

tVOC Sensor Use in Colorado Oil & Gas Regulation 7

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COLORADO

Air Pollution Control Division

Department of Public Health & Environment

Overview

- Background on why this program was created
- Program overview
- Initial findings



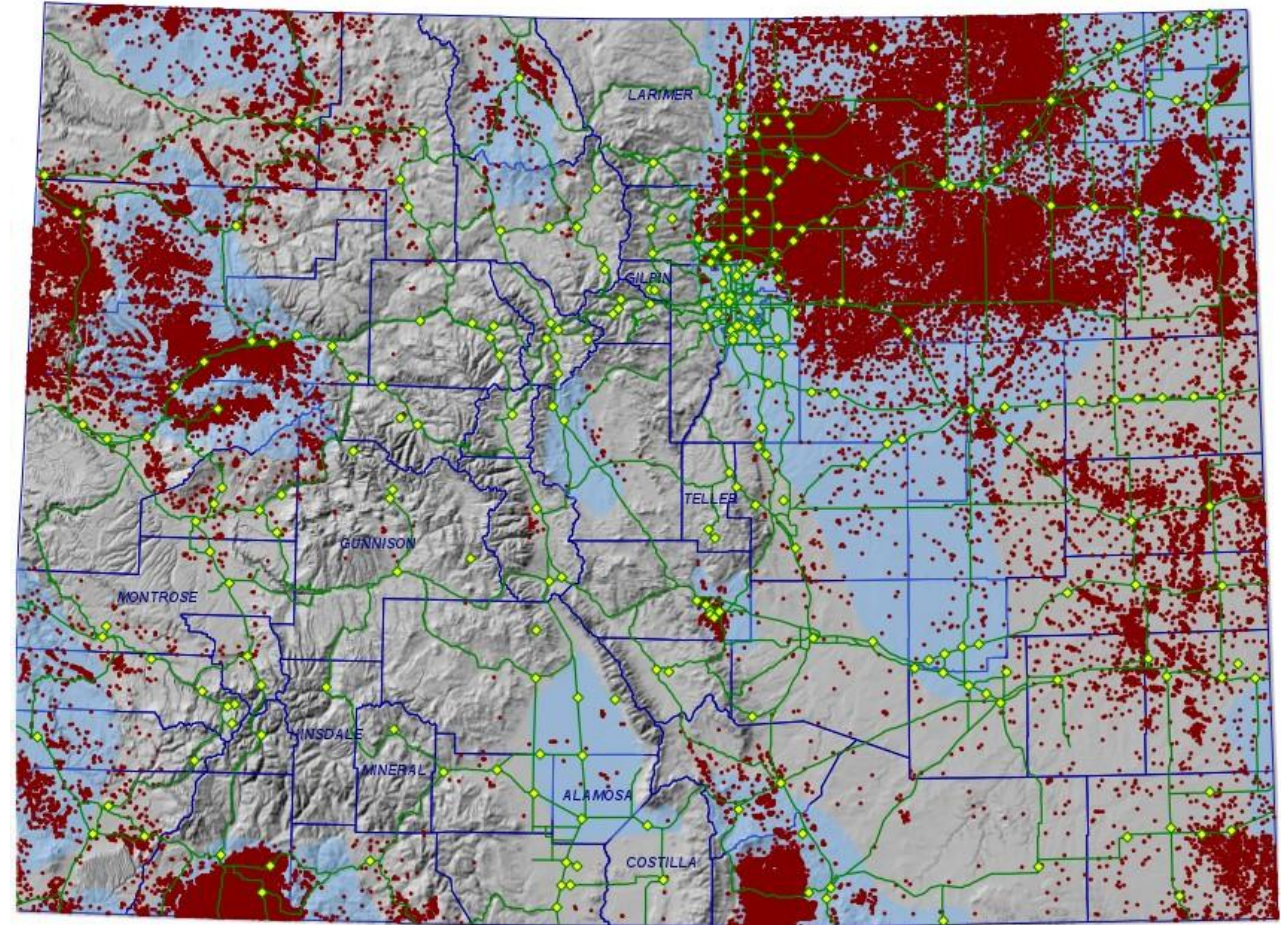
Senate Bill 19-181 Air Quality Provisions

- Directs the AQCC to minimize emissions from oil and gas facilities
 - Broad definition of facilities to include exploration and production sites through the transmission sector
 - Methane, hydrocarbon, volatile organic compound (VOC), hazardous air pollutants (HAPs), and nitrogen oxide (NO_x) emissions
- Specifically directs the AQCC to consider certain strategies, including
 - A requirement that oil and natural gas operators must install and operate continuous methane emissions monitors at facilities with large emissions potential, at multi-well facilities, and at facilities in close proximity to occupied dwellings.



