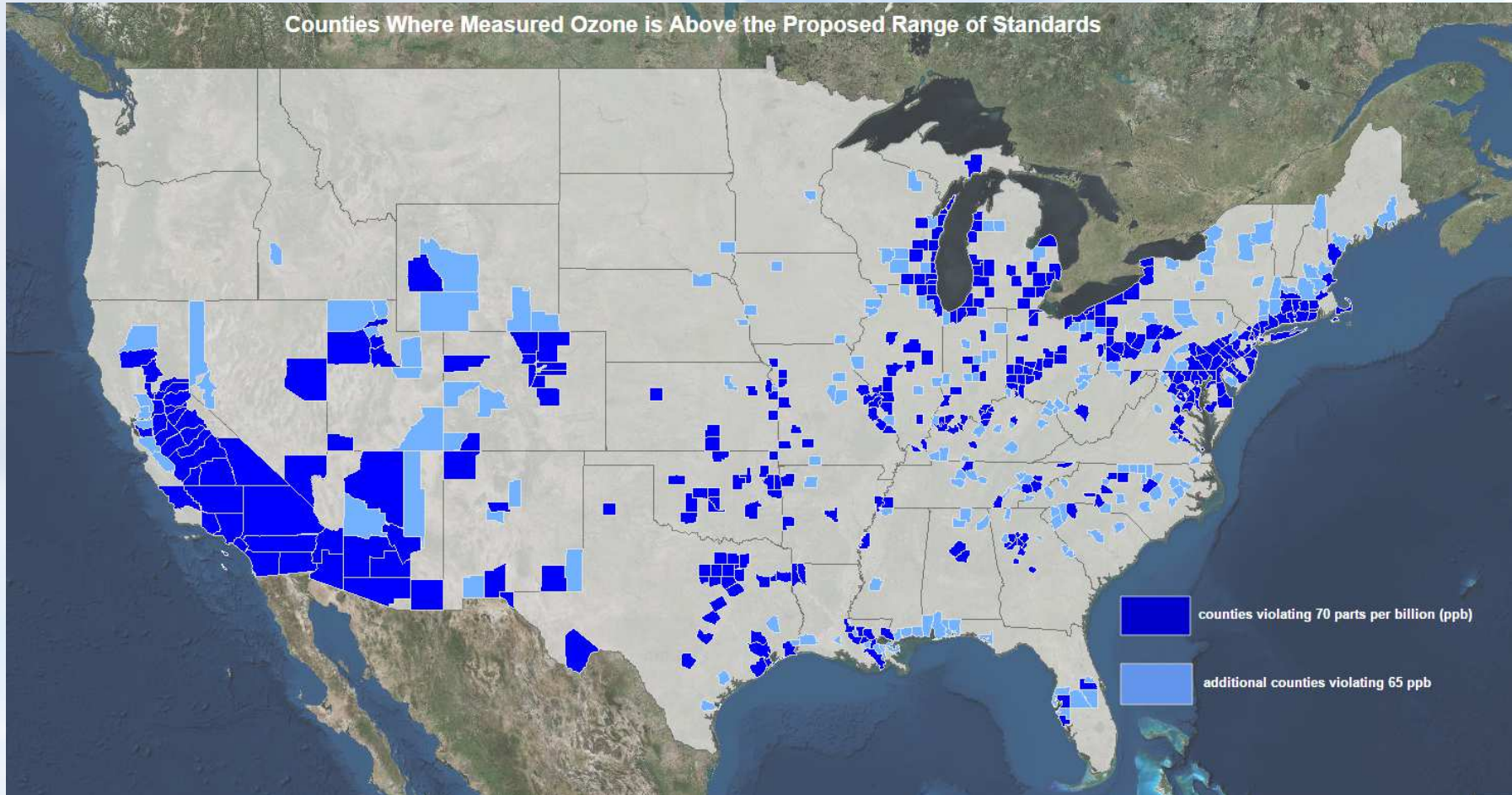
# Updates to Ozone NAAQS

- > On December 17, 2014, EPA proposed revisions to the Ozone National Ambient Air Quality Standard (NAAQS).

