



EPA's Recent Regulation of Oil and Gas Activities

Presented by:

John B. King

Breazeale, Sachse & Wilson, LLP

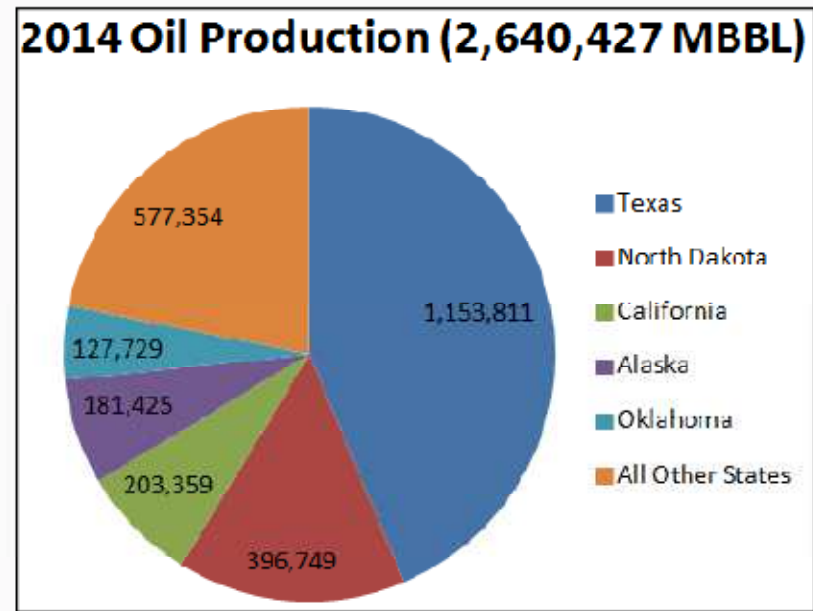
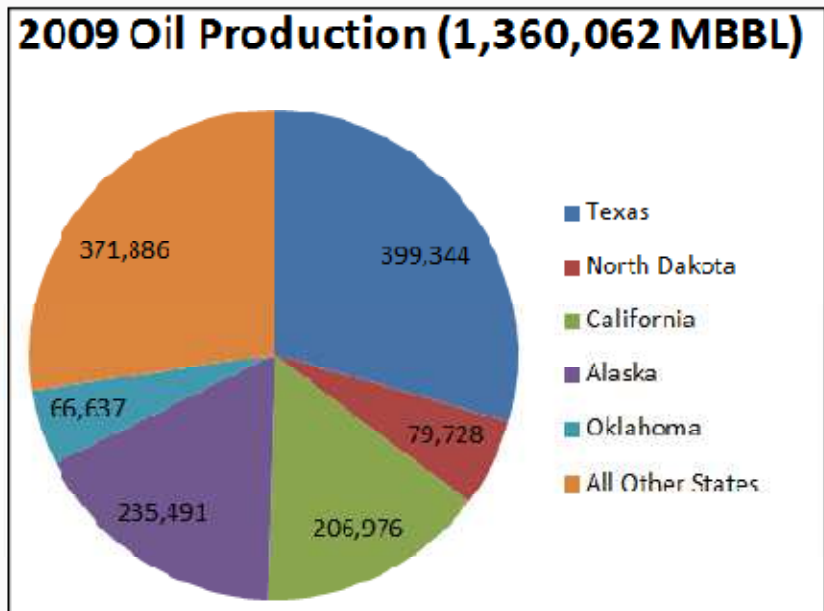
Baton Rouge, Louisiana

Outline

Overview	
The 2012 Rule	<ul style="list-style-type: none">• The basics• Key provisions
Climate Action	<ul style="list-style-type: none">• Climate Action Plan• Methane Strategy• Jan. 2015 Fact Sheet
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Overview