Colorado Oil and Gas Development

- Over 50,000 wells - more than ½ are in the Denver-Julesburg (DJ) Basin in NE Colorado



Pre and Early Production Monitoring

- **Goal:**
 - To obtain more information regarding potential emissions from pre-production operations (drilling, fracking, millout, flowback, early production)
 - To determine potential impacts to human health
 - To obtain more information on innovative monitoring techniques
- **Three objectives listed in the regulation:**
 - Detect, evaluate, and reduce as necessary hazardous air pollutant emissions
 - Detect, evaluate, and reduce as necessary ozone precursor emissions
 - Detect, evaluate, and reduce as necessary methane emissions



Pre and Early Production Monitoring

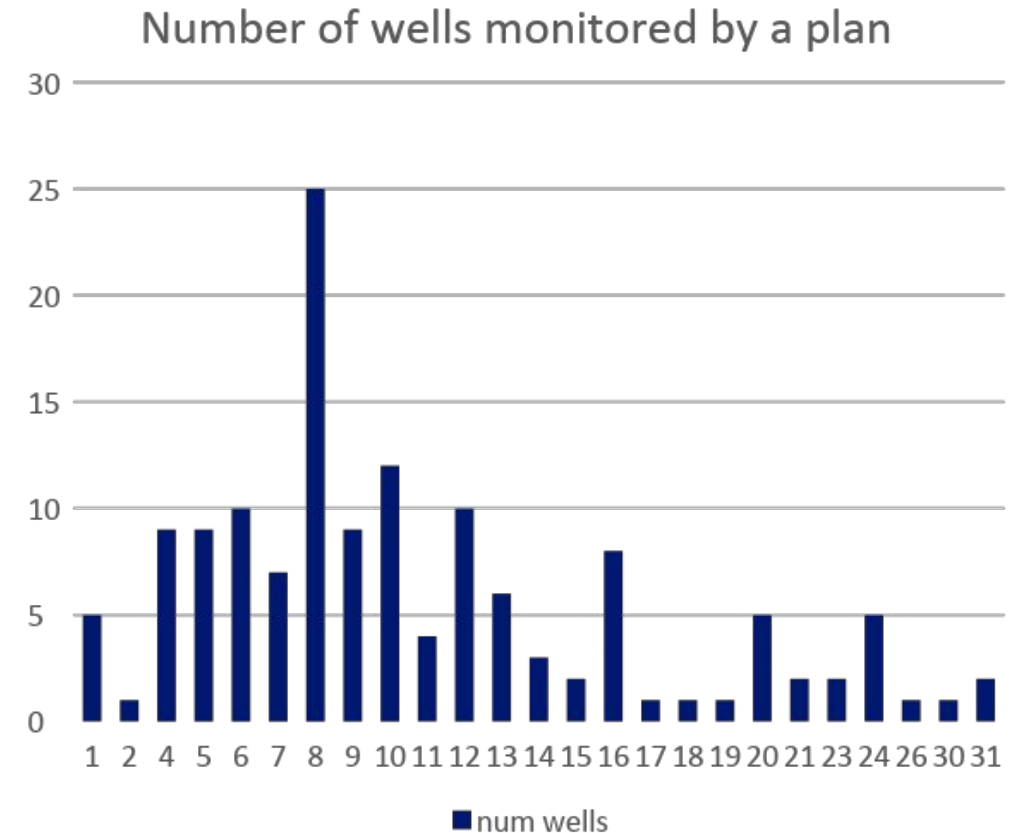
Air Quality Monitoring (Part D, Section VI.)

