EPA's Proposed Methane Rules Affecting Oil & Gas Operations

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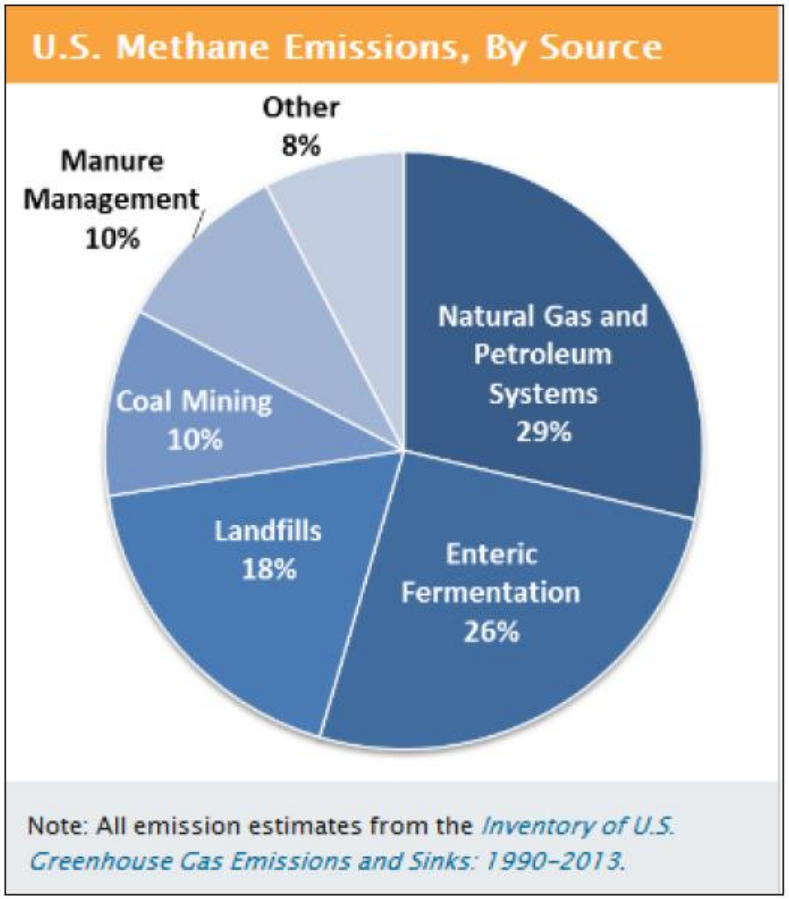
- Proposed rule is part of President Obama's Climate Action Plan and Methane Strategy, announced earlier this year
- Goal to reduce methane emissions from oil and gas industry by 40 – 45% from 2012 levels by 2025



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Existing Rules (NSPS OOOO)

- Rule applies to ‘affected facilities’ that commence construction, reconstruction or modification after 8/23/2011
- Industry Sector targeted
  - Production (fractured and refractured gas wells) in specified types of geologic formations
  - Gathering (compressors, controllers, storage tanks)
  - Processing (compressors, controllers, storage tanks, equipment leaks, sweetening units)
  - Transmission (storage tanks)
  - Certain downstream equipment and storage tanks

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EPA's Proposed Rule to Reduce from Oil and Gas Operations - Overview

- Proposal signed August 18; published in Federal Register September 18; comments accepted until November 17
- "Updates" the 2012 New Source Performance Standards (NSPS)
- Capture natural gas from the completion of hydraulically fractured wells (natural gas wells covered by 2012 NSPS)
- Leak detection and repair requirements
- Emission limits for new and modified pneumatic pumps
- Expand emissions limitation to certain equipment not covered at natural gas transmission compressor stations and natural gas storage facilities

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Proposed NSPS OOOOa

- New NSPS OOOOa would apply to facilities newly constructed or modified after 9/18/15

- Applicable to certain equipment at:
  - Oil Well Sites
  - Production Gathering and Boosting Stations
  - Natural Gas Processing Plants
  - Natural Gas Compressor Stations (Transmission and Storage)

- For sources covered by 2012 NSPS OOOO
  - Requires controls for methane for certain equipment
  - Requires VOC controls on certain additional equipment at natural gas well sites, production gathering and boosting stations and natural gas processing plants

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Summary of Proposed Standards
Finding and Repairing Leaks

- Fugitive emissions from well sites, natural gas compressor stations (transmission and storage), production gathering and boosting stations