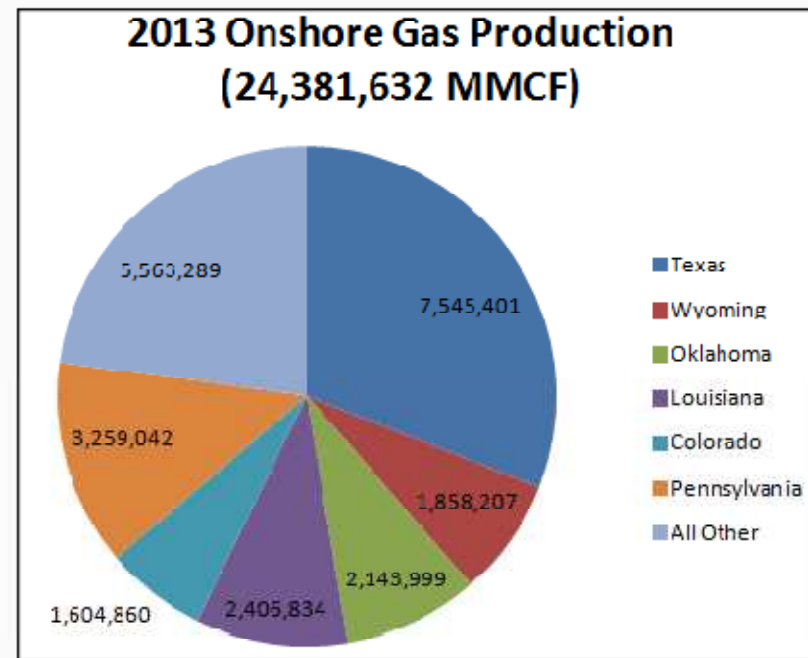
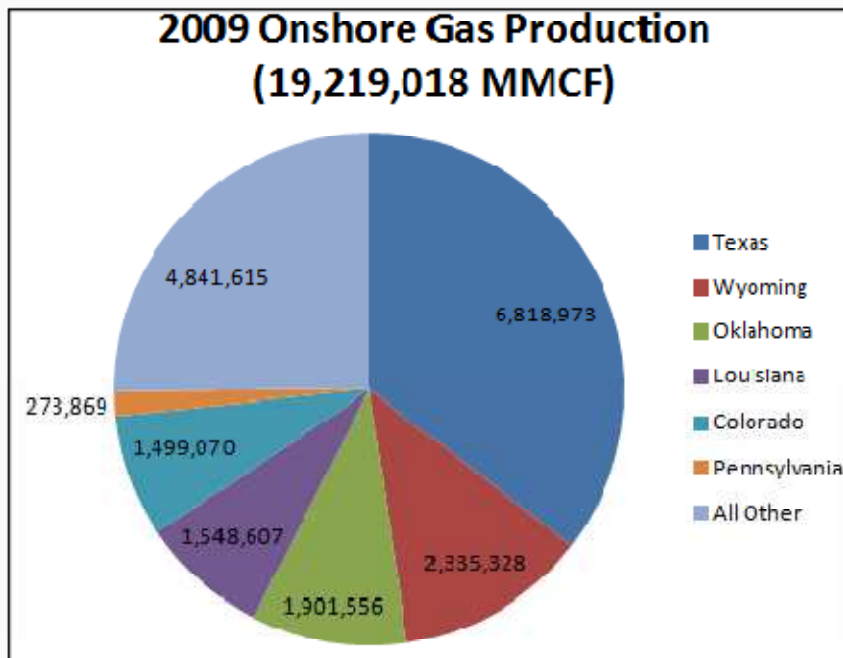
US Onshore Crude Oil Production



