Colorado Oil and Gas Storage Tank Enforcement

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Presentation Outline

- Introduction to Storage Tank Initiative
- Historical background
- Results of Enforcement Actions
- Lessons learned

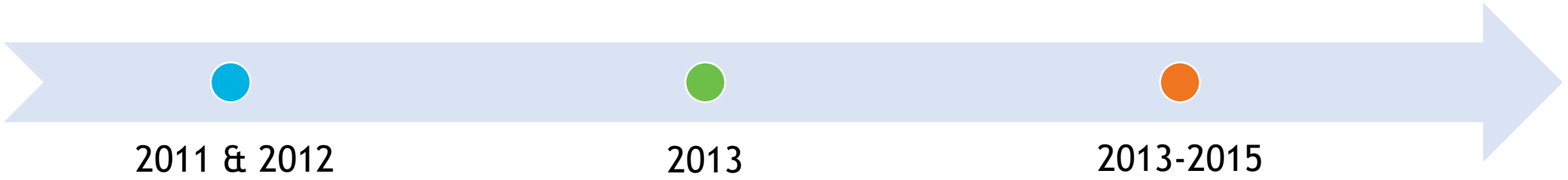
Storage Tanks & Vapor Control Systems

- Large source of Volatile Organic Compounds from Exploration and Production for Oil and Gas
- Approximately 8,000 hydrocarbon liquids storage tank facilities in Colorado
- Colorado has regulated storage tanks since 2002
- EPA identified storage tanks as an affected source nationally with adoption of federal New Source Performance Standards Subpart OOOO

Optical Gas Imaging Camera (IR Camera)

- Camera using a spectral filter that detects hydrocarbons on the wavelength where a gas absorbs infrared energy
- Not otherwise seen by the naked eye
- Several manufacturers and models available :
  - FLIR models GF300, GF320, GFX320, GF620
  - Opgal EyeCGas camera
  - Infrared Cameras Inc. (ICI) Gas DetectIR VOC
  - Konica Minolta Gas Camera System, Model: GMP01

Timeline



- 2011 & 2012: EPA/APCD partner to complete inspections at storage tanks using an IR Camera
- 2013: APCD commences 2 year pilot IR Camera Program
- 2015: Evaluation of approximately 4,500 IR inspections

IR Camera Assessment Findings

- APCD inspectors observed emissions at approximately 25% of facilities inspected with the IR Camera

- Location of the emissions predominantly observed from thief hatches and pressure relief valves on storage tanks.
  - indication of inadequate design, operation, and/or maintenance

Timeline

- April 15, 2015: Noble Enforcement Settlement
- August - December 2015: Initiate enforcement actions
  - Three cases jointly with EPA Region 8
- 2016-2019: Settlement Negotiations
  - Storage Tank Workgroup – Oil and Gas stakeholders and APCD develop Storage Tank and Vapor Control Systems Guideline published May 5, 2018
- 2018-2020: Successful settlements reached

Basis for Enforcement Actions

- Using technical knowledge developed through 2011 & 2012 EPA/APCD collaboration, enforcement actions sought to address operators' entire field of facilities in Ozone Non-Attainment Area
- Regulatory Basis of enforcement action:

  "All hydrocarbon liquids and produced water collection, storage, processing, and handling operations, regardless of size, must be **designed, operated, and maintained** so as to minimize emission of volatile organic compounds to the atmosphere to the *maximum extent practicable*."

  AQCC Regulation No. 7, Part D, Section I.C.1.b*

  * Previously Regulation No. 7, XVII.C.1.b directed that all *leakage* must be minimized. 2019 regulatory revisions adjusted language provided here.

Results of Enforcement

Results of Enforcement Actions

- Requires evaluation of all existing controlled storage tanks for adequate design.
- Development of modeling guideline(s) and Engineering Design standards to assess design and proper function of Vapor Control Systems
  - If storage tanks found to be inadequately designed, operators must modify facilities to be adequately designed.
- Establish requirements to quickly address emissions observations
  - Must address emissions or shut in production at facility
  - Requires an evaluation of the cause if repeated observation of emissions at a facility

Results of Enforcement Actions

- Initial and ongoing increased IR inspection frequencies
- Requires the development of Inspection and Preventive Maintenance Program to ensure facilities are operated and maintained consistent with design criteria
- Requires recordkeeping and semi-annual reporting to the APCD

Results of Enforcement Actions

- Settlements cover 93% of all condensate storage tanks in Ozone Non-Attainment Area
- Approximately $14 million in Total Penalties
  - $2.75 million administrative penalties
  - $6 million committed to Supplemental Environmental Projects (SEPs)
- Additional mitigation efforts:
  - Installation of auto-gauging and Lease Automated Custody Transfer (LACT) to remove need to open thief hatch
  - Tanker truck vapor control during unloading operations ("vapor balancing")
  - Install artificial lift at select wells to reduce well unloading events

Results of Enforcement Actions

- Ancillary results through this effort:
  - Development of Storage Tank Vapor Control System Guidelines
  - Development of technology intended to provide a closed loop system to prevent emissions by maintaining tank environment
  - Enhanced use of tank pressure monitors

Lessons Learned

Lessons Learned

- Hydrocarbon storage tanks are a large source of VOC emissions that need control systems requiring substantial design to ensure capture performance
- Global settlements are a considerable resource requirement
  - Each action had its own case team
  - Two-plus years of negotiations for each case
  - Benefit was to have such a large number of facilities under settlement, rather than achieving compliance at a single facility.
- Case development expertise
  - Technical knowledge on design critical to success
  - APCD/EPA collaboration highly valuable in challenging case development

Lessons Learned

- Found Operation and Maintenance activities critical to controlling emissions
- Diversity in operators affects ability and feasibility of enhanced monitoring and oversight needed
- Considerable resource requirement to implement the elements of each settlement
  - Many operators increased staff specific to resource oversight of implementing elements of settlement
  - Government oversight extends for 5 years under most settlements

Questions?

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