

# Colorado's Recent Efforts to Address Hydrocarbons from Oil and Gas Operations

Presentation to the Joint Meeting of the Southern Ute Indian Tribe/State of Colorado Environmental Commission and the Colorado Air Quality Control Commission

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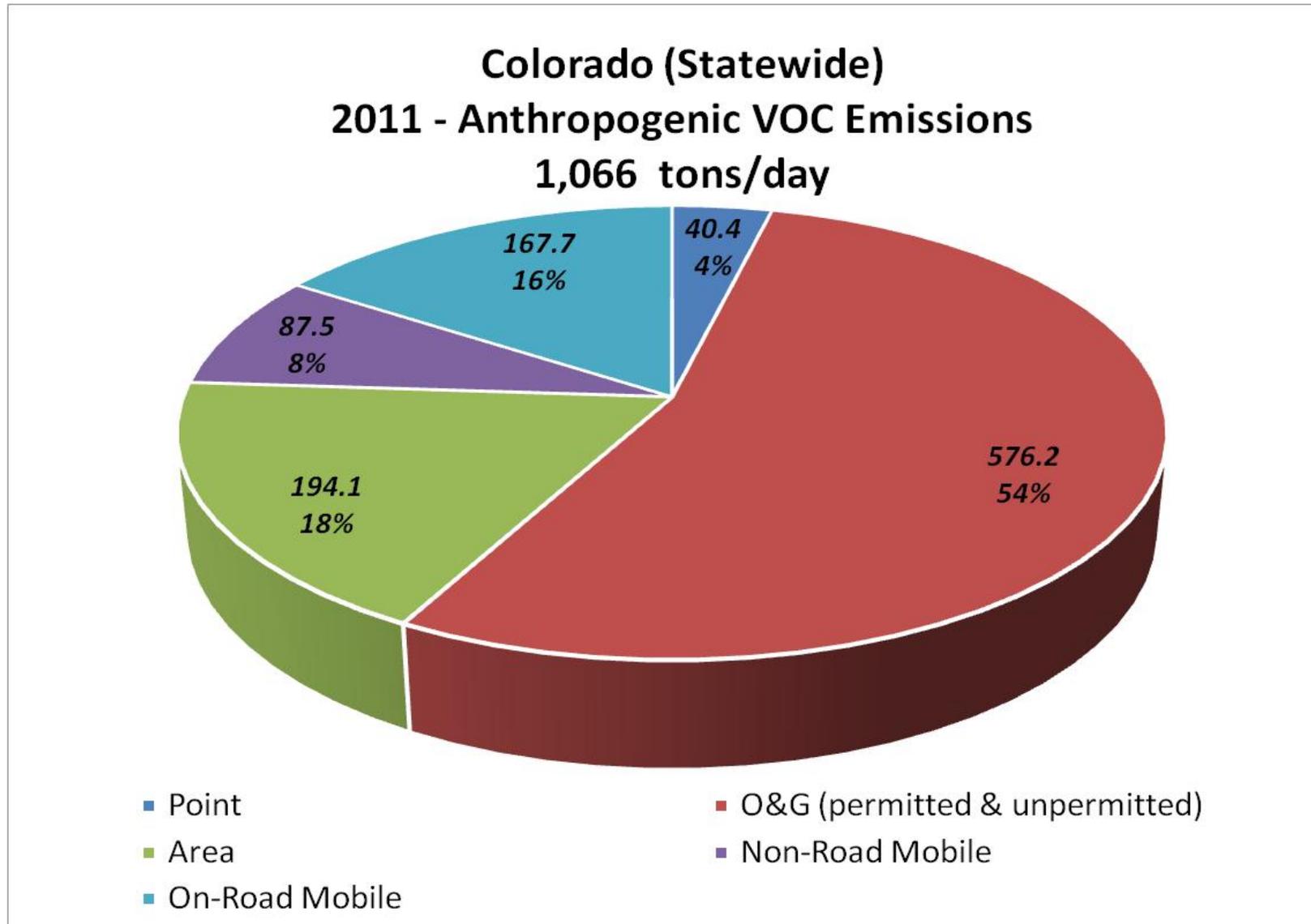
Colorado Department of Public Health and Environment