Source: U.S. Energy Information Administration

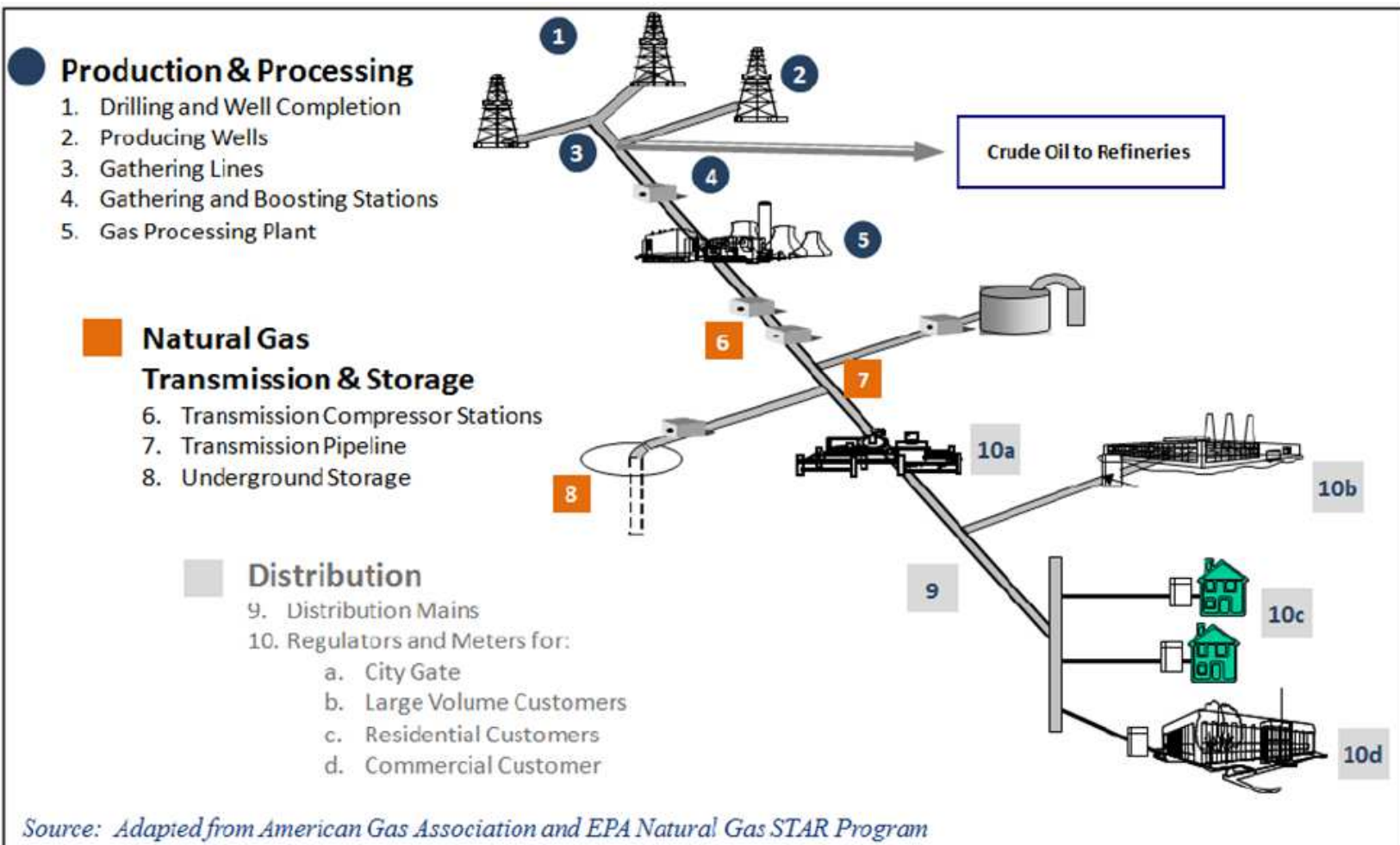
Overview

US Onshore Natural Gas Production



Source: U.S. Energy Information Administration

Overview



The 2012 Rule - The Basics

- Oil and Natural Gas Sector: NSPS and NESHAPS
 - Proposed Rule: 76 Fed. Reg. 52738 (August 23, 2011)
 - Final Rule: 77 Fed. Reg. 49490 (August 16, 2012)
 - Revisions: 78 Fed. Reg. 58416 (September 23, 2013) (storage vessels)
 - 79 Fed. Reg. 79018 (December 31, 2014) (clarification as to completions, storage vessels)
- Regulations: Applies to new, modified, reconstructed sources after August 23, 2011
 - NSPS: 40 CFR 60, Subpart OOOO ('Quad 0')
 - NESHAPS: 40 CFR 63, Subpart HH
- Intended to focus on VOC emissions from these sources
 - But, reduced air toxics and methane as well
 - Reductions claimed by EPA ...
 - VOCs: 190,000 to 290,000 tons
 - Air Toxics: 12,000 to 20,000 tons
 - Methane: 1.0 to 1.7 million short tons [19 – 33M tons of CO₂e]

The 2012 Rule - The Basics

Natural gas well sites

- Hydraulically fractured wells
- Pneumatic controllers
- Storage tanks

Oil well sites

- Pneumatic controllers
- Storage tanks

Natural gas production gathering and boosting stations

- Compressors
- Pneumatic controllers
- Storage tanks

Natural gas processing plants

- Compressors
- Equipment leaks
- Pneumatic controllers
- Storage tanks

Natural gas compressor stations (transmission and storage)

- Storage tanks

The 2012 Rule - Key Provisions

- **Applicability**

- Facilities that commence construction, modification, or reconstruction after August 23, 2011
 - New sources

- **Reduced emission completions or 'green completions'**

- Essentially, capturing VOC/methane emissions during flowback period

- Phase 1 (before Jan. 1, 2015)

- Route emissions to combustion device with continuous ignition source (flare), and
 - General duty to maximize recovery and minimize releases to the atmosphere

- OR,

- As above, plus use REC and route saleable gas to gas flow line

- Phase 2 (after Jan. 1, 2015) – Do all of the above

- **Storage tanks**

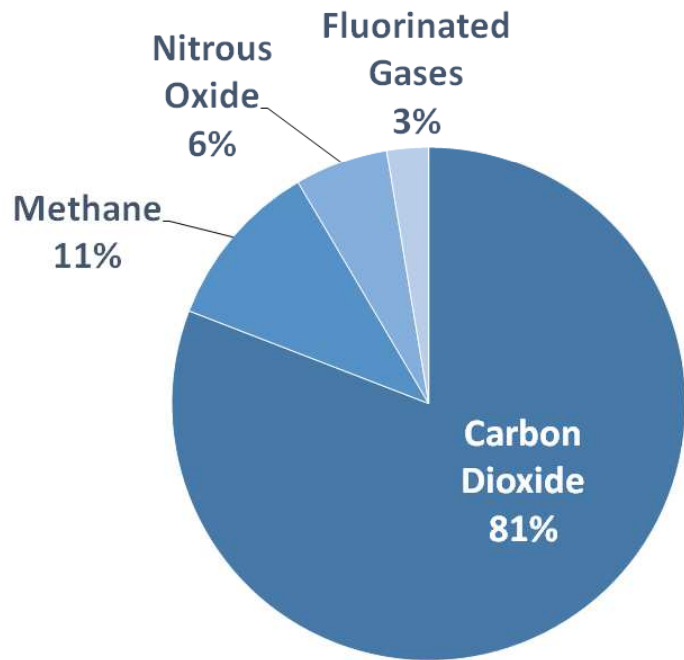
- Tanks with emission greater than 6 tons per year must reduce VOC emission by 95%