Current Ozone (8-hr) Standards	Proposed Ozone (8-hr) Standards
Primary: 0.075 ppm	Primary: 0.065-0.070 ppm
Secondary: 0.075 ppm	Secondary: 0.065-0.070 ppm

- > Comment period ended March 17, 2015.
- > Final rule estimated to be published by October 1, 2015  
<https://www.federalregister.gov/articles/2014/12/17/2014-28674/national-ambient-air-quality-standards-for-ozone>

# Current Compliance with Proposed Ozone NAAQS





# NSR Major Source Thresholds

- > For NSR in **attainment** areas, “Major” is:
  - ❖ Emissions of any criteria pollutant > 100 tpy (including fugitives) if listed on List of 28; OR
  - ❖ Emissions of any criteria pollutant > 250 tpy (not counting fugitive emissions)
  - ❖ If you are major for one attainment criteria pollutant, you are major for them ALL
  
- > For NSR in **nonattainment** designation depends on severity

# List of 28 (100 tpy Threshold)

1. Coal cleaning plants (with thermal dryers)
2. Kraft pulp mills
3. Portland cement plants
4. Primary zinc smelters
5. Iron and steel mills
6. Primary aluminum ore reduction plants
7. Primary copper smelters
8. Municipal incinerators capable of charging more than 250 tons of refuse per day
9. Hydrofluoric acid plants
10. Sulfuric acid plants
11. Nitric acid plants
12. Petroleum refineries
13. Lime plants
14. Phosphate rock processing plants
15. Coke oven batteries
16. Sulfur recovery plants
17. Carbon black plants (furnace process)
18. Primary lead smelters
19. Fuel conversion plants
20. Sintering plants
21. Secondary metal production plants
22. Chemical process plants
23. Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels
24. Taconite ore processing plants
25. Glass fiber processing plants
26. Charcoal production plants
27. Fossil fuel-fired steam electric plants of more than 250 million British thermal units (BTU) per hour heat input
28. Fossil-fuel boilers (or combination thereof) totaling more than 250 million BTU/ hour heat input

# PSD Applicability

- > Attainment areas only
- > Determined on a pollutant-by-pollutant basis

## How is PSD triggered?

- ❖ For existing major sources:
  - ◆ A “significant” increase in emissions of any criteria pollutant
- ❖ For new sources:
  - ◆ An increase equal to or greater than major source thresholds (100 / 250 tpy)
- ❖ For existing minor sources:
  - ◆ An increase equal to or greater than major source thresholds (100 / 250 tpy)

# Significant Increases at Existing Major Sources

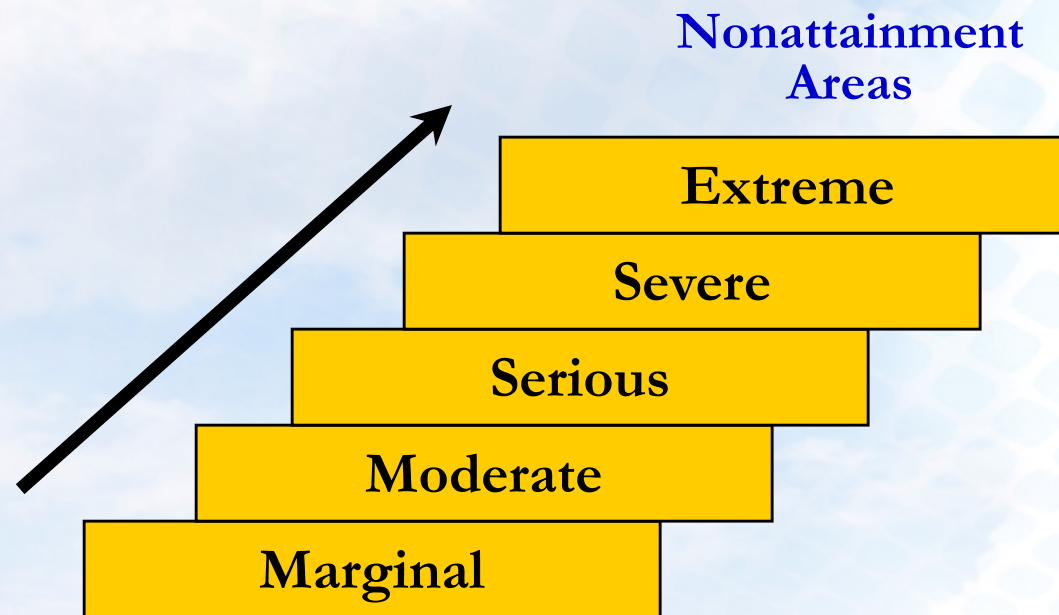
Pollutant	Significance Threshold (tpy)
VOC	40
CO	100
NO <sub>x</sub>	40
SO <sub>2</sub>	40
PM <sub>10</sub>	15
PM <sub>2.5</sub>	10
Pb	0.6
Fluorides	3
Sulfuric acid mist	7
★ H <sub>2</sub> S	10
Total reduced sulfur	10
Reduced sulfur compounds	10

