ARAPAHOE COUNTY
PUBLIC WORKS & DEVELOPMENT

LDC23-003
Oil & Gas Study Session
June 6, 2023

CDPHE's O&G Air Emissions Rules, Permitting, Inspections, Monitoring & Rulemaking

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Questions Answered by Kate Fury, CDPHE

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Acronyms

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CDPHE	Colorado Department of Public Health & Environment
COGCC	Colorado Oil & Gas Conservation Commission
AQCC	CDPHE's Air Quality Control Commission
ECD	Enclosed Combustion Device
VOCs	Volatile Organic Compounds
CAMML, MOOSE	Mobile Air Monitoring vans; need to hook up to electric power
SPoD	Solar Pod
PID	Photo Ionization Detector
FLIR	Forward Looking Infrared cameras
APEN	Air Pollution Emission Notice (permit)
NOx	Nitrogen Oxides
HAPs	Hazardous Air Pollutants
SUMMA canister	collect air samples to measure levels for 40 solvents and aromatics
GHG	Greenhouse gases (CO_2 and NOx)
ESG	Environmental, Social and Governace

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What does CDPHE Regulate?

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CDPHE regulates emissions while COGCC regulates operations and has authority over site locations and equipment.

CDPHE O&G Facility Permitting & Inspections

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- CDPHE permits the equipment associated with emissions - tanks, separators, ECDs (Enclosed Combustion Devices or combustors), etc. Operators have to file APENs (Air Pollutant Emissions Notices) plus a permit for the entire facility.

- CDPHE conducts inspections based on the total emissions (greater emissions have more frequent inspections) to make sure facilities are in compliance with their permits. CDPHE inspectors use FLIR cameras to detect emissions such as methane, other hydrocarbons and volatile organic compounds (VOCs) resulting from oil and gas operations. (The camera detects heat and the images look like smoke.) CDPHE evaluates whether the equipment is being maintained and if the operator is conducting their own inspections.

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Operators' Air Quality Monitoring Plans & Trigger Levels

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- Required: Air quality monitoring plan, filed at least 60 days prior to drilling. CDPHE has to approve the plan before drilling starts. Copy of the approved plan to the local government and the proximate local government, if there is another local government within 2,000 ft of the pad. **Plans are site-specific**. The most common plans include 3-4 sensors to monitor VOCs. The plan has to specify the predominant wind pattern and sensors are generally placed downwind of the pad.

- Each plan includes site-specific trigger levels. The plans will specify what actions need to be taken and who needs to be notified if the trigger levels are exceeded.

Detection, Sampling and Analysis Equipment

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PID

FLIR Camera – Thermal Imaging

SUMA Canister

Gas Chromatograph

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CDPHE Portable Monitoring Equipment

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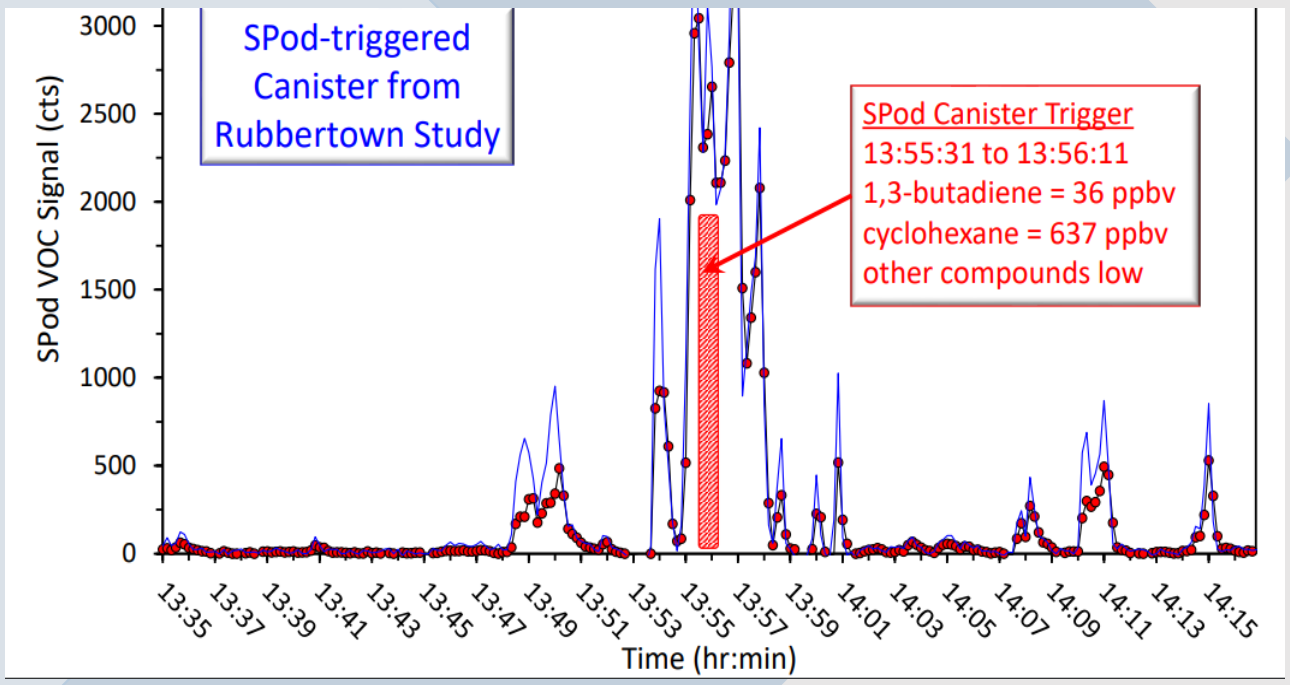
CAMML – CO Air Monitoring Mobile Lab

