Protective Air Standards for Oil and Gas Sources are Good for Human Health, Economic Security and Environmental Protection

Meeting with OMB

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Finding the ways that work

Need for Protective Clean Air Standards

Oil and natural gas facilities contribute significantly to air pollution associated with serious human health effects and adverse environmental consequences

- ground-level ozone
- toxic air pollution
- particulate pollution
- climate-disrupting pollution
- haze that obscures scenic vistas in national parks and wilderness areas

Critical Policy Considerations

In developing protective clean air measures, EPA should consider:

- Multi-pollutant benefits of numerous controls
- The significant impact of emissions from existing sources
- Highly favorable economics of many solutions
- Strengthen understanding of actual emissions, particularly for wells and tanks
- Some state standards provide solid building blocks

Regional Impacts of Existing Sources

- Barnett Shale – Mature gas field
  - Public Health Burden: Cook Children's Hospital Study
    - Community-wide Children's Health Assessment and Survey (CCHAPS)
  - Loss of Property Value and Tax Base:
    - Flower Mound study – 3-14%
    - Ft Worth analysis – 35%
  - Economic Burden to Local Governments:
    - Facilitating public forums for resident input
    - Creating oil and gas task forces
    - Conducting air quality studies
    - Hiring additional staff

Ground-level Ozone

VOC and NOx emissions from O&G production in the Barnett Shale are comparable to the combined emissions from all the cars and trucks in the metro area

Winter-time ozone exceedances have occurred in Wyoming near the Pinedale-Anticline natural gas field and in Utah's Uintah basin. These previously pristine areas now experience ozone pollution episodes comparable to highly polluted urban areas.

Significant Source of HAPs

- TCEQ measured benzene at levels above short-term, health-based comparison level at two sites in the Barnett Shale

- Air monitoring conducted by Garfield County, Colorado revealed elevated cancer and non-cancer risks from oil and gas activities in the Piceance basin

Protective Standards Must Address Methane Leaks/Venting/Releases

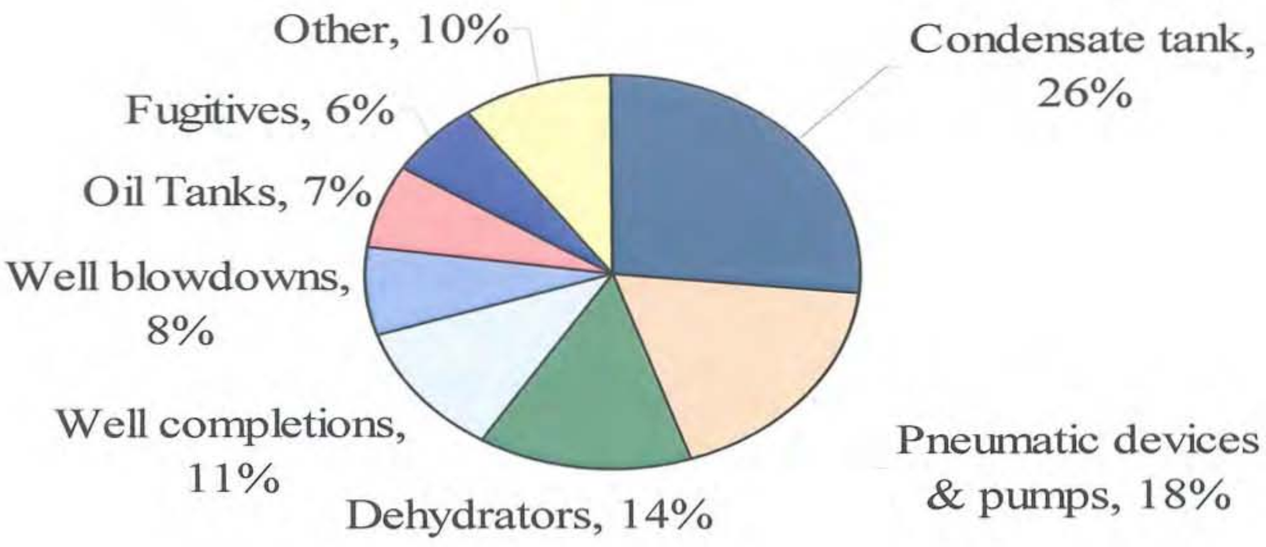
- # 1 contributor to US methane emissions
- Methane contributes to background tropospheric ozone pollution
- In TSD for GHG MRR, EPA provides a revised estimate for 2006 Oil/Gas GHG emissions of 307 $MMTCO_2e$
  - Based on updates of 4 of 6 sources "believed to be significantly underestimated"
  - 65% higher than U.S. GHG Inventory Estimate
- To put 307 $MMTCO_2e$ in context:
  - Annual GHG from 59 million passenger vehicles
  - Annual CO_2 from approximately 80 coal-fired power plants
  - About half of UK's or 2/3 of Spain's GHG; more than combined GHG from Netherlands and Austria (2007)

Addressing Existing Air Pollution

- Sections 112 and 111(d) address existing sources; VOCs and CH4 should be addressed under section 111(d).
- Wyoming and Colorado rules apply to existing sources. Wyoming has required control of flash emissions from pressure vessels and storage tanks since 1997, controls from dehydration units since 2001, green completions in the Jonah/Pinedale area since 2004; offsets in the Jonah/Pinedale area since 2008
- Similar to new sources, pollution abatement from existing sources can be highly cost-effective.