# Nonattainment New Source Review (NNSR) Major Sources

- > Major Source: potential emissions  $\geq$  100 tpy (or less depending on classification of area)
  - ❖ “Major” status is determined on a pollutant by pollutant basis (i.e., a source can be major for a nonattainment pollutant and minor for attainment pollutants)

# Nonattainment Area Designations

Tiered nonattainment area designations



Increasingly stringent regulations

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## Section 3

# Federal Regulations

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# New Source Performance Standards (NSPS) (40 CFR 60)

- > Applies to *Criteria Pollutants*
- > Developed and listed by industry and equipment
- > Applicability must be evaluated for *new, modified, and reconstructed sources*
  - ❖ *Note that “existing” sources are not impacted until “modified” or “reconstructed”*



# Maximum Achievable Control Technology (MACT)/National Emission Standards for Hazardous Air Pollutants (NESHAP) Regulations

- > Regulate HAPs that may have the potential to cause chronic health effects
- > Contained in 40 CFR 61 and 63
- > MACT standards apply to specific source categories (e.g., refining, organic liquids distribution)

# Major vs. Area Sources

- > Most standards apply only to major sources but some apply to area sources
  - ❖ MACT HH
  - ❖ MACT ZZZZ
- > A site is a *major source* of HAPs if:
  - ❖ Potential to Emit (PTE) > 10 tons per year (tpy) for any single HAP, or
  - ❖ PTE > 25 tpy for combined HAPs
- > Non-major sources are called area sources
- > Can apply for permit to artificially limit PTE and thus avoid MACT

# Prominent Federal Requirements in Oil and Gas Industry

- > NSPS 0000 - *Gas Production, Transmission, and Distribution*
- > NSPS IIII/JJJJ and MACT ZZZZ - *Engines*
- > NSPS GG/KKKK and MACT YYYY - *Gas Turbines*
- > NSPS KKK/LLL/VV/VVa - *Gas Processing Plants*
- > MACT HH/HHH - *Dehydration Unit/Fugitives*
- > NSPS K, Ka, Kb - *Storage Tanks*
- > NSPS Dc, NESHAP DDDDD/JJJJJJ - *Heaters, Boilers, Reboilers*
- > 40 CFR Part 98 - *Mandatory GHG Reporting - Subpart W, Subpart C*

# NSPS Subpart 0000 - Crude Oil and Natural Gas Production, Transmission, and Distribution Applicability

NSPS 0000 Affected Facility	Production (Well Site)	Gathering	Gas Processing	Transmission
Hydraulically Fractured Natural Gas Wells	X			
Centrifugal Compressors		X	X	
Reciprocating Compressors		X	X	
Pneumatic Controller	X	X	X	
Storage Vessels	X	X	X	X
Equipment Leaks			X	
Sweetening Units			X	

\* Constructed/modified/reconstructed after August 23, 2011

# NSPS 0000 Compliance Schedule

NSPS 0000 Affected Facility	Standard	Compliance Date
Hydraulically fractured wildcat and delineation wells	Completion combustion	October 15, 2012
Hydraulically fractured low pressure non-wildcat and non-delineation wells	Completion combustion	October 15, 2012
Other hydraulically fractured wells	Completion combustion	Before 1/1/2015
Other hydraulically fractured wells	REC and completion combustion	After 1/1/2015
Centrifugal compressors with wet seals	95% reduction	October 15, 2012
Reciprocating compressors	Change rod packing	October 15, 2012
Pneumatic controllers at NG processing plants	Zero bleed rate	October 15, 2012
Pneumatic controllers between wellhead and NG processing plants	6 scfh bleed rate	October 15, 2013
Group 2 and 1 Storage Vessels	95% reduction	April 15, 2014/2015
Equipment Leaks	LDAR program	October 15, 2012
Sweetening Units	Reduce SO <sub>2</sub> as calculated	October 15, 2012

