

Oil and Natural Gas Sector Regulatory Program Update

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Overview

- ▶ EPA's air regulations for the oil and natural gas sector
- ▶ 2012 rulemaking
- ▶ Status of reconsideration
- ▶ Technical white papers

New Source Performance Standards (NSPS)

- ▶ Authority: section 111(b) of Clean Air Act (CAA)
- ▶ Primarily regulate criteria pollutants and precursors from new, modified and reconstructed sources
 - ▶ Ozone (via precursors VOC* and NOx*)
 - ▶ Sulfur dioxide
 - ▶ Nitrogen dioxide
 - ▶ Particulate matter
 - ▶ Carbon monoxide
 - ▶ Lead
- ▶ Concept -- NSPS must reflect “best system of emission reductions”
- ▶ Must be reviewed every 8 years to determine whether technology advances warrant updating the requirements

*Volatile organic compounds (VOC) and oxides of nitrogen (NOx)

National Emission Standards for Hazardous Air Pollutants (NESHAP)

- ▶ Section 112 of the CAA requires EPA to control a specific list of air toxics from new and existing sources
- ▶ Pollutants of primary concern to oil and natural gas sector:
 - ▶ benzene, toluene, ethylbenzene, mixed xylenes (BTEX)
 - ▶ n-hexane
- ▶ Concept -- technology-based standards that require what the best facilities are doing (maximum achievable control technology -- MACT)
- ▶ Requires risk and technology review (RTR)
 - ▶ One-time residual risk assessment 8 years after promulgation of MACT to determine if existing rule provides an ample margin of safety
 - ▶ Technology review every 8 years to determine if technology advances warrant updating the requirements

Some Regulatory History

- ▶ 1985 - NSPS KKK (VOC) and LLL (SO₂) for gas processing plants
- ▶ 1999 - NESHAP HH for oil & natural gas production facilities
- ▶ 1999 - NESHAP HHH for natural gas transmission & storage facilities
- ▶ 2007 - Area source NESHAP HH for oil & natural gas production

- ▶ 08/23/11 - Proposed new NSPS OOOO and updated NESHAP HH & HHH
- ▶ 08/16/12 - Published final rules for OOOO, HH and HHH
- ▶ 10/15/12 - Received petitions for reconsideration of OOOO, HH and HHH
- ▶ 04/12/13 - Proposed storage vessel implementation amendments (NSPS-1)
- ▶ 09/23/13 - Published NSPS-1 final rule
- ▶ 11/22/13 - Received petitions for reconsideration of NSPS-1

2012 NSPS - Well Completions

- ▶ Applies to all hydraulically fractured gas wells, both new wells and existing wells that are fractured or refractured
- ▶ Beginning 1/1/15, the rule requires “green completions” for most wells
- ▶ Requires flaring in situations not meeting criteria for green completions (and where flaring is not a hazard)
 - ▶ Wildcat and delineation wells
 - ▶ Low pressure wells
 - ▶ Wells completed from 10/15/12 to 12/31/14



Green Completion Equipment
(Source: Weatherford)



A natural gas well site. EPA photo.

2012 NSPS - Compressors and Storage Vessels

- ▶ Centrifugal Compressors

- ▶ Dry seal compressors not affected
- ▶ 95% control for wet seal compressors



*A combustion device and storage tanks
EPA photo*

- ▶ Reciprocating Compressors

- ▶ Requires replacement of rod packing
- ▶ 26,000 hours of operation **or** every 3 years, regardless of hours of operation

- ▶ Storage vessels

- ▶ 95% control for tanks ≥ 6 tpy VOC PTE
- ▶ First compliance date 10/15/13
- ▶ Reconsidered in 2013 (details later)

2012 NSPS - Pneumatic Controllers and Equipment Leaks

- ▶ **Pneumatic controllers at oil & gas production facilities**
 - ▶ Requires “low-bleed” controllers (gas bleed rate \leq 6 scfh)
 - ▶ Exempts critical applications requiring high-bleed, gas-actuated controllers due to functional requirements
- ▶ **Pneumatic controllers at gas processing plants**
 - ▶ Requires continuous bleed, natural gas-actuated controllers to have zero bleed rate
- ▶ **Equipment leaks at gas processing plants**
 - ▶ Upgrades leak detection and repair (LDAR) for gas processing plants to lower leak threshold (500 ppm vs. 10,000 ppm)

