



Addressing Air Emissions from the Oil and Natural Gas Industry

**Overview of EPA's Proposed
New Source Performance Standards
and
National Emission Standards for Hazardous Air Pollutants**

**Tribal Consultation Call
October 12, 2011**



Overview of Action

- On August 23, 2011, the U.S. Environmental Protection Agency (EPA) proposed a suite of highly cost-effective regulations that would reduce harmful air pollution from the oil and natural gas industry while allowing continued, responsible growth in U.S. oil and natural gas production.
- The proposal includes the first federal air standards for wells that are hydraulically fractured. The standards would:
 - Reduce emissions of smog-forming volatile organic compounds (VOCs), and air toxics including the carcinogen benzene.
 - Yield a significant environmental co-benefit by reducing methane emissions from new and modified wells. Methane is a potent greenhouse gas – more than 20 times as potent as carbon dioxide.
- The updated, flexible standards are based on existing, cost-effective technology and will institutionalize best practices that are already in place in some states and in use by several companies.
- The technologies and best practices allow operators to capture and sell natural gas that currently escapes into the air, threatening public health and wasting a valuable resource.
- These technologies will allow operators to save nearly 30 million dollars per year even as they cut emissions of benzene and other air toxics, as well as volatile organic compounds – pollutants that form ground-level ozone (smog), which can cause asthma.



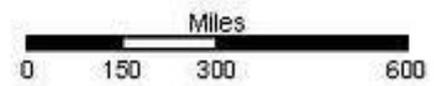
United States Shale Gas Plays

Shale Gas Plays
 Basins

Stacked Appalachian Plays

Marcellus
 Utica
 Devonian (OH shale)

November 2008

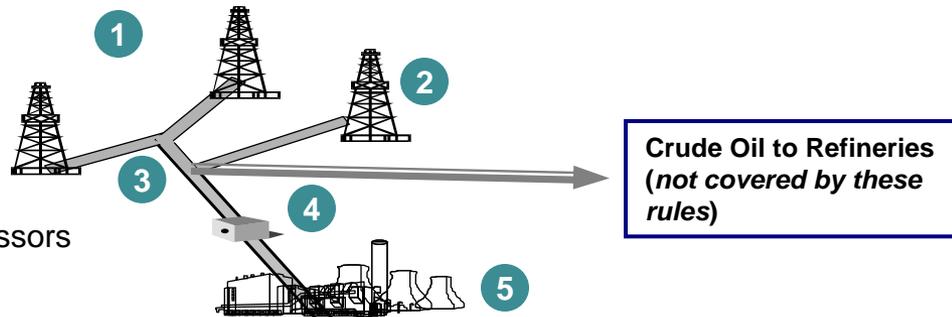


Oil and Natural Gas Operations

Oil and natural gas systems encompass wells, gas gathering and processing facilities, storage, as well as transmission and distribution pipelines. These components are all important aspects of the process of getting natural gas out of the ground and to the end user.

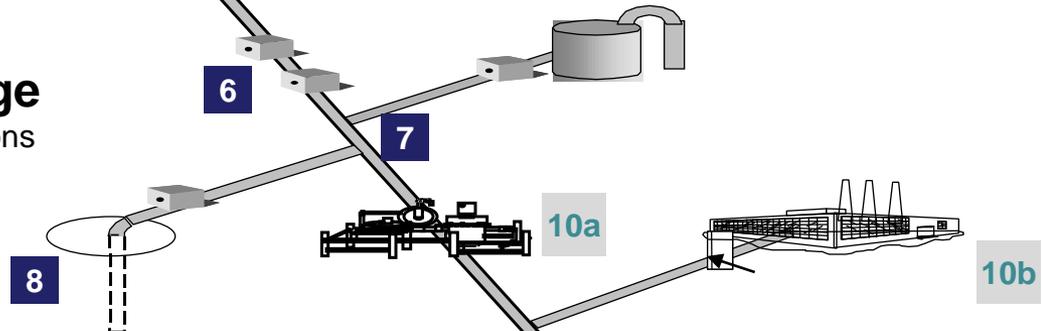
● Production & Processing

1. Drilling and Well Completion
2. Producing Wells
3. Gathering Lines
4. Gathering and Boosting Compressors
5. Gas Processing Plant