- Air quality monitoring at/around pre-production and early production operations where drilling begins on/after May 1, 2021
 - **Drilling** - bore a hole to create a well for oil and/or gas production
 - **Pre-production** - drilling through the hydrocarbon bearing zones, hydraulic fracturing or refracturing, drill-out, flowback
 - **Early production** - 6 months after well is capable of consistently producing salable gas or liquid hydrocarbons
- Submit air quality **monitoring plan** to the Division and local governments within 2,000 feet of the proposed operations
 - Plan objective (HAPs, ozone precursors, methane), monitoring equipment, monitoring siting plan, sampling/measurement intervals, response levels
- Submit monthly **reports**
 - Description of activities, summary of monitoring during 10 days prior to pre-production (first reporting month only), monitored air quality results, description of responsive actions
- **Notify the Division and local government** within 48 hours of responsive actions



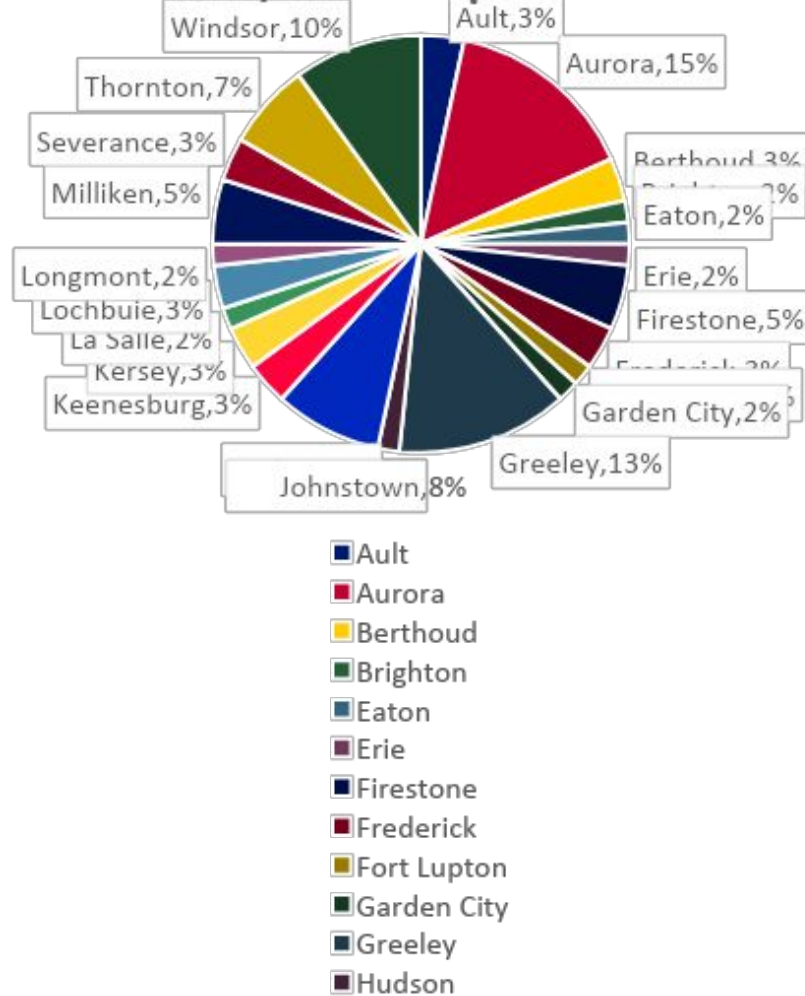
Regulation 7 – Monitoring Plans

- Process
 - Review of submitted plan
 - Review of APCD and/or local government comments
 - Approval of plan
 - Upload to online records
- Initial findings
 - Number of plans (144)
 - Number of operators (24)
 - Local jurisdictions
 - Cities and towns (21)
 - Counties (13)
 - Impact to multiple local jurisdictions (58)