- **Equipment leaks**

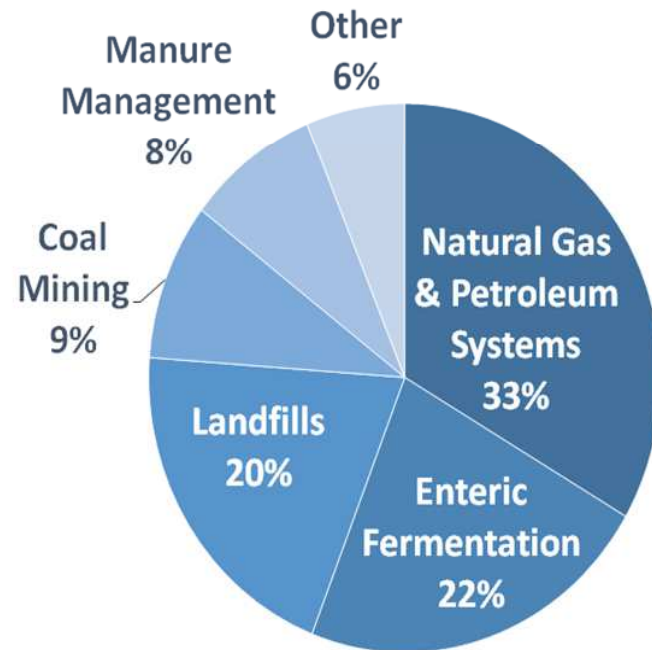
- Applies 40 CFR VVa to natural gas processing plants