# High Level Observations

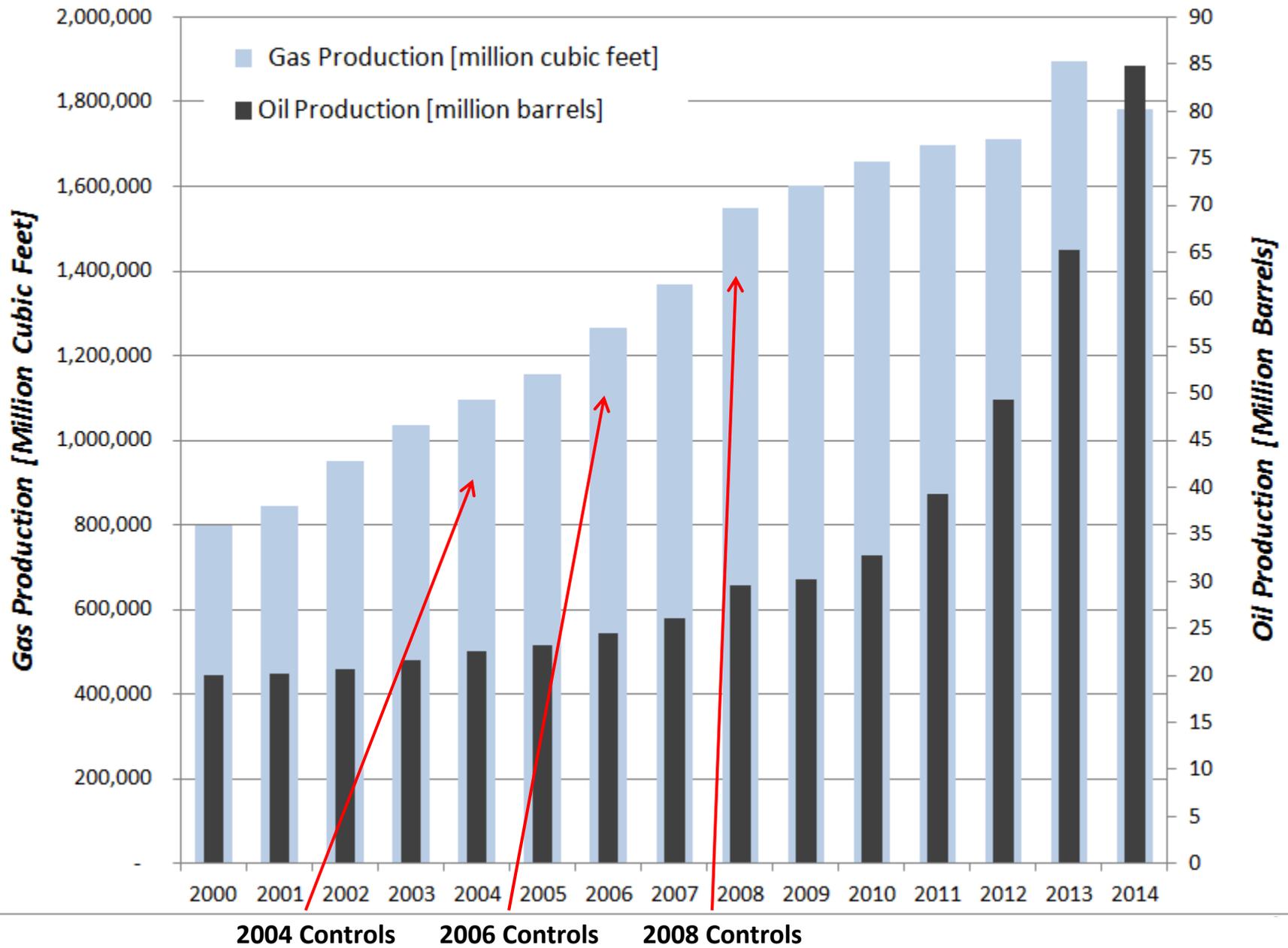
- Oil and Gas emissions impact multiple areas across the state
- Oil and Gas sector is the predominant source of VOC emissions
- It is also a significant source of NO<sub>x</sub> and methane emissions
- Colorado has implemented strategies that foster increased use of natural gas; maximizing the capture and beneficial use of natural gas has economic and environmental benefits
- Absent additional requirements, oil and gas emissions are expected to increase while emissions from other sectors are expected to decrease

# Statewide VOC Emissions



- Colorado has been a national leader in regulating air emissions from oil and gas production sector
  - 2004 rulemaking to reduce VOC emissions from O&G sources in the Denver Metro/North Front Range region
  - 2006 adoption of O&G emission controls with statewide applicability
  - 2008 action to further reduce O&G emissions in the Denver Metro/North Front Range region
- Even with all of these rules in place, Colorado needs to further improve air quality and keep pace with the industry

