



Colorado's Hydrocarbon Control Rules for the Oil and Gas Sector: Rule Implementation and Lessons Learned

Presentation to the Committee on Gas

National Association of Regulatory Utility
Commissioners 127th Annual Meeting
November 9, 2015

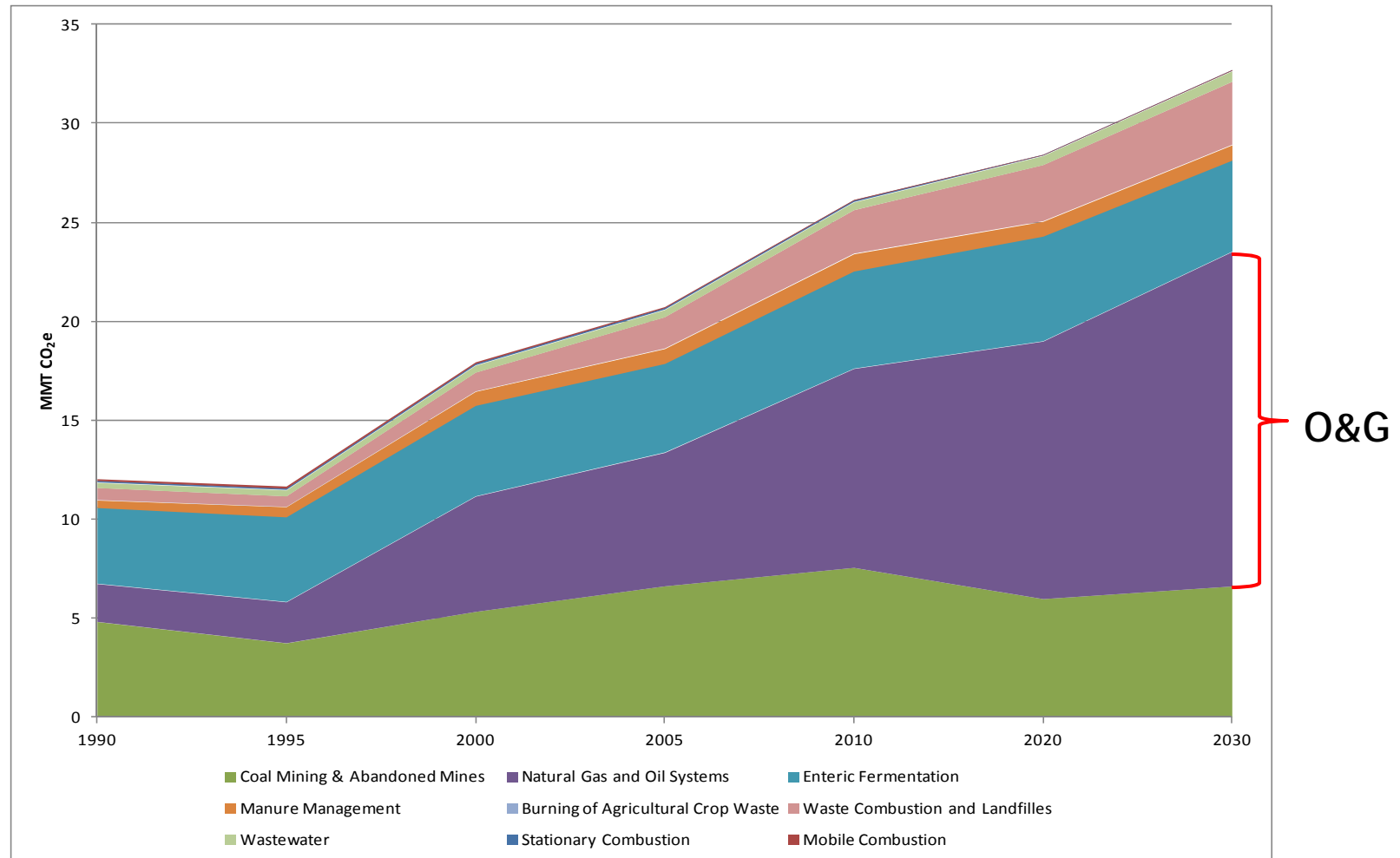
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High Level Observations

- Colorado ranks 6th in the U.S. for natural gas production and 7th for crude oil production
(U.S. Energy Information Administration website - November 2015
<http://www.eia.gov/state/?sid=CO>)
- O&G is also a significant source of volatile organic compounds, nitrogen oxides and methane
- These emissions impact multiple areas across the state

Trend in Colorado Methane Emissions by Source Category (MMTCO₂e)

(Colorado Greenhouse Gas Inventory - 2014 Update)