Climate Action

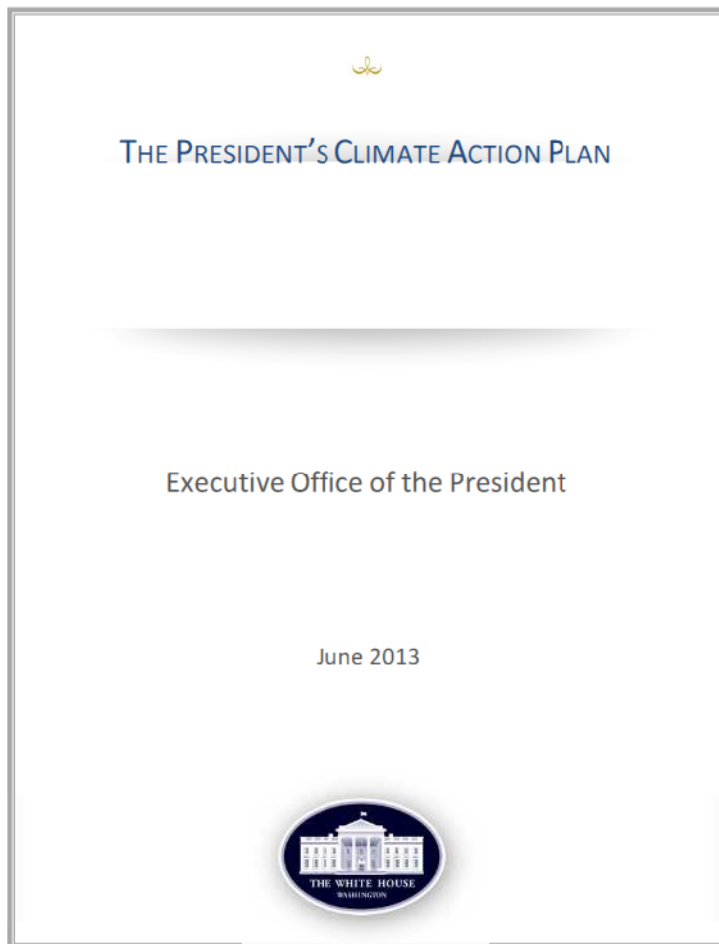
U.S. Greenhouse Gas Emissions in 2014



U.S. Methane Emissions, By Source

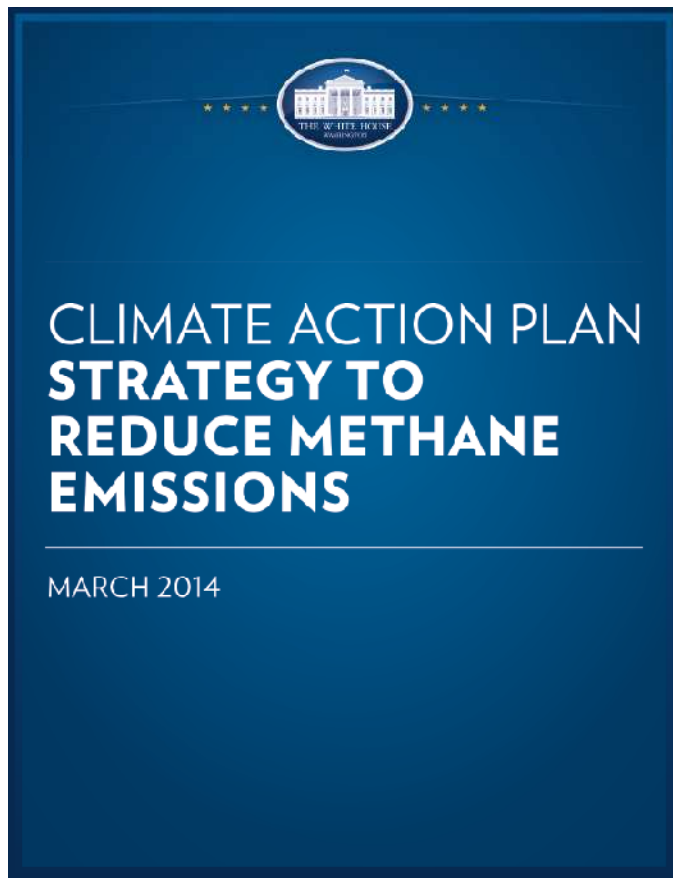


Climate Action



- Provides overall plan to reduce “carbon pollution” by 17% from 2005 levels by 2020
 - Cut carbon emissions
 - Prepare US for climate change impacts
 - Lead international efforts
- To cut carbon emissions, reduce methane from landfills, coal use, agriculture, and oil and gas development
- Methane has 20x GWP but acknowledges that methane emissions are down 8% since 1990
- Calls natural gas a ‘bridge fuel’ to be used as world transitions to cleaner sources of energy

Climate Action



- Builds on Climate Action Plan
- Identifies specifics on reduction of methane from landfills, coal use, agriculture, and oil and gas development
- As to oil and gas, calls for use of ‘cost effective technologies’ and BMPs to capture methane from vents/leaks across entire sector
 - Equipment upgrades/replacements
 - Process/operational changes
- Notes that EPA will build on “common-sense federal standards,” mentioning the 2012 Rule
 - Noted that 2012 Rule was directed at VOCs but also reduced methane

Climate Action

The White House

Office of the Press Secretary

For Immediate Release

January 14, 2015

FACT SHEET: Administration Takes Steps Forward on Climate Action Plan by Announcing Actions to Cut Methane Emissions

The Obama Administration is committed to taking responsible steps to address climate change and help ensure a cleaner, more stable environment for future generations. As part of that effort, today, the Administration is announcing a new goal to cut methane emissions from the oil and gas sector by 40 – 45 percent from 2012 levels by 2025, and a set of actions to put the U.S. on a path to achieve this ambitious goal.

- Announced a new goal to reduce methane emissions from oil and gas sector by 40 – 45% from 2012 levels by 2025
- Announced several steps:
 - Propose commonsense standards for methane/VOCs from new and modified sources
 - Develop guidelines (CTGs) to reduce ozone-forming pollutants that will also reduce methane
 - Enhance leak detection and emission reporting
 - Lead by example on public lands, mentioning the BLM's updated standards
 - Reduce methane emissions while improving public safety

The 2016 Rule - The Basics

- EPA added to (“built-on”) 2012 NSPS
 - Proposed rule - 80 Fed. Reg. 56594 (September 18, 2015)
 - Final rule - 81 Fed. Reg. 35824 (June 3, 2016)
- Regulations: New, modified, reconstructed sources
 - 40 CFR 60, Subpart OOOO (‘Quad O’)
 - Amended to apply between August 23, 2011 and September 18, 2015
 - 40 CFR 60, Subpart OOOOa (‘Quad Oa’)
 - Applies to sources after September 18, 2015
- Main focus is reduction of methane to address ‘climate change’
 - Adds methane component to equipment/sources covered in 2012 Rule
 - Addresses equipment/sources not covered in 2012 Rule
 - Reductions claimed by EPA by 2025 ...
 - VOCs: 210,000 tons
 - Air Toxics: 3,900 tons
 - Methane: 510,000 tons