- Surveys for Leaks
  - Initial surveys for fugitive emissions from components
    - Valves, connectors, open-ended lines, pressure relief devices, tank hatches, etc.
    - Using Optical Gas Imaging; comments solicited on Method 21 as alternative
  - Surveys every 6 months
  - Repairs or replacements of components found leaking within 15 days
  - Incentives for minimizing leaks
  - Exemptions for certain oil wells (low production, wellhead only)

- Seeking comments on use of corporate wide leak detection and repair programs

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Summary of Proposed Standards
Compressors (other than at well sites)

- Natural gas processing plants and natural gas production gathering & boosting stations – the same as required for VOC emissions under OOOO
- Natural gas transmission compressor stations:
  - Requirements to control both VOCs and Methane
  - Wet seal centrifugal compressors - 95% reduction of methane and VOC emissions
  - Dry seal centrifugal compressors not regulated.
- Reciprocating compressors - Replace rod packing, or route emissions from rod packing through closed vent system, to reduce methane and VOC emissions

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Summary of Proposed Standards
New & Modified Pneumatic Pumps

- Natural Gas Processing Plants - Zero emissions of methane and VOC emissions from natural gas-driven chemical/methanol pneumatic pumps and diaphragm pneumatic pumps
- Pneumatic pumps at other covered locations – methane and VOC emissions from those pumps must be controlled by 95% if emission control device is already on site

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Summary of Proposed Standards
Hydraulically Fractured Oil Well Completions

- Subcategory 2 wells (wildcat and delineation wells) – use completion combustion device to reduce VOC and methane emissions
- Subcategory 1 wells (non-wildcat, non-delineation wells) – use reduced emissions completions (RECs or ‘green completions’) if feasible, plus combustion device

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Proposal to Clarify "Adjacent" Sources

- Clarifies EPA's aggregation policy to define what constitutes a stationary source subject to major source permitting
- Oil and gas exploration facilities with a common owner adjacent to one another are considered a single source
- EPA taking comment on 2 options:
  - Adjacent by proximity – within ¼ mile
  - Adjacent to include functionally interrelated equipment that might not otherwise meet the proximity requirement
- The final rule will affect whether sources are permitted as major, requiring additional controls

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Control Techniques Guidelines

- Concurrent with the OOOO proposal, EPA released draft Control Techniques Guidelines ("CTGs") for reducing VOC emissions from existing equipment and processes in the oil and natural gas industry.

- As EPA states, "CTGs are not regulations and do not impose legal requirements on sources; rather, they provide recommendations for state and local air agencies to consider in determining reasonably available control technology ("RACT") for reducing emissions from covered processes and equipment." States will then be required to impose RACT on existing sources in most ozone nonattainment areas, including the ozone transport region.

- New ozone standard at 70 ppb could result in increase in the number of new ozone nonattainment areas by 2017.

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Air Quality and Greenhouse Gas Issues Creating Risk for the Oil and Gas Sector

October 8, 2015

ERM

Agenda

- The High Level View of Regulatory Risk
- **Onslaught of Investigation & Enforcement**
- "114 Letter" Information Requests – primarily over "peak flow"
- Follow up Inspections and Enforcement – Consent Decrees
- **Onslaught of New Rules & Requirements**
- Mandatory Emission Control, Monitoring & Reporting Rules
- Facility Aggregation to Step Up Air Permit Levels
- Lowered Ozone NAAQS – "Nonattainment"

"Future" Investigation & Enforcement Is Now!

- "Peak Flow" 114 Letters issued early 2015 to first site in Colorado, now issued to sites on Tribal Lands, more in Colorado, North Dakota…and the Eagle Ford in Texas
- Not limited to upstream operations, midstream operations included as well
- EPA has released a "compliance alert" for O&G "vapor control system adequacy"
- EPA estimates $73 Million in penalties & response actions per consent decree

EPA "Peak Flow" Compliance Effort:

What is a "114 Letter"?

- Section 114 of the Clean Air Act of 1990 allows the EPA Administrator to request data on air emissions issues with broad discretion
- Burden of response: internal time plus costs for technical & legal support
- EPA can ask about methane emissions even though the O&G methane rules are not final
- Purpose is data collection to support enforcement actions: Consent Decrees

What is "Peak Flow"?