2006 Western Regional Air Partnership VOC Emissions

Small number of source categories account for most of the emissions



Opportunity: Pollution Reductions Often Have Short Pay Back

- **GAO: An October 2010 report from GAO estimates available emission reduction technologies could enable a 40% or greater reduction in venting and flaring associated with natural gas production. "Federal Oil and Gas Leases: Opportunities exist to Capture Vented and Flared Natural Gas, Which Would Increase Royalty Payments and Reduced Greenhouse Gases," GAO-11-34.**
- **Wells:**
  - Reduced emission completions, plunger lifts and smart well automation
  - Between 1990 and 2009, Devon Energy generated $106,596,000 due to use of reduced emission completions in the Barnett
- **Pneumatic Devices and Pumps**
  - Replacing or retrofitting high with low or no-bleed pneumatic devices saved natural gas operators $254.8 million and as much as 36.4 bcf of methane (as of October 2006).
- **Crude Oil, Condensate and Produced Water Tanks**
  - TCEQ estimated savings of $68,000 and a two-week payback period for use of a vapor recovery system on a storage tank battery.
- **Glycol Dehydrators**
  - Savings of up to $75,019 from installing flash tank separator per unit
  - $53,200 from using non-condensed gas as on-site fuel per unit

Cost-effective methane reduction opportunities

Technology/practice	Volume of natural gas reductions (Mcf/yr)	Value of annual gas savings (dollars/yr)[1]	Implementation costs	Payback time (months)
Change from high to low-bleed pneumatic device[2]	50 to 260, depending on age of device at time of replacement	$350–1,820, depending on age of device at time of replacement	$210–1,850 depending on age of device at time of replacement	3–13, depending on age of device at time of replacement
Retrofitting high-bleed devices[3]	230	$1,610	$675	6
Replace gas with air in pneumatic device (per facility)[4]	20,000	$140,000	$60,000	6
Green completions[5]	25.2 billion cubic feet annually[6]	$176 million	$1,000–10,000[7]	1–3
Plunger lift systems[8]	4,700–18,250 per well	$32,900–127,750	$2,591–10,363 per well	2–14
Well automation devices[9]	500 per well	$35,000 per well	$11,000 per well	3
Reducing glycol circulation rates on glycol dehydrators[10]	N/A. In general, EPA found circulation rates to be two or more times higher than necessary.[11]	$2,758–275,940	Negligible	Immediate
Replacing glycol dehydrator with desiccant dehydrator[12]	1,063	$7,441	$15,787	21
Using pipeline pump-down techniques to lower gas line pressure before maintenance[13]	200,000	$1,400,000	$98,757 or zero if using in-line compressors	1 or immediate if using in-line compressors
Directed inspection and maintenance at compressor stations[14]	29,412 per compressor station	$88,239 per compressor station	$26,248 per compressor station	N/A. Potential average first year savings equal $61,991
Vapor recovery units on crude oil storage tanks[15]	4,900-96,000	$30,300-606,800	$35,738–103-959	3–19
Replace compressor rod packing systems[16]	865	$6,055	$540	2
Install BASO valves[17]	Varies. One partner reported savings of 222 Mcf per year for a single installation	$1554 per valve	< $1000 per valve	Less than one year
Replacement of wet seals with dry seals on wet seal centrifugal compressors[18]	45,120 per seal	$315,000 per seal	$324,000 per seal	10 per seal

1 Cost of gas $7.00/ thousand cubic feet (Mcf).
2 http://www.epa.gov/gasstar/documents/ll_pneumatics.pdf
3 http://www.epa.gov/gasstar/documents/ll_pneumatics.pdf
4 http://www.epa.gov/gasstar/documents/ll_instrument_air.pdf
5 http://www.epa.gov/gasstar/documents/workshops/midland-2006/gremillion.pdf
6 http://www.epa.gov/gasstar/documents/workshops/midland-2006/gremillion.pdf . Specific amounts vary depending on well pressure.
7 http://www.epa.gov/gasstar/documents/greencompletions.pdf. Based on 2004 data.
8 http://www.epa.gov/gasstar/documents/ll_plungerlift.pdf
9 http://www.epa.gov/gasstar/documents/workshops/midland-2006/gremillion.pdf
10 http://www.epa.gov/gasstar/documents/ll_flashtanks3.pdf
11 The amount of methane vented is directly proportional to the TEG circulation rate. Thus, the amount of natural gas reductions depends on the individual amount of circulation rates and the extent to which they are higher than necessary.
12 http://www.epa.gov/gasstar/documents/ll_desde.pdf
13 http://www.epa.gov/gasstar/documents/ll_pipeline.pdf
14 http://www.epa.gov/gasstar/documents/ll_dimcompstat.pdf
15 http://www.epa.gov/gasstar/documents/ll_final_vap.pdf. Assumes a gas price of $700/Mcf times 95% of the annual volume of gas lost.
16 http://www.epa.gov/gasstar/documents/ll_rodpack.pdf
17 http://www.epa.gov/gasstar/documents/installbaso.pdf
18 http://www.epa.gov/gasstar/documents/ll_wetseals.pdf

Additional information

- Detailed information can be found in joint Environmental Defense Fund/Wyoming Outdoor Council White Paper
- Questions? Elizabeth Paranhos 303 880-4285 elizabeth@delonelaw.com or Ramón Alvarez, 512 691 3408, ralvarez@edf.org