MOOSE – Mobile Oil/Gas Optical Sensor of Emissions

SPoD – Solar PoD

- Measures total VOCs



Operators' Leak Detection and Repair Programs

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Another method to reduce emissions.

- Quarterly inspections are required to locate and repair leaking components, including valves, pumps, connectors, compressors, and agitators, in order to minimize the emission of fugitive volatile organic compounds (VOCs) and hazardous air pollutants (HAPs).
- Instruments used to detect leaks include **PIDs and FLIR** camera.
- Identifying leaks as quickly as possible is in the best interest of the operator, so many operators conduct more frequent LDAR inspections on a voluntary basis.

VOCs and HAPs examples - benzene, cyclohexane, ethylbenzene, ethylene glycol, n-hexane, mercury, toluene and xylene. BTEX often below detection limits after routing through a glycol dehydration unit.

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Aerial Monitoring

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APCD received approximately $7 million in 2022 to implement an aerial monitoring program, which is still under development.

The goal of the program is to study Greenhouse Gas (GHG) concentrations and apportion sources of GHG. Previous studies have found multiple sources of methane in addition to oil & gas on the Front Range. For example, concentrated animal feed operations (CAFOs) account for close to half of our methane concentrations during certain times of year, whereas the contribution from oil & gas can vary from half to 80%.

Current, Past & Future Rulemaking

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July 2023 rulemaking: Greenhouse Gas (GHG) Intensity Verification to ensure a reduction in greenhouse gas emissions from oil and gas upstream operations (drilling, fracking, production). A previous rulemaking set the reduction limits - this rulemaking is to determine how those emissions reductions will be verified.

2022 Rule: Requires operators to reduce GHG emissions. Allows operators to choose their own methods to reduce company-wide GHG emissions by 30%. Rather than CDPHE dictating specific measures for specific equipment, operators select methods to reduce emissions: electrification, tankless facilities and shutting wells down periodically. This is unique and different from traditional emissions rules which target specific processes or equipment.

Governor's Mandate: GHG reductions

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The Governor's March 2023 letter mandated reductions in NOx emissions from oil and gas. Goals are a **30% reduction from a 2017 baseline by 2025 and 50% by 2030**. CDPHE is working with COGCC, operators and utility providers to identify strategies to meet these goals.

What strategies? Right now, everything is on the table, but specific strategies are still being determined. Goal is end of summer 2023, as the identified strategies will be codified in a December 2023 rulemaking.

Rulemaking related to statutory requirements is conducted **every month** at the Air Quality Control Commission until the end of 2024. Their calendar is set until the end of 2024, assuming no new legislation results in different timelines. Potentially, at the end of 2024, CDPHE AQCC can start on new ideas.

Colorado has the strictest air emission rules in the country and some of the strictest rules in the world. Other countries are following Colorado in the Greenhouse Gas Verification rulemaking and use Colorado as a model.

The Role of Local Government

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Local governments can tailor rules to match citizen concerns and can inspect facilities more often than CDPHE. CDPHE can't get to every facility every year.

Adams County and other counties, inspect every facility every year.

Local governments have used their land use authority to limit where oil and gas operations can be conducted.

What Operators are Currently Doing for Air Quality

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- Continuous Air Monitoring 10 days before drilling through 6 months after production begins, for every well pad. Site-specific plans. Conducted by 3rd party independent consultants.

- CDPHE reviews the air monitoring data in the monthly reports.

- 3 levels of Civitas alerts:
  1. Low level concentration, short duration: Internal investigation
  2. Low concentration, longer duration or large concentration over a short interval: Send field support to determine if a short-lived activity on the pad caused the emissions or it's an equipment leak.
  3. Longer duration (15 minutes or longer) and somewhat higher concentrations related to exposure limits for 14-day continuous exposure; Reported to CDPHE within 48 hours. No sampling required by CDPHE.

What other jurisdictions are doing

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Please refer to Table 1 for summaries of air quality and monitoring in other jurisdictions.

Questions? Discussion?

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Environmental, Social, and Governance

According to 2 sources

The Meaning of ESG in the Oil & Gas Industry ESG is an acronym that stands for **Environmental, Social, and Governance**. ESG standards provide a framework for judging the sustainability and ethicality of an investment. Companies that ignore ESG issues risk being perceived as less desirable investments.

Environmental, Social, and Governance (ESG) investing is rapidly becoming one of the most visible and durable megatrends in the oil and gas industry as momentum builds behind efforts to promote renewable energy, sustainability, and the energy transition.