2012 NESHAP Amendments

▶ Oil and Natural Gas Production (HH)

- ▶ Glycol dehydrators
 - Sets new standards for small dehydrators at major sources
- ▶ Equipment leaks at gas plants
 - Strengthens requirements for leak detection and repair
- ▶ Storage Vessels
 - Amends definition of “associated equipment” to allow storage vessel emissions to be counted toward major source determination at well sites

▶ Natural Gas Transmission & Storage (HHH)

- ▶ Glycol dehydrators
 - Sets new standards for small dehydrators



*Glycol dehydrators at a well production pad
EPA photo*

Petitions for Reconsideration

- ▶ Received 12 petitions for reconsideration and 9 petitions for judicial review
- ▶ EPA is currently addressing the NSPS and NESHAP issues separately
 - ▶ NSPS-1 Storage vessel implementation revisions
 - ▶ NSPS-1.5 Time-critical clarification of well completion requirements
 - ▶ NSPS-2 Remaining issues
 - ▶ NESHAP

Storage Vessels Reconsideration (NSPS-1)

- ▶ Clarified which tanks are subject to the rule
 - ▶ Revised definition of “storage vessel” – based on tank contents
 - Crude oil
 - Condensate
 - Intermediate hydrocarbon liquids
 - Produced water
 - ▶ Revised “affected facility” description – based on tank emissions
 - Storage vessels with potential to emit VOC \geq 6 tpy
 - PTE takes into account any legally and practically enforceable permit or other limitation
 - PTE does not include any vapor recovered and routed to a process

Storage Vessels (NSPS-1), continued

- ▶ Phases in control dates for storage vessels constructed since NSPS proposal
 - ▶ **Group 1** (constructed between August 23, 2011 and April 12, 2013)
 - Estimate emissions by October 15, 2013 to determine “affected facility” (≥ 6 tpy)
 - Submit one-time notification with first annual report (were due by January 16, 2014)
 - Control by April 15, 2015
 - ▶ **Group 2** (constructed after April 12, 2013)
 - Estimate emissions by April 15, 2014 or within 30 days of startup, whichever is later
 - Control by 60 days after startup

- ▶ **Alternative emission limits**
 - ▶ 95% control, **or**
 - ▶ Limit uncontrolled emissions to <4 tpy
 - Emissions must be <4 tpy for at least 12 consecutive months
 - Must estimate emissions monthly
 - Allows controls to be removed and potentially reused at another location
 - If emissions reach 4 tpy, must apply 95% control

Storage Vessels (NSPS-1), continued

- ▶ Streamlined monitoring requirements (while we continue to evaluate)
 - ▶ Removed field performance testing and replaced with requirement to use controls “designed for” 95% control
 - ▶ Streamlined site inspection requirements by requiring only 15-minute Method 22 combustor check and auditory, visual, and olfactory check of storage vessel cover and closed vent system to be performed monthly
- ▶ Revised protocol for manufacturer-conducted tests of combustors
 - ▶ Reconciled NSPS language with that in the NESHAP, which was already correct
 - ▶ Manufacturers submit test results to EPA, who reviews and posts results on website
- ▶ Extended time for operators to submit annual report and compliance certification for all affected facilities under NSPS from 30 to 90 days

Time-Critical Clarifications (NSPS-1.5)

- ▶ 1/1/15 compliance date for reduced emissions completion (REC) requirement for most hydraulically fractured gas wells
- ▶ EPA previously provided clarification letter to American Petroleum Institute addressing several issues following the 2012 final NSPS
- ▶ Work underway to amend rule to clarify requirements and to add definitions of key terms
- ▶ NSPS-1.5 final rule scheduled prior to 1/1/15 REC compliance date

Obama Administration Strategy to Reduce Methane Emissions

- ▶ Strategy released March 2014
- ▶ Sets forth plan to reduce domestic and international methane emissions
- ▶ Targets four key sources
 - ▶ Landfills
 - ▶ Coal Mines
 - ▶ Agriculture
 - ▶ Oil and Gas
- ▶ Strategy for oil and gas includes the release of five white papers on potentially significant sources of methane

White Paper Overview

- ▶ Purpose
 - ▶ Obtain a common understanding of emerging data on emissions and control for certain potentially significant sources of VOCs and methane
 - ▶ Focus on technical issues
 - ▶ Part of Obama Administration's *Strategy to Reduce Methane Emissions*

