Statewide Oil and Gas Hydrocarbon Emissions Reductions Initiative

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COLORADO
Air Pollution Control Division
Department of Public Health & Environment
Overview

- Basis for stakeholder process
- Pneumatic controller task force
- Hydrocarbon emission reduction strategies
- Next steps
Basis

- Established by Air Quality Control Commission Regulation No. 7 “Statement of Basis and Purpose” (Nov. 2017)
  - Evaluate cost-effective hydrocarbon emission reductions from the statewide oil and natural gas sector
  - Study pneumatic controller emission reduction options, including causes of improper operation, techniques and costs, maintenance methods, definitions

- Two year stakeholder processes

- Consists of industry, local government, and environmental NGO representatives
Commission Directive: “Reassessment” provision for inspection and enhanced response

- Examine emission reduction options
  - Rate, type, application, causes of improper operation
- Inspection and repair techniques and costs
- Available preventative maintenance methods
- Definition appropriateness
  - “Enhanced response”, “pneumatic controller”
    - Including intermittent, no-bleed, and self-contained pneumatic types
- More information needed regarding “good engineering and maintenance practices”

Information used to reassess Section XVIII.F
Division-led study of pneumatic controller emission reduction options
- Only in Denver Metro North Front Range ("DMNFR") Ozone Nonattainment Area

Task Force Scope
- Data collection
  - Inventory of pneumatic devices (kinds, quantities, sizes)
  - Improper operation rates, causes & repair techniques
- Data will guide recommendations
Hydrocarbon stakeholder process

- Kick-off January 2018
  - Industry, local government (municipalities, counties), and environmental representatives
  - Statewide Hydrocarbon Emissions Reduction (SHER) Team
    - Developed goals
    - Monthly meetings
      - Transmission subgroup
      - Upstream/midstream subgroup
- Public comment meetings
SHER Team - goals

• Evaluate potential areas for hydrocarbon emission reductions from the oil and gas industry statewide (within Division jurisdiction)
  ▫ Consider cost-effective strategies
  ▫ Consider near-term and long-term strategies
  ▫ Consider implementation flexibility
    • Consider operational and location difference
    • Consider regulatory and non-regulatory measures
Oil and gas sectors

- Production
  - Pneumatic Controllers
  - Gathering/Boosting Stations
  - Tanks
  - Chemical Injection Pumps

- Gathering and Processing
  - Reciprocating Compressors
  - Centrifugal Compressors
  - Gas Engines
  - Blowdowns/Venting

- Transmission
  - Reciprocating Compressors
  - Station Fugitives
  - Engines
  - Pipelines

- Distribution
  - Mishaps (Dig-ins)
  - Residential
  - Mains - Unprotected Steel
  - Services - Unprotected Steel

Diagram:
- Producing Wells
- Gathering Lines
- Transmission Lines
- Processing Plant
- Compressor Stations
- Underground Storage
- Distribution Mains (Lines)
- City Gate (Regulators/Meters)
- LNG or Propane/Air Plant
- Large Volume Customer
- Regulator/Meter
- Residential Customers
- Commercial Customer
Opportunity to Innovate

- Strong engagement by key stakeholders
  - Exchange ideas and determine what works best for Colorado
- Not limited by an EPA framework
  - SHER Team is separate from any ozone State Implementation Plan (SIP) or federal emission standard
Hydrocarbon emission reduction strategies

- Oil and gas sector (upstream, midstream, transmission) statewide
- Hydrocarbon emissions
- Cost-effective strategies
Hydrocarbon emission reduction strategies

• Strategies
  ▫ Dehydrators
  ▫ Flash gas/flaring
  ▫ LACT/load-out
  ▫ Tankless production
  ▫ Well liquids unloading
  ▫ Pneumatic devices
  ▫ Leak detection, monitoring
  ▫ Downstream transmission
  ▫ Infrastructure, inventory
Hydrocarbon emission reduction strategies

- **Flash gas/flaring**
  - **Strategy:** reduce flash gas emissions
  - **Remove entrained oxygen from flash gas allowing up to 100% of site flash gas to be captured and sold instead of combusted**

Courtesy of EcoVapor
Hydrocarbon emission reduction strategies

• Tankless production
  ▫ **Strategy:** reduce emissions from storage tanks and load-out
  ▫ **Tankless production = tanklite**
    • Oil tankless - eliminates oil tank emissions, oil truck loadout emissions, reduces truck traffic
    • No tanks - eliminates oil and water tank emissions, oil and water truck loadout emissions, reduces truck traffic
Hydrocarbon emission reduction strategies

- **Well liquids unloading**
  - **Strategy:** reduce emissions from well liquids unloading
  - **When the reservoir energy is insufficient to lift the produced liquid up the wellbore, liquids accumulate and need to be removed to maintain production**
  - **Liquids unloading techniques**
    - Formation energy dependent (e.g., plunger lifts, vent cycles)
    - Added energy dependent (e.g., pumps)
    - Surface compression
  - **Liquids unloading does not always result in vented emissions**
Hydrocarbon emission reduction strategies

• Pneumatic devices

  ▫ Strategy: reduce emissions from natural gas driven pneumatic controllers and pneumatic pumps
    • Pneumatic controllers - replace with zero bleed if technically feasible
    • Pneumatic controllers - direct measurement of continuous bleed
    • Pneumatic controllers - implement the find and fix program statewide
    • Pneumatic pumps - replace with zero bleed if technically feasible
    • Pneumatic pumps - implement 95% control statewide
Hydrocarbon emission reduction strategies

• Leak detection
  ▫ **Strategies: reduce fugitive emissions from components**
    • Monitoring - aerial monitoring
    • Monitoring - remote sensing technology pilot
    • Inspection frequency - increase inspection frequencies at smaller well production facilities and natural gas compressor stations
Hydrocarbon emission reduction strategies

- **Downstream transmission**
  - **Strategy:** reduce emissions from downstream transmission compressors and compressor stations
    - Compressor stations LDAR
    - Reciprocating compressor rod packing replacements
    - Segment based reductions
Next steps

- Spring 2019: complete evaluation
- Fall 2019: determine recommendations
- January 2020: present recommendations
  - Speaking role for industry, local government, and environmental organizations
- May 2020: Pneumatic Controller Task Force report
Questions?