Highlights of Colorado's Oil and Gas
Emission Reduction Rules

Overview of New Emission Reduction Strategies

- LDAR for compressor stations and well production facilities
- Expanded control requirements for storage tanks
- Improved capture of emissions at controlled tanks
- Expanded control requirements for glycol dehydrators
- Capture or control of the gas stream at well production facilities
- Requirements to minimize emissions during well maintenance
- Expanded pneumatic controller requirements statewide
- Auto-igniters on all combustion devices

Costs and Benefits of New Rules

- Estimated annual cost of new rules for industry is approximately \$42 million
- Significant reduction of volatile organic compounds and methane
 - Approximately 94,000 tpy of VOC
 - Approximately 64,000 tpy of methane
 - Overall cost effectiveness for the entire package is approximately \$450 per ton of VOC reduced

LDAR for Compressor Stations and Well Production Facilities

- Frequent visitation and monitoring using Method 21, infra-red (IR) cameras, audio/visual/olfactory observations
 - Wells: plumbing, separators, ancillary piping
 - Compressor stations: compressors, engines, dehys, processing skids, tanks, piping, etc.
- Tiered monitoring schedule to focus on the highest emitting facilities and reduce the burden on smaller facilities
- Repair schedule for identified leaks
- Recordkeeping and reporting requirements



Storage Tank Inspections

- Controlled tanks must be operated without venting to the atmosphere
- Establishes requirements for Storage Tank Emission Management systems (STEM)
- Emissions associated with the top of the storage tank (pressure relief valves, thief hatches, control devices/piping) are addressed through STEM
- Certified design to minimize emissions
- Extensive instrument based and AVO monitoring
- A tiered monitoring schedule focuses on the highest emitting facilities and reduces the burden on smaller facilities



Repairing Leaks & Recordkeeping

- First attempt at repair required within 5 working days with provisions for good cause (parts availability or full shut-down)
- Instrument monitoring following the repair(s) are required within 15 working days to determine effectiveness
- Operators must maintain records
 - Initial approved instrument monitoring method
 - List of leaking components and monitoring method used to determine the leak
 - Date of first repair attempt and if necessary additional attempts



2014 Inspection Results (1803 New Facilities Inspected; 4869 Total Inspections)

Component type	Number of leaks identified	Number of leaks repaired	Number of leaks on delay of repair list as of Dec. 31
Valves	745	680	29
Connectors	688	602	48
Flanges	86	77	2
Pump seals	16	16	0
Pressure relief devices	171	169	1
Total	1,706	1,544	80

Leaks identified (1706)



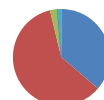
- Valves (745)
- Connectors (688)
- Flanges (86)
- Pump seals (16)
- Pressure relief devices (171)

Leaks repaired (1544)



- Valves (680)
- Connectors (602)
- Flanges (77)
- Pump seals (16)
- Pressure relief devices (169)

Repairs delayed (80)



- Valves (29)
- Connectors (48)
- Flanges (2)
- Pump seals (0)
- Pressure relief devices (1)



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Highlights of Colorado's Oil and Gas
Emission Reduction Rules

Comparing EPA's Proposed Rules to Colorado Regulations

Equipment/process	NSPS OOOO	NSPS OOOOa	CTG	Colorado
	VOC	VOC and methane	VOC	HC
Gas well completions	◆	◆		
Oil well completions		◆		
Centrifugal compressors	◆	◆	◆	◆
Reciprocating compressors	◆	◆	◆	◆
Pneumatic controllers	◆	◆	◆	◆
Pneumatic pumps		◆	◆	
LDAR – natural gas processing plants	◆	◆	◆	◆
LDAR – well sites		◆	◆	◆
LDAR – compressor stations		◆	◆	◆

Where Can Colorado's Materials be Found?

- Website links to the rules and supporting materials

<https://www.colorado.gov/pacific/cdphe/aqcc-meeting-materials-february-19-23-2014>

<https://www.colorado.gov/pacific/cdphe/emissions-requirements-oil-and-gas-industry>

Lessons Learned So Far

- Older facilities have more problems
- Payback for eliminating high-bleed pneumatics is a few months - \$\$\$ for the companies and royalty owners coupled with fewer emissions
- Companies are consolidating their equipment to single pads and in some cases are going tankless
- Centralized processing of liquids is growing - reduces opportunities for emissions
- Pressures are being stepped down at production facilities; lower pressure = fewer emissions
- Companies have preventative maintenance on the mind - a greater awareness means more attention to facilities and equipment
- Merging federal and state regulations is mandatory for company compliance and agency oversight