- Surge in vapors during "dump" events from separator to tank overwhelms the capacity of vapor control device & emissions (methane & VOC) result
- 95% emissions control required for subject tanks (NSPS OOOO & state rule)
- Easy to detect excursions by flyover with optical imaging device (IR camera) because of high volume of release compared to low standard for allowable
- Latest 114 letters focus on "peak flow", but are not limited to it

How do you avoid / fix the issue?

- If new installation, design & build for overall for higher emission rates
- If retrofit, must assess operational restrictions & viable engineering changes,
- Both require detailed engineering & analytical assessment
- Both require detailed regulatory compliance assessment

O&G Air Rules Overview:

Air Emissions Control Regulations

- New Source Performance Standards: current Subpart OOOO, proposed Subpart OOOO changes, proposed Subpart OOOOa – requires control of VOC, and now methane, for new & modified O&G equipment
- Tribal NSR: proposal to apply above controls for operations on Tribal Lands
- Control Technique Guidelines: proposal to require states to apply some of the above controls to existing O&G equipment in ozone nonattainment areas
- Mandatory GHG Reporting: was primarily upstream, expanded to midstream

Lowered Ozone National Ambient Air Quality Standard

- Sets the ozone concentration that is considered a health risk
- Concentration over health risk level = “nonattainment area”
- New standard will expand nonattainment to rural areas – some O&G fields

Source Determination or Facility Aggregation

- Complexity of applicable air permit program is driven by total facility emissions
- Aggregation of facilities drives up “facility” emissions & air permit complexity
- How to do “Source Determination” was a policy, now a proposed rule
- May be based on proximity only, may integrate “interrelatedness” too

Source Applicability – Multi-Level Assessment!

Element	Impact
Type of Equipment?	Emissions from wells, oil wells, compressors, fugitive components, pneumatic equipment, pneumatic pumps, storage vessels and emission control devices may be covered based on remaining criteria
VOC and/or Methane Emitted?	The current NSPS OOOO & proposed CTG's apply to VOC only; GHG Reporting applies to methane only; proposed NSPS OOOOa and Tribal Lands NSR applies to VOC & methane
New or Existing Equipment? (Not Facility-Wide)	All NSPS & proposed Tribal Lands NSR apply only to new or modified sources; proposed CTG's apply to existing sources; GHG Reporting applies to new & existing sources
For NSPS, Date of Installation or Modification?	Each NSPS rule applies to sources installed or modified in a specific date range: OOOO is 8/23/2011 (or 4/12/13), proposed changes to OOOO is between 8/23/11 & 9/18/15, OOOOa is after 9/18/15, and there will be more to come

NSPS – CTGs – Tribal NSR – Source Determination – Methane Challenge

Operational Change

Gas and Oil Wells
Compressors
Fugitive Components
Pneumatic Equipment
Storage Vessels
Control Devices

Capital Expenses

Equipment: wells, pneumatics, flares, control equipment
Re-design/approach: monitoring equipment (IR cameras, sampling)
Existing (retrofits) vs New

Operational Expenses

People: training, skillsets, MOC challenges
Equipment Upgrades: records, reports, data systems
External Stakeholders: Agencies, NGOs, neighbors/public
License to Operate: Violation, Risk

Actions

Check Gaps (vulnerability) “Peak Flow”
Influence proposed rule language
Field trial of proposed methods (leaks: is it do-able?)
Evaluate alternatives
Plan ahead: future impacts?

The Road Ahead – More Regulation?

Considerations

- ID facilities & units at risk now & later
- ID current compliance status, including non-”peak flow” issues & permitting
- Assess operational risk: risk of shutdown or production restrictions
- Assess financial risk: potential total cost including penalties, negotiations, engineering, equipment, installation & lost production
- Assess Reputational risk: local community backlash, international / NGO pressure

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SC-CO2 and the Regulation of Methane in the Oilfield

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10/8/2015

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“Winter is Coming”

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SC – CO2

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Social Cost of Carbon (SC-CO2)

- "As required under Executive Order 12866, the EPA conducts benefit-cost analyses for major Clean Air Act rules. While benefit-cost analysis can help to inform policy decisions, as permissible and appropriate under governing statutory provisions, the EPA does not use a benefit-cost test (i.e., a determination of whether monetized benefits exceed costs) as the sole or primary decision tool when required to consider costs or to determine whether to issue regulations under the Clean Air Act."

- The social cost of carbon (SC-CO2) is "an estimate of the monetary value of impacts associated with marginal changes in CO2 emissions in a given year. It is typically used to assess the avoided damages as a result of regulatory actions (i.e., benefits of rulemakings that lead to an incremental reduction in cumulative global CO2 emissions)."

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The “Social Cost of Methane”

- In the cost analysis of the OOOO rule, EPA call for comment of the social cost of methane, a surrogate for CO2.

- “While EPA is not accounting for the CO2 disbenefits at this time, we request comment on the appropriateness of the monetization of such impacts using the SC-CO2 and aspects of the calculation.”

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“New” Sources

- “Potential respondents under subpart OOOOa are owners or operators of new, modified or reconstructed oil and natural gas affected facilities as defined under the rule.”

- 40 CFR 60.14 provides that an existing facility is modified, and therefore subject to an NSPS, if it undergoes “any physical change in the method of operation . . . which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted.”

- 40 CFR 60.15, in turn, provides that a facility is reconstructed if components are replaced at an existing facility to such an extent that the capital cost of the new equipment/components exceed 50 percent of what is believed to be the cost of a completely new facility.

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“Next Generation Rule Making”

As part of the Next Generation Compliance strategy EPA is designing rules to include requirements for regulated entities and/or third parties to regularly assess compliance and take steps to prevent noncompliance, by:

- Performing periodic self-monitoring and self-certification of their compliance activities;
- Using independent 3rd party to verify and report on compliance status;
- Leveraging immediate feedback and continuous monitoring technologies.

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Increased use of Imaging Technologies in OOOO and other proposed rules

OOOO solicits comment on the use of optical gas imaging for or method 21 for leak detection and resurvey.

Also see Refinery MACT a

- Allowing refineries to meet the leak detection and repair (LDAR) requirements in Refinery MACT 1 by monitoring for leaks using optical gas imaging in place of EPA Method 21, once the monitoring protocol set forth in Appendix K is promulgated.
- Establishing a fence line monitoring work practice standard to improve the management of fugitive emissions.

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MARK BROOKER, CEO – THE FRONTLINE GROUP

- 38 years of experience in Oil & Gas
- 12 years in field supervision; drilled and completed ~100 wells
- MBA – University of Houston 1993
- Started The Frontline Group in 1992 to provide management consulting to technical managers in upstream
- Texas Business Leadership Council Executive Team member

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THE REALITY OF REGULATION

- Congress not passing bills proposed by the Administration
- Administration using Regulation and Rule-Making to promote agenda
- Congress tightening budgets to slow deployment
- But…don’t expect massive reversal with next administration
- Practical modification and timetable expansion more likely

THE WAY FORWARD

- Analyze & re-design facilities to accommodate future compliance regulations
  - Access
  - Change-out
  - Measurement
- Actively understand what you own & purchase
  - Research coatings & materials
  - Operational practices for improvements
- Commit resources to remain ahead of legislation
- Engage in policy creation

OPERATORS

- Future designs and compatibility
- Keep up with trends and technology
- Expect alterations
- Expect repairs and replacements to conform
- Engage in forums

SERVICE COMPANIES

- Understand designs in light of compliance
- Develop modification kits or processes
- Develop adequate repair techniques
- Help customers understand compliance issues – materials, seals, metallurgy
- Be prepared to educate on proper and improper installation

INVESTORS

- Assume an additional cost for compliance
- Drone and scanning technologies may have regulatory limitations, permits, licenses
- Due diligence process will probably have to be modified
- New asset creation will most likely be affected and targeted

PREPARATION

- Determine current relevant data storage mechanism(s)
- Create database characterizations that are useful
- Determine stakeholders and communication plan
- Search for best practices, trial solutions, and competitor successes
- Organize RACI for operations, reporting, and response

PRIORITIZATION

- Understand vessel vintages and origins
- Prepare visual inspection formats for field assessment and repairs/maintenance
- Determine limitations on access and identify design problems for inspection
- Evaluate geographic and activity criteria
- Identify other potential violations
- Matrix to arrive at priority

PLANNING

- Organize multi-disciplinary team to:
  - Set response criteria
  - Determine priority and scheduling
  - Communicate with field teams
  - Respond & adjust based on budgets and enforcement
  - Inform upper management
  - Gather and share best practices
  - Confirm documentation
  - Track deployment

PRACTICES

- Educate workforce and communicate commitment to implementation and safety
- Document compliance and variance as per counsel
- Initiate vertical accountability and hand-over
- Management know your situation and suppliers
- Commit resources to track industry current state
- Consider regional cooperatives
- Update contingency, response, and public communications plans