The 2016 Rule - The Basics

Sources covered by the 2012 New Source Performance Standards (NSPS) for VOCs and the 2016 NSPS for Methane and VOCs, by site				
Location and Equipment/Process Covered	Required to Reduce Emissions Under EPA Rules	Rules that Apply		
		2012 NSPS for VOCs*	2016 NSPS for methane	2016 NSPS for VOCs
Natural Gas Well Sites				
Completions of hydraulically fractured wells	✓	•	•	
Compressors				
Equipment leaks	✓		•	•
Pneumatic controllers	✓	•	•	
Pneumatic pumps	✓		•	•
Storage tanks	✓	•		
Oil Well Sites				
Completions of hydraulically fractured wells	✓		•	•
Compressors				
Equipment leaks	✓		•	•
Pneumatic controllers	✓	•	•	
Pneumatic pumps	✓		•	•
Storage tanks	✓	•		
Production Gathering and Boosting Stations				
Compressors	✓	•	•	
Equipment leaks	✓		•	•
Pneumatic controllers	✓	•	•	
Pneumatic pumps				
Storage tanks	✓	•		
Natural Gas Processing Plants*				
Compressors	✓	•	•	
Equipment leaks	✓	•	•	
Pneumatic controllers	✓	•	•	
Pneumatic pumps	✓		•	•
Storage tanks	✓	•		
Natural Gas Compressor Stations (Transmission & Storage)				
Compressors	✓		•	•
Equipment leaks	✓		•	•
Pneumatic controllers	✓		•	•
Pneumatic pumps				
Storage tanks	✓	•		

* Note: Types of sources already subject to the 2012 NSPS requirements for VOC reductions that also are covered by the 2016 methane requirements will not have to install additional controls, because the controls to reduce VOCs reduce both pollutants.

The 2016 Rule - Key Provisions

- Sources subject to the 2012 NSPS do not have to install additional controls
Same controls reduce both
- Additional sources
 - Hydraulically fractured oil wells are subject to RECs (green completions)
 - Pneumatic pumps at well sites and gas processing plants
 - Compressors and pneumatic controllers at transmission and storage facilities
- Requires owners/operators to find and repair leaks
- Next Generation Enforcement
 - Electronic reporting
 - Optical gas imaging to monitor for fugitive emissions
 - Digital picture reporting to establish a REC
 - PE certification of ...
 - infeasibility of connecting pump to control device; and
 - closed vent systems
- General duty - 40 CFR 60.5370a(b)
 - At all times (including SSM), owners and operators shall maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions.
 - Determination based on information available to the Administrator which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source.
 - Note - Added to Subpart 0000 as well

Information Collection Request

- Sent to existing sources to gather information for regulation as to those sources
Sent under authority of CAA 114
- March 10, 2016
Announced actions to begin regulating existing sources of “methane pollution”
Builds on Paris Agreement
Regulate because “methane emissions are substantially higher than previously understood”
- Notices
81 Fed. Reg. 35763, June 3, 2016
81 Fed. Reg. 66962, September 23, 2016 (allowed 30 extra days to comment)
Announced it was planning to send/had sent ICR to OMB for review
Part 1 – the ‘operator survey’
Sent to all known operators of production wells
To better understand types of equipment at production facilities
Respond in 30 days
Part 2 – the ‘detailed facility survey’
Sent to selected facilities across the industry segments
Production, gathering and boosting, processing, compression/transmission, pipeline,
natural gas storage, and LNG storage and import/export facilities
Collect detailed, unit-specific information on ...
emission sources at the facility and
emission control devices/practices used to reduce emissions
Respond in 60 days

Source Determination

- What is 'adjacent' to determine what is a 'major source' under Title V?

Major source:

Building, structure, facility or installation which emits or may emit a pollutant

Building, structure, facility, or installation – three-pronged test

Same industrial grouping

Located on one or more contiguous or adjacent properties

Under the control of the same person or persons under common control

- 81 Fed. Reg. 35622 (June 3, 2016)

Equipment located at a single 'surface site' will be considered 'adjacent'

any combination of one or more graded pad sites, gravel pad sites, foundations, platforms, or the immediate physical location upon which equipment is physically affixed (63.761)

Equipment located on separate surface sites within 1/4 mile of each other?

Aggregate only if equipment is shared between separate surface sites

Shared equipment?

Emission control devices, storage tanks, phase separators

If so, aggregate as the sites meet the 'common sense notion of a plant'

Separate surface sites not aggregated if ...