# NSPS III - Compression Ignition ICE

## > Applies to:

- ❖ Stationary ICE defined to include reciprocating ICE, rotary ICE and other ICE except combustion turbines
- ❖ Commence construction/modification/reconstruction **after July 11, 2005**
- ❖ **Any size** (horsepower rating)
- ❖ **Emergency & Non-Emergency**

## > Exemptions:

- ❖ Engines manufactured as a certified NFPA fire pump engine after 7/1/06 or modified/reconstructed to meet NFPA certification after 7/11/05

# NSPS JJJJ - Spark Ignition ICE

- > Applies to any new, modified, or reconstructed stationary ICE...
  - ❖ that is **spark-ignited**,
  - ❖ of **any size** (hp rating),
  - ❖ of **any fuel type**, and
  - ❖ that was constructed (ordered), modified, or reconstructed after **6/12/06** and manufactured after...

Type	Size	Affected Date
Any (except LB $500 \leq \text{hp} < 1350$ )	$\geq 500$ hp	7/1/2007
LB	$500 \leq \text{hp} < 1350$	1/1/2008
Any	$< 500$ hp	7/1/2008
Emergency	$> 25$	1/1/2009

# MACT ZZZZ - Stationary RICE

- > Applies to ALL stationary RICE regardless of date
- > Emissions limits, testing, monitoring
- > Several engine sizes/types comply with MACT ZZZZ by complying with the corresponding NSPS Subpart.

Examples include:

- ❖ Area source - new/reconstructed RICE (constructed on or after 6/12/2006)
- ❖ Major source - new/reconstructed SI 2SLB < 500 hp; new/reconstructed 4SLB < 250 hp, new/reconstructed 4SRB < 500 hp; ALL new emergency or limited use RICE < 500 HP



# Summary of Regulated Engine Pollutants

NSPS JJJJ	NSPS IIII	RICE MACT
VOC	NMHC/HC	Formaldehyde and CO (as surrogates for Total HAPs)
NO <sub>x</sub>	NO <sub>x</sub>	
CO	CO	
PM	PM	

# NSPS GG - Stationary Gas Turbines

- > Applies to Stationary Gas Turbines with
  - ❖ Heat input at peak load (H.I.P.L)  $\geq 10$  MMBtu/hr (based on lower heating value of fuel)
  - ❖ Constructed/modified/reconstructed after 10/3/1977 but before 2/5/2005
- > Standards for NO<sub>x</sub> and SO<sub>2</sub>
- > Initial Performance Test Required

# NSPS KKKK - Stationary Gas Turbines

- > Turbines constructed/reconstructed/modified after 2/5/2005
- > Subject for turbines > 10 MMBtu/hr
- > Standards for NO<sub>x</sub> (14 subcategories) and SO<sub>2</sub>
- > Potential emission limits, testing, monitoring, and reporting
- > Stationary combustion turbines regulated under this subpart are exempt from the requirements of subpart GG

# MACT YYYY - Turbines

- > Subject for stationary turbines at major sources
- > An affected source is any existing, new, or reconstructed stationary combustion turbine located at a **major source** of HAP emissions.
- > A new/reconstructed source is one that commenced construction/reconstructed **after January 14, 2003**
- > Performance tests, emission limits, monitoring, and reporting are required for applicable units.

# NSPS KKK and NSPS LLL - Natural Gas Processing Plants

- > Constructed, reconstructed, or modified after January 20, 1984 and on or before August 23, 2011
- > 40 CFR 60 Subpart KKK - Regulates **VOC** emissions in NG Processing Plants from compressors, dehys, sweetening units, and others.
- > 40 CFR 60 Subpart LLL- Regulates **SO<sub>2</sub>** emissions in NG Processing Plants from sweetening units and sulfur recovery units.