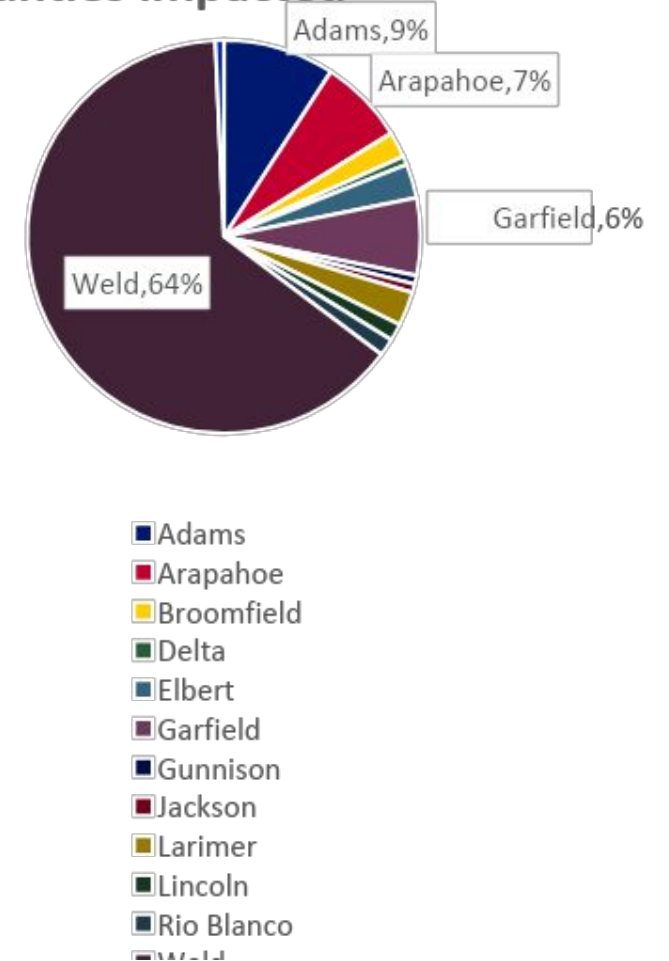


Regulation 7 – Monitoring Plans

Towns/cities impacted



Counties impacted

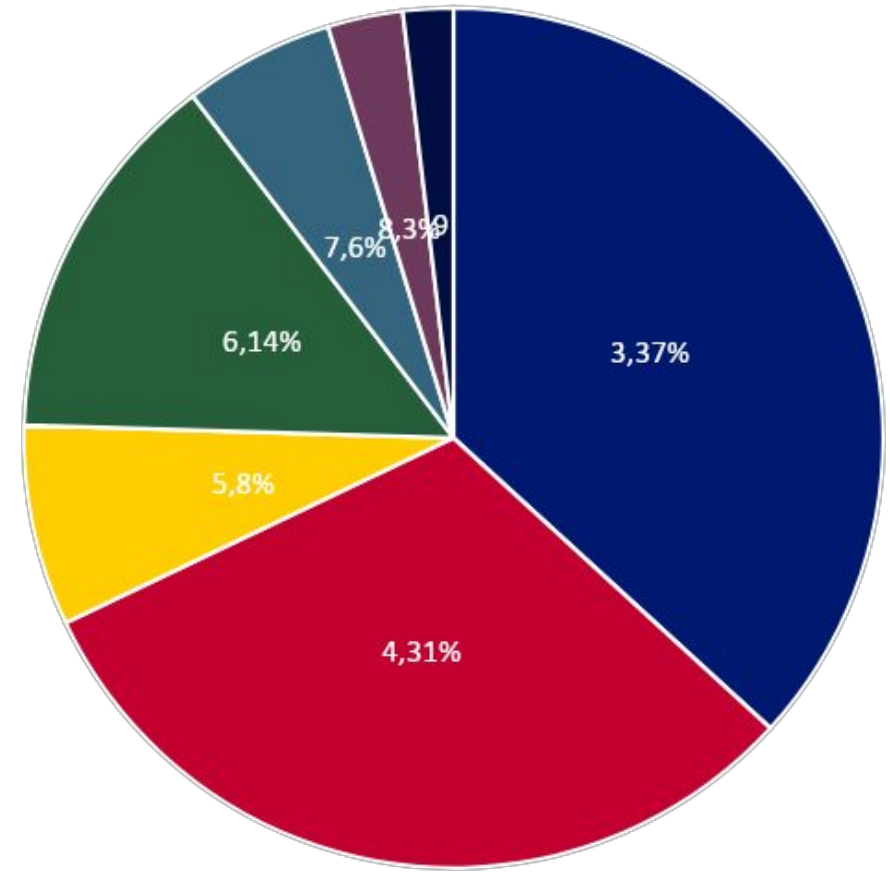


Regulation 7 – Monitoring Plans

Early Findings

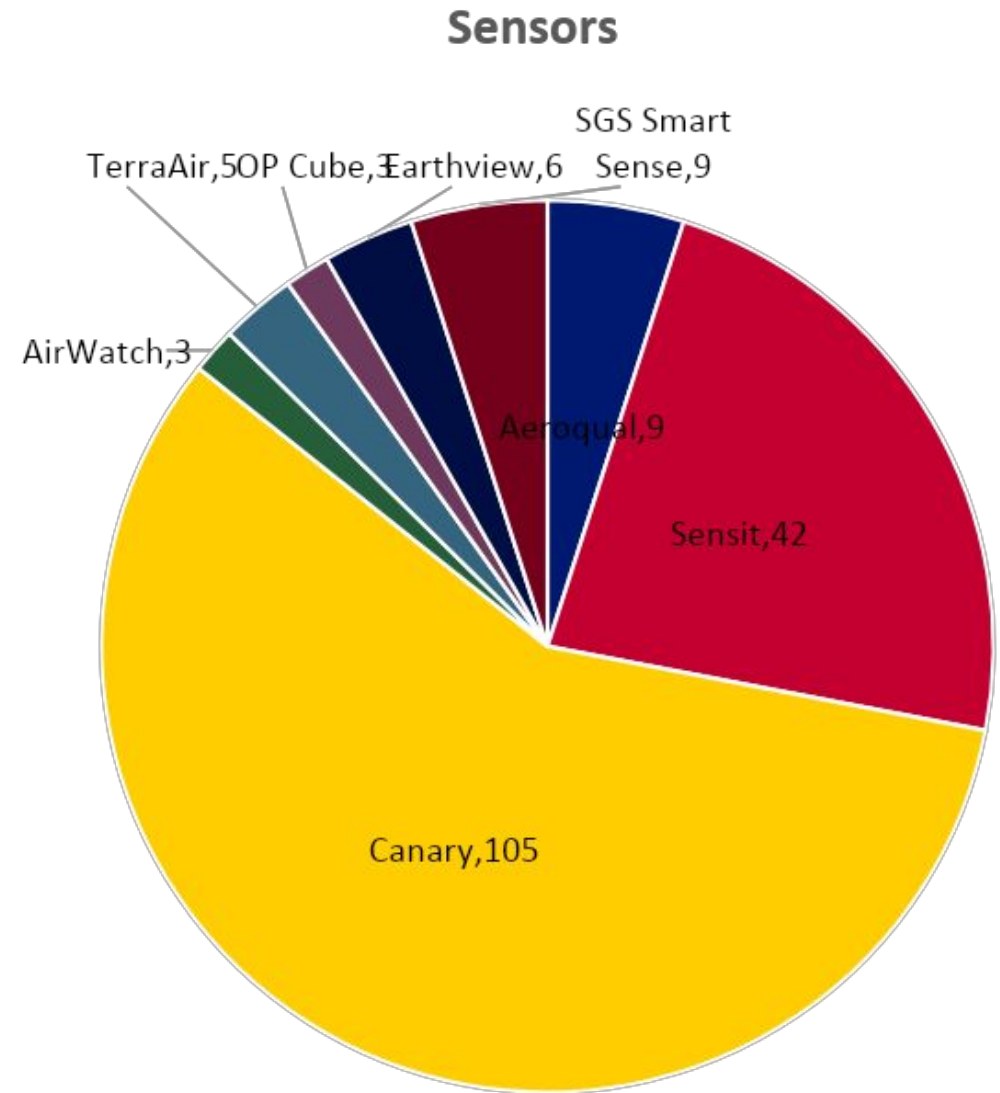
- Type of sensors
 - Photoionization detectors
 - Metal oxide sensors
 - Whole air sampling
- Pollutant(s) monitored
 - PID/MOX - VOC
 - Tube/canisters - benzene
- Number of sensors
 - Ranges 3 to 9
- Response levels
 - Internal investigation
 - Division and local government notification

Number of sensors



Regulation 7 – Sensors

- Meteorological sensors
- Photoionization detectors
 - Canary S
 - Sensit SPOD
 - Aeroqual AQS1
 - Earthview AlphaSense
 - SGS Smart Sense
 - Praxis/OP Cube
- Metal oxide sensors
 - Airwatch (now retired)
 - Terra AirGuardian