Greater than 1/4 mile of each other

Do not share equipment, even if within 1/4 mile

Other - Ozone CTGs

- **Control Techniques Guidelines for the Oil and Natural Gas Industry, October 20, 2016**
 - Applies to VOC emissions from existing oil and gas equipment and processes
 - Ozone non-attainment areas (Moderate or above), states in ozone transport region
 - Provide recommendations for meeting RACT requirements
 - Applies to storage tanks, compressors, pneumatic controllers/pumps, equipment leaks, fugitives

Storage Tanks

- | | |
|---|---|
| <ul style="list-style-type: none">• Individual storage tanks with a potential to emit (PTE) \geq 6 tons per year (tpy) of VOCs. | <ul style="list-style-type: none">• 95% reduction of VOC emissions• If owner/operators demonstrate that actual VOC emissions without controls are less than 4 tpy, as determined monthly, for 12 consecutive months, 95% control no longer required, provided uncontrolled VOC emissions remain below 4 tpy. |
|---|---|

Other - Ozone CTGs

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Storage Tanks

Leaks (Equipment Leaks and Fugitive Emissions)	
<ul style="list-style-type: none"> Equipment leaks from components in VOC service located at a natural gas processing plant. 	<ul style="list-style-type: none"> Implement the 40 CFR part 60, subpart VVa leak detection and repair (LDAR) program for natural gas processing plants.
<ul style="list-style-type: none"> Fugitive emissions (leaks) from individual well sites with wells with a gas-to-oil ratio (GOR) \geq 300 that produce, on average, > 15 barrel of oil equivalents (boe) per well per day. 	<ul style="list-style-type: none"> Develop and implement semiannual optical gas imaging (OGI) monitoring and repair plan covering fugitive emissions components within a company-defined area. Method 21 can be used as an alternative to OGI at a 500 ppm repair threshold level.
<ul style="list-style-type: none"> Fugitive emissions (leaks) at individual gathering & boosting stations located from the wellhead to the point of custody transfer to the natural gas transmission and storage segment, or an oil pipeline. 	<ul style="list-style-type: none"> Develop and implement a quarterly OGI monitoring and repair plan that covers the collection of fugitive emissions components at gathering and boosting stations within a company-defined area. Method 21 can be used as an alternative to OGI at a 500 ppm repair threshold.

Other - Emission Factors Update

- *Air Alliance Houston, et al v. EPA*
Sue and settle case in which EPA agreed to review AP-42 emission factors
- Reviewing elevated and enclosed ground flares at natural gas production sites
 - Elevated flares - thermal oxidation system using an open flame without enclosure
 - Enclosed ground flares - thermal oxidation system using a flame with an enclosure
 - NGPS – Wells, related processes used in extraction, production, lifting, stabilization, separation, and treating of natural gas/condensate
 - Includes the pad where well is located and stand-alone sites where natural gas (including condensate/produced water) from several wells may be separated, stored and treated
- Schedule
 - June 5, 2017 – Review and propose to revise or propose a determination to not revise
 - February 5, 2018 – Issue final revisions or finalize a determination to not revise
- Already reviewed and agreed to change VOC emission factors for flares
 - AP-42 Section 5.1 – Petroleum Industry - petroleum refining
 - AP-42 Section 8.13 – Inorganic Chemical Industry - sulfur recovery
 - AP-42 Section 13.5 – Miscellaneous Source - industrial flares (CO and VOC)

Other - In General

- Refineries, 80 Fed. Reg. 75178 (December 1, 2015)
 - Applies to major sources - 142 refineries
 - First ever fence line monitoring for benzene
- Pretreatment Standards (effluent guidelines), 81 Fed. Reg. 41845, June 28, 2016
 - No discharge of wastewater pollutants associated with production, field exploration, drilling, well completion, or well treatment for unconventional oil and gas extraction into POTWs
 - 81 Fed. Reg. 67191, Sep. 30, 2016 – extended compliance date to Nov. 29, 2016
- GHG Reporting, 80 Fed. Reg. 64262, Oct. 22, 2015/79 Fed. Reg. 70352, Nov. 25, 2014
 - Production, processing, storage, transmission - 40 CFR 98, Subpart W
 - Reporting for emissions > 25,000 metric tons CO₂e from facility
 - Refineries - 40 CFR 98, Subpart Y/MM
 - Natural gas liquids fractionators - 40 CFR 98, Subpart W
- BLM regulations applicable on Federal/Indian lands
 - 80 Fed. Reg. 16128, March 26, 2015: Regulates hydraulic fracturing
 - Stayed and on appeal in Tenth Circuit
 - 81 Fed. Reg. 6616, Feb. 8, 2016: Methane and Waste Prevention Rule (proposed)
 - Limits amount of flaring, adds leak detection, reduces venting
- Pipelines
 - EPA using NEPA regulations to review and comment on FERCs EIS
 - EPA also using CWA Section 404 to 'veto' Corps permit decisions
 - Mingo Logan Coal Co. v. U.S. E.P.A.*, 714 F.3d 608 (D.C. Cir. 2013)