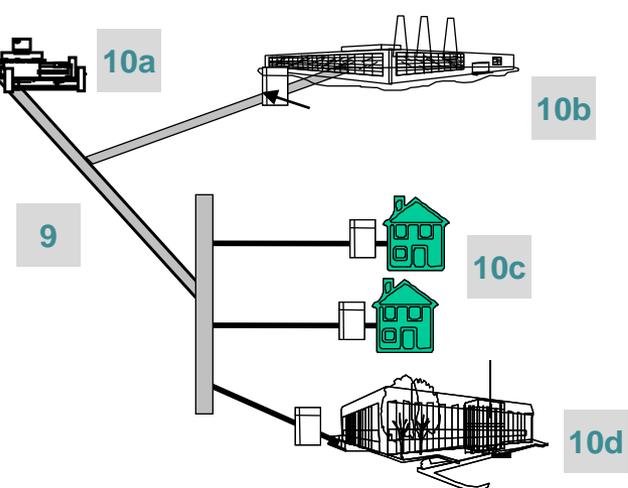
■ Transmission & Storage

6. Transmission Compressor Stations
7. Transmission Pipeline
8. Underground Storage



■ Distribution (not covered by these rules)

9. Distribution Mains
10. Regulators and Meters for:
 - a. City Gate
 - b. Large Volume Customers
 - c. Residential Customers
 - d. Commercial Customer





Oil and Natural Gas Sector Emits Significant Amounts of Pollutants

Pollutant	Emissions (tpy) (includes engines and boilers)
VOCs	2.2 million
Air Toxics	130,000
GHG (Methane)	16 million (300 MMTCO ₂ e)

- 1.1 million producing oil and gas wells
 - 500,000 producing gas wells
 - 11,400 new fractured gas wells completed per year
 - 14,000 existing gas wells re-fractured and completed per year
- 600 gas processing plants
- 3,000 gas transmission compression stations (there are thousands more gathering and boosting stations not included in this number)
- 1.5 million miles of gas pipelines

Note: The Oil and Natural Gas Sector accounts for **40%** of all U.S. methane emissions. This is about **4%** of all U.S. GHG emissions.



Emissions from Oil and Gas Production, Transmission, and Storage are a Health Concern

Pollutant	Health and Other Effects
VOCs	<p>VOCs react in the air to form ozone and PM_{2.5}.</p> <p>Ozone can cause asthma attacks, hospital and emergency department visits, school loss days, and premature mortality</p> <p>PM_{2.5} causes premature mortality for adults and infants, heart attacks and hospital admissions. Also can cause asthma attacks, acute and chronic bronchitis, hospital and emergency room visits, work loss days, restricted activity days, and respiratory symptoms.</p>
Air Toxics (including benzene)	<p>Can cause cancer and other serious, irreversible health effects .</p>
GHG (Methane)	<p>Reacts in the air to form ozone.</p> <p>A potent GHG. Once emitted into the atmosphere, it absorbs terrestrial infrared radiation, which contributes to increased global warming and continuing climate change.</p>



Clean Air Act Requirements

To address concerns from oil and gas industry air emissions, the Clean Air Act requires EPA to set the following standards:

New Source Performance Standards

- EPA is required to set, and periodically review, performance standards for new sources in this industry to reduce emissions of VOCs and other pollutants.

Air Toxics Rules: MACT and Residual Risk and Technology Reviews

- The Clean Air Act requires EPA to set and periodically review technology-based air toxics standards (called MACT standards). Air toxics are pollutants known to, or suspected of, causing cancer and other serious health effects.
- EPA is required to conduct two reviews and update the existing standards if necessary.
 - **Residual Risk Assessment:** To determine whether additional emission reductions are warranted to protect public health or the environment. This is a one-time review.
 - **Technology Reviews:** To determine if better emission control approaches, practices, or processes are now available. Technology reviews are required every eight years.



What We Have Done So Far

- Two NSPS rules
 - 1985 NSPS – covers VOC leak detection and repair at gas processing plants (facilities that remove natural gas liquids from field gas)
 - 1985 NSPS – covers sulfur dioxide (SO₂) emissions from gas processing plants
- Two Air Toxics Rules
 - Oil and Natural Gas Production
 - 1999 MACT – covers some glycol dehydrators, storage tanks, and leak detection
 - 2007 Area Sources – covers only glycol dehydrators
 - Natural Gas Transmission and Storage
 - 1999 MACT – covers only glycol dehydrators

NSPS Review



Green Completion Equipment (source: Weatherford)

- Existing NSPS covers only natural gas processing plants.
- Identified significant unregulated sources of emissions:
 - Well completions (and re-completions)
 - Compressors
 - Pneumatic controllers
 - Storage vessels (condensate and crude oil tanks)
 - Produced water ponds and pits



NSPS Proposal – Well Completions

- The NSPS would limit VOC emissions from gas wells as they are being prepared for production, a process called “well completion.”
- It would apply to all hydraulically fractured (“fracked”) wells, both new wells and existing wells that are fracked or refracked to get more gas out of a well.
 - These processes are the source of an estimated 500,000 tons of VOC emissions each year.
 - About 9,700 completions of new wells annually are not controlled.
 - 12,000 re-completions annually would fit the criteria but are not controlled.
- The rule would require combination of green completion and flaring for most fractured wells.
 - Would achieve 95% VOC reduction and 90% recovery of salable natural gas.
 - Would require flaring in situations not meeting criteria for reduced emissions completion where flaring is not a hazard.