# Colorado Annual Oil and Gas Production



# Rationale for New Rules

- Reduce leakage from O&G production
- Responsible development
- Reduce waste
- Maximize climate change benefits of natural gas usage
- Ensure benefits from existing rules for petroleum storage tanks
- Proactively address non-compliance with ozone National Ambient Air Quality Standard *while also reducing methane emissions which contributes to global climate change*

# 2014 Rulemaking

- Wide range of regulatory requirements aimed at reducing hydrocarbons (both VOC and CH<sub>4</sub>) emissions from O&G production sector
  - Adopt federal oil and gas rules
  - Expand some ozone NAA measures statewide
  - Enhance capture at controlled storage tanks
  - Leak detection and repair requirements - “LDAR”
- Collaborative effort involving the State, industry and environmental group stakeholders

# 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
- Requires capture or control of the gas stream at well production facilities
- Establishes requirements to minimize emissions during well maintenance
- Expanded pneumatic controller requirements statewide
- Requires auto-igniters on all combustion devices



# Costs and Benefits of New Rules

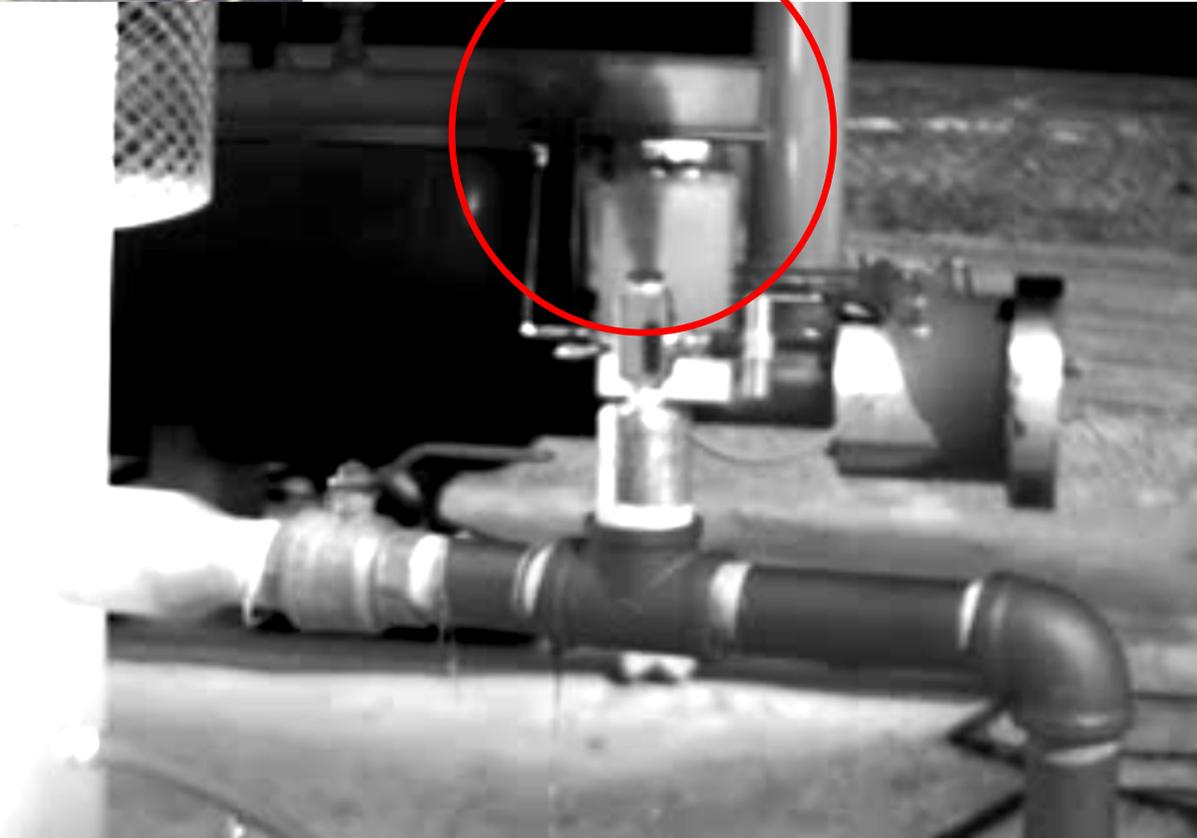
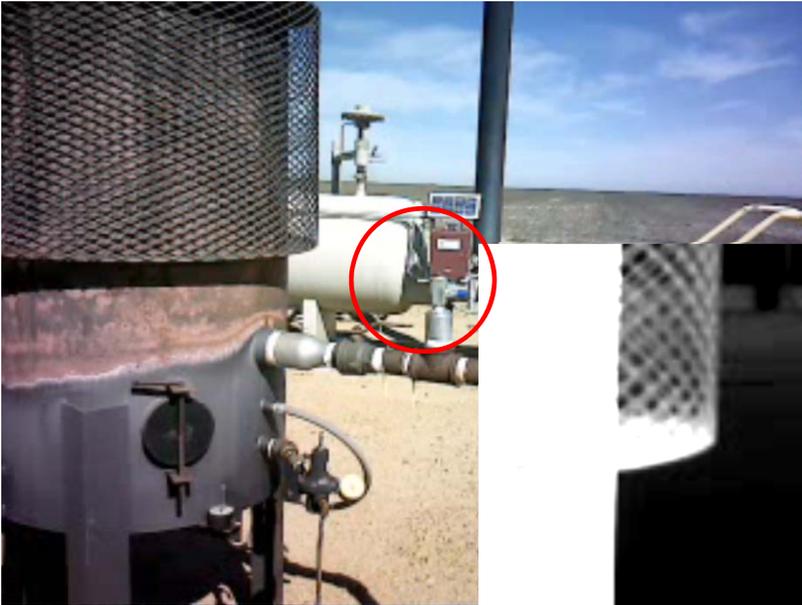
- Estimated annual cost of new rules for industry is approximately \$42 million
- Significant reduction of volatile organic compounds and methane
  - Approximately 94,000 tpy of VOC
  - Approximately 64,000 tpy of methane
  - Overall cost effectiveness for the entire package is approximately \$450 per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