# MACT HH - Oil and Natural Gas Production Facilities

- > Regulates HAP emissions in O&G **production**
  - ❖ Glycol dehy units (major and area sources)
  - ❖ Storage vessels with potential for flash emissions (major sources)
  - ❖ Compressors and ancillary equipment in VOC HAP service (major sources)
- > Exempt from all except recordkeeping requirements if EITHER are met:
  - ❖ Benzene emissions < 0.90 Mg/yr (1.0 tpy) prior to controls OR after federally enforceable controls
  - ❖ Throughput < 85,000 scm/day (3,000,000 scf/day)

# MACT HHH - Oil and Natural Gas Transmission Facilities

- > Regulates HAP emissions in NG **transmission**
- > Glycol dehydration units
- > Major sources only

# 40 CFR Part 98 - GHG Reporting Regulations

- Subpart C - Stationary Fuel Combustion Sources
- Subpart W - Petroleum and Natural Gas Systems
  1. Offshore and onshore petroleum and natural gas production
  2. Natural gas processing plants
  3. Natural gas transmission compression
  4. Underground natural gas storage
  5. LNG storage and import/export equipment
  6. Natural gas distribution
- Subpart NN - Suppliers of Natural Gas and Natural Gas Liquids
- Subpart PP - Suppliers of Carbon Dioxide



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## Section 4

# Future Regulations

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# 2014 EPA White Papers

> On April 15, 2014, EPA released 5 White Papers on Methane and VOC Emissions. These white papers cover the following sources:

- ❖ Compressors
- ❖ Oil well completions and associated gas
- ❖ Equipment leaks
- ❖ Liquids unloading
- ❖ Pneumatic devices

> Fact Sheet:

<http://www.epa.gov/airquality/oilandgas/pdfs/20140415summary.pdf>

# Climate Action Plan Updates

- > Comprehensive, interagency strategy (EPA, BLM) to reduce methane emissions
- > **By 2020 reduce methane emissions by 17% below 2005 levels**
- > New announcements on January 14, 2015
  - ❖ Building on five technical white papers...EPA will initiate a rulemaking effort to set standards for methane and VOC emissions from new and modified oil and gas production sources, and natural gas processing and transmission sources. EPA will issue a proposed rule in the summer of 2015 and a final rule will follow in 2016.
  - ❖ Fact Sheet:

<http://www.whitehouse.gov/the-press-office/2015/01/14/fact-sheet-administration-takes-steps-forward-climate-action-plan-anno-1>

# Potential Future NSPS 0000 Applicability

NSPS 0000 Affected Facility	Production (Well Site)	Gathering	Gas Processing	Transmission
- Hydraulically Fractured Natural Gas Wells <b>and Oil Wells</b> - <b>Liquid Unloading of gas wells</b> - <b>Oil well associated gas venting/flaring</b>	X			
Centrifugal Compressors (wet seal only) <b>(Dry Seal included)</b>	<b>X</b>	X	X	<b>X</b>
Reciprocating Compressors	<b>X</b>	X	X	<b>X</b>
Pneumatic Controller <b>and Pumps</b> <b>(Intermittent and &lt; 6scfh)</b>	X	X	X	<b>X</b>
Storage Vessels	X	X	X	X
Equipment Leaks	<b>X</b>	<b>X</b>	X	<b>X</b>
Sweetening Units			X	

# Proposed Subpart W Rule for 2016

- > Adds monitoring, calculation, and reporting methodology for **oil** wells with hydraulic fracturing
- > Adds a new segment for “Onshore Petroleum and Natural Gas Gathering and Boosting”
- > Adds new “Onshore Natural Gas Transmission Pipelines” for pipeline blowdowns between compressor stations
- > Adds additional requirements for reporting well API numbers

Proposed Rule:

[http://www.epa.gov/ghgreporting/documents/pdf/2014/documents/subpart\\_w\\_2015\\_revisions.pdf](http://www.epa.gov/ghgreporting/documents/pdf/2014/documents/subpart_w_2015_revisions.pdf)

# NGO Section 112 Petition

- > On May 13, 2014, environmental groups petitioned the EPA to limit HAP emissions at oil and gas wells.
- > Petition requests EPA to establish an area source category for oil and gas production wells for certain locations.
- > Petition requests that EPA require oil and gas production wells to reduce VOC and HAP emissions by:
  - ❖ Performing green completions;
  - ❖ Using a closed loop system;
  - ❖ Using a vapory recovery unit; or
  - ❖ Capping or reduction in flaring.

# Questions?

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