Compliance

- National Enforcement Initiative
 - Proposed - 80 Fed. Reg. 55352 (Sep. 15, 2015)
 - Announced - February 18, 2016
 - Beginning - October 1, 2016
- Two highlights for oil and gas sector

Ensuring Energy Extraction Activities Comply with Environmental Laws

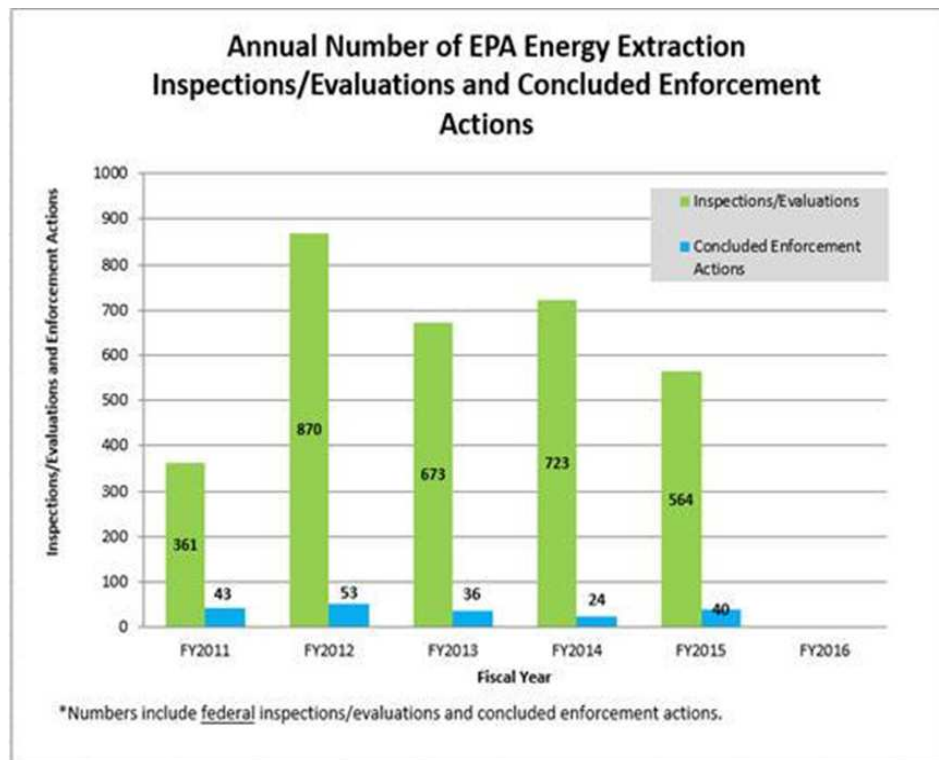
Need to assure energy sources developed in an environmentally protective manner
Some techniques for NG extraction pose a significant risk to public health and the environment
Continue to address pollution through greater use of ...

- Advanced pollution monitoring
- Reporting techniques
- Next Generation technologies (infrared cameras to make the 'invisible visible')

Cutting Hazardous Air Pollutants (expanded initiative)

Used advanced monitoring and found that emissions are > permitted/estimated
Focus on leaks, flares, and excess emissions from refineries and chemical plants
Expanded to include addressing air emissions from large product storage tanks
Focus on identifying and addressing violations of LDAR

Compliance



Compliance Alert, Sep. 2015

- EPA identified concerns regarding significant emissions from storage vessels at oil and gas production facilities
- EPA used infrared cameras to observe emissions
- Reasons for emissions ...
 - Inadequate design and sizing of vapor control systems, and
 - Inadequate vapor control system operation and maintenance
- EPA suggested several options/practices to minimize emissions, such as ...
 - Reduce liquid pressure prior to transfer
 - Increase capacity of control devices
 - Properly maintain PRV
 - Use properly sized, compatible gaskets in vents and thief hatches
- Mentions settlement with Noble Energy
 - \$4.95M civil penalty
 - \$4M on SEPs
 - \$4.5M on mitigation projects
 - \$60M in injunctive relief items

Cost and Benefits

	2012	2016	ICR
Energy	Savings of \$11M*	Savings of \$320M in 2020 \$530M in 2025*	n/a
Capital	\$25M	\$250M in 2020 \$360M in 2025	n/a
Compliance	\$170M (O&M, MIRR) Assumes \$4/Mcf, \$70/barrel	\$390M in 2020 \$640M in 2025 Assumes \$4/Mcf	Part 1 - \$16M Part 2 - \$23M
Social Cost of Carbon	n/a	\$160-960M in 2020 \$320-1,800M in 2025 (depends on discount rate)	n/a

*Due to product recovery

MIRR = monitoring, inspection, recordkeeping, and reporting



Questions?

John B. King
Breazeale, Sachse & Wilson, LLP

225/381-8014
jbk@bswllp.com
www.bswenviroblog.com