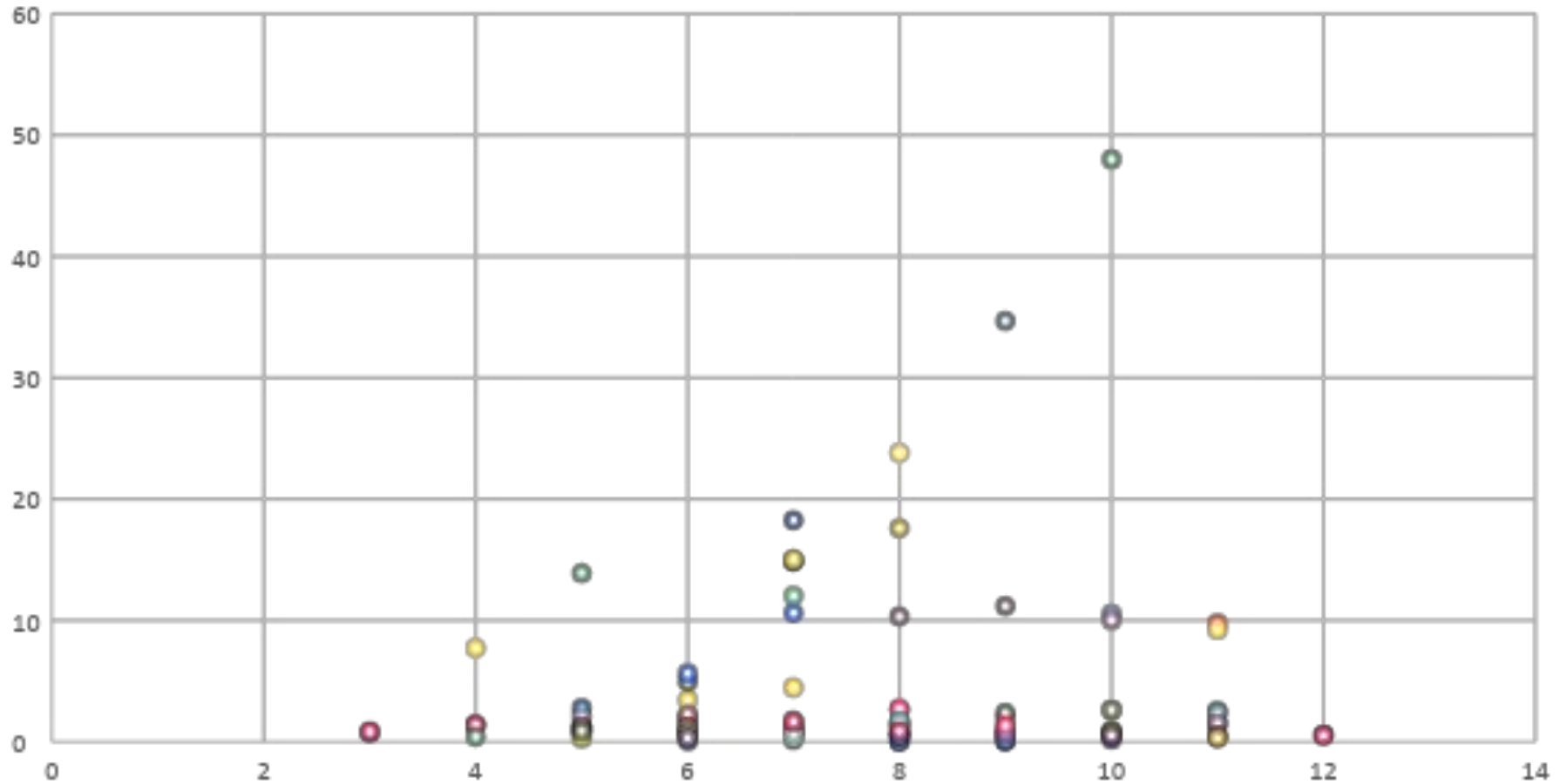
Regulation 7 – Monthly Monitoring Reports

- Process
 - Review of submitted report
 - Review of APCD comments
 - Approval of report
 - Upload to online records
- >300 monthly reports received



Regulation 7 – Monitoring Data

Site max VOC reading



Monitoring Program Timeline

Monitoring required for wells drilled on/after May 1, 2021

Operators submit monthly air monitoring reports - 10 days prior to pre-production through six months of early production

By March, 2022, update to the Air Commission on learnings/insights, data observations, length of monitoring, potential exemptions

Continual assessment and improvement