NSPS Proposal – Other Emission Sources

- Compressors (gathering/boosting through transmission/storage)
 - Centrifugal – require dry seals, seek comment on controlled wet seals as equivalent
 - Reciprocating – require replacement of rod packing at 26,000 hours of operation (3 years for most compressors in regular use)
- Storage vessels (crude oil and condensate tanks)
 - Throughput \geq 1 bpd condensate or 20 bpd crude (6 tpy VOC) – require 95% control
 - Throughput $<$ 1 bpd condensate or 20 bpd crude ($<$ 6 tpy VOC) – no control
- Pneumatic devices
 - Require non-gas-actuated devices (instrument air systems) at gas processing plants
 - Require “low-bleed” controllers (gas emissions \leq 6 scfh) at other facilities
 - Exempt applications requiring high-bleed controllers due to functional requirements
- Equipment leaks
 - Leak detection and repair (LDAR) already required for gas processing plants under existing NSPS
 - Upgrade LDAR to lower leak threshold (500 ppm vs. 10,000 ppm) at gas plants
- Produced water ponds
 - Not enough data to propose controls at this time
 - Soliciting comment and data on emissions and control techniques for later consideration



Permitting Implications

- The NSPS will not create permitting issues.
 - Controls under NSPS will actually make it less likely that wells are major sources since the NSPS will reduce emissions by 95%.
- The proposal would exempt well completions and other processes subject to the oil and gas NSPS from Title V applicability if they are not major sources.



Air Toxics Review

The Technology and Risk Reviews Cover:

- Oil and Natural Gas Production
 - Tanks
 - Equipment leaks
 - Glycol dehydrators
- Natural Gas Transmission and Storage
 - Glycol dehydrators



Well Production Pad with Glycol Dehydrators
(source: EPA)



Proposal – Air Toxics

Technology Review

- Technology review results for oil and gas production and for transmission and storage:
 - We did not identify any available cost-effective technologies for controlling glycol dehydrators and storage tanks that could achieve greater reductions than the current standards.
 - We improved the standard for equipment leaks for oil and gas production as a result of our technology review.
- The review identified unregulated emission points, and the proposal includes provisions to reduce emissions from those points.
 - Glycol dehydrators:
 - Establish limits for small dehydrators at major sources.
 - “small” means gas throughput < 3 million scf/day (production) or < 10 million scf/day (transmission & storage).
 - Storage tanks (for oil and gas production only):
 - Regulate all crude oil and condensate tanks at major sources.
 - Remove throughput, API gravity, and gas/oil ratio criteria.



Proposal – Air Toxics

Risk Review

- EPA conducted two risk reviews for this proposal, one for **oil and gas production**, and one for **transmission and storage**.
- **Oil and Gas Production**
 - We determined that the risks from actual emissions are approximately 40 in 1 million. EPA considers this risk to be acceptable.
 - However, potential risks from emissions allowed by the regulation would be as high as 400 in 1 million. EPA does not consider a risk of 400 in 1 million to be acceptable.
 - Potential risks from emissions allowed by the regulation would be reduced to about 40 in 1 million.
 - The proposed changes would eliminate the 1 ton per year benzene compliance option for glycol dehydrators at major sources.



Proposal – Air Toxics

Risk Review (continued)

- **Transmission and Storage**

- Our risk review estimates that the cancer risk from air toxics emissions from natural gas transmission and storage is approximately 90 in 1 million.
- While EPA considers a risk level of 90 in 1 million to be acceptable, we are proposing changes to this standard that would lower the risk level to 20 in 1 million. This would protect the public health with an ample margin of safety.
- The proposed changes would eliminate the 1 ton per year benzene compliance option for glycol dehydrators at major sources.



Schedule

- Proposal was signed July 28 and was published August 23.
- Three public hearings were held in the Pittsburgh, Denver, and Dallas areas on September 27, 28, and 29, respectively.
- Comment period closes October 31
- We are under a consent decree deadline to take final action on these rules by February 28, 2012.