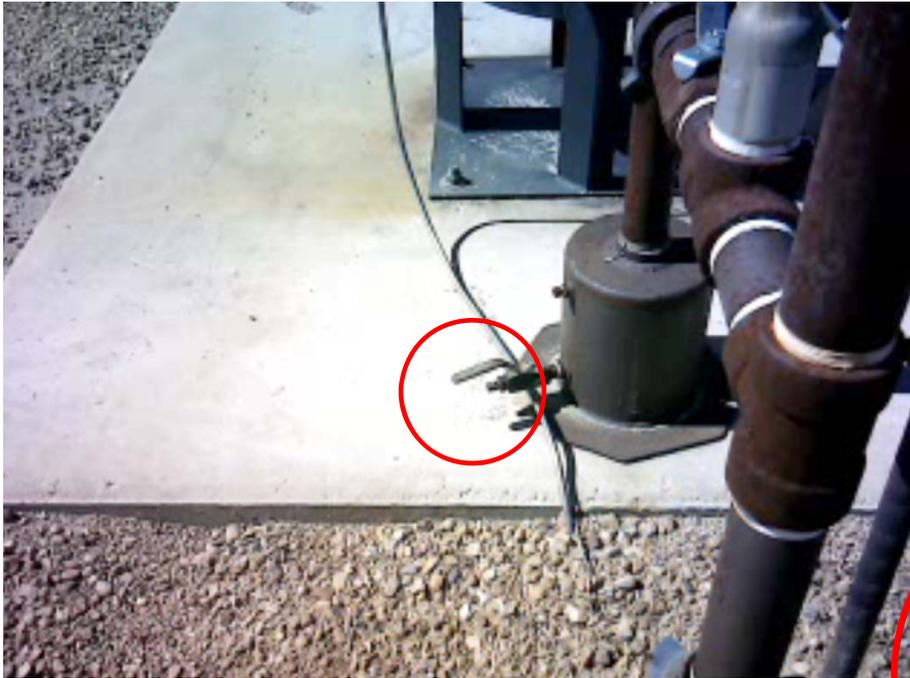
# LDAR for Compressor Stations and Well Production Facilities

- 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 burdens on smaller facilities
- Repair schedule for identified leaks
- Recordkeeping and reporting requirements



## Leak on open-ended valve on piping connected to Flare Combustor





Leak - open  
valve on Drip Pot

# 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 burdens on smaller facilities





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Highlights of Colorado's Oil and Gas  
Emission Reduction Rules



Leak on loose  
hammer union on  
pipe leading to  
Flare Combustor



# 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



# In Closing:

- VOC and methane emissions from O&G operations are getting increased attention
- There are cost-effective strategies that can reduce these emissions
- Broad collaboration is important
- Colorado's rules ensure responsible development of Colorado's oil and gas resources and can serve as a model or reference point for EPA and other states