- ▶ Topics
 - ▶ Compressors
 - ▶ Completions and ongoing production of hydraulically fractured oil wells
 - ▶ Leaks
 - ▶ Liquids unloading
 - ▶ Pneumatic devices

- ▶ Status
 - ▶ Released on April 15, 2014, for external peer review
 - ▶ Peer review to be completed by June 16, 2014
 - ▶ Accepting technical information and data from the public until June 16, 2014

White Paper Structure

- ▶ Problem Statement
 - ▶ Define the source(s)
 - ▶ Define the context

- ▶ Available Emissions Data and Estimates
 - ▶ Summarize and compare the various data sources and estimates
 - ▶ Characterize quantity, geographic dispersion, distribution across sources

- ▶ Available Control Technologies
 - ▶ Cost, efficacy, and prevalence of technologies

- ▶ Charge Questions for Reviewers
 - ▶ Technical questions of particular interest to EPA

White Paper Next Steps

- ▶ June 16, 2014
 - ▶ Peer review deadline
 - ▶ Deadline for accepting technical information and data from the public
- ▶ Summer 2014
 - ▶ Submitted info and reviews will be made available
 - ▶ Review submitted info
- ▶ Fall 2014
 - ▶ Determine how best to pursue further methane reductions
- ▶ End of 2016
 - ▶ If EPA decides to develop additional regulations, complete those regulations

For Additional Information

- ▶ Visit: www.epa.gov/airquality/oilandgas
- ▶ Contact:
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- ▶ For information on the white papers, contact:
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Appendix

White Paper Charge Questions: Compressors

- ▶ Appropriate characterization of the different studies and data sources
- ▶ Ongoing or planned studies on this source of emissions
- ▶ Full range of technologies available to reduce vented compressor emissions
- ▶ Technical limitations to replacement of wet seals with dry seals
- ▶ Technical reasons for using a wet seal compressor without a gas recovery system
- ▶ Technical limitations to installation of gas capture systems at reciprocating compressors
- ▶ Specific applications that require wet seal compressors

White Paper Charge Questions: Completions and Ongoing Production of Hydraulically Fractured Oil Wells

- ▶ Appropriate characterization of the different studies and data sources
- ▶ Ongoing or planned studies on this source of emissions
- ▶ Full range of technologies available to reduce emissions
- ▶ Hydraulically fractured oil well completions
 - ▶ Methodologies for estimating completion emissions and rate of recompletions
 - ▶ Feasibility/cost of “green completions” at oil wells
 - ▶ Feasibility/cost of completion combustion devices at oil wells
- ▶ Ongoing production from hydraulically fractured oil wells
 - ▶ Methodologies for estimating associated gas emissions
 - ▶ Availability of pipeline infrastructure in tight oil formations

White Paper Charge Questions: Leaks

- ▶ Appropriate characterization of the different studies and data sources
- ▶ Ongoing or planned studies on this source of emissions
- ▶ Types of facilities more prone to leaks
- ▶ Full range of technologies available to detect leak emissions
- ▶ Applicability of detection and repair techniques to both oil and gas wells
- ▶ Comparison of the cost of detecting vs. cost of repairing a leak
- ▶ Necessity of leak detection technologies to quantify emissions
- ▶ State of innovation in leak detection technologies

White Paper Charge Questions: Liquids Unloading

- ▶ Appropriate characterization of the different studies and data sources
- ▶ Ongoing or planned studies on this source of emissions
- ▶ Full range of technologies available to reduce emissions
- ▶ Types of wells most likely to require liquids unloading
- ▶ Ability of plunger lift systems to perform liquids unloading without any air emissions
- ▶ Pros and cons of installing a “smart” automation system as part of a plunger lift system
- ▶ Feasibility of the use of flares during liquids unloading operations
- ▶ Rationale of performing blowdowns instead of using more effective liquid removal technologies

White Paper Charge Questions: Pneumatic Devices

- ▶ Appropriate characterization of the different studies and data sources
- ▶ Ongoing or planned studies on this source of emissions
- ▶ Full range of technologies available to reduce emissions
- ▶ Explanation for wide range of emission rates from pneumatic controllers
- ▶ Barriers to installing instrument air systems
- ▶ Barriers to using instrument air-driven controllers and pumps
- ▶ Limitations of electric-powered pneumatic controllers and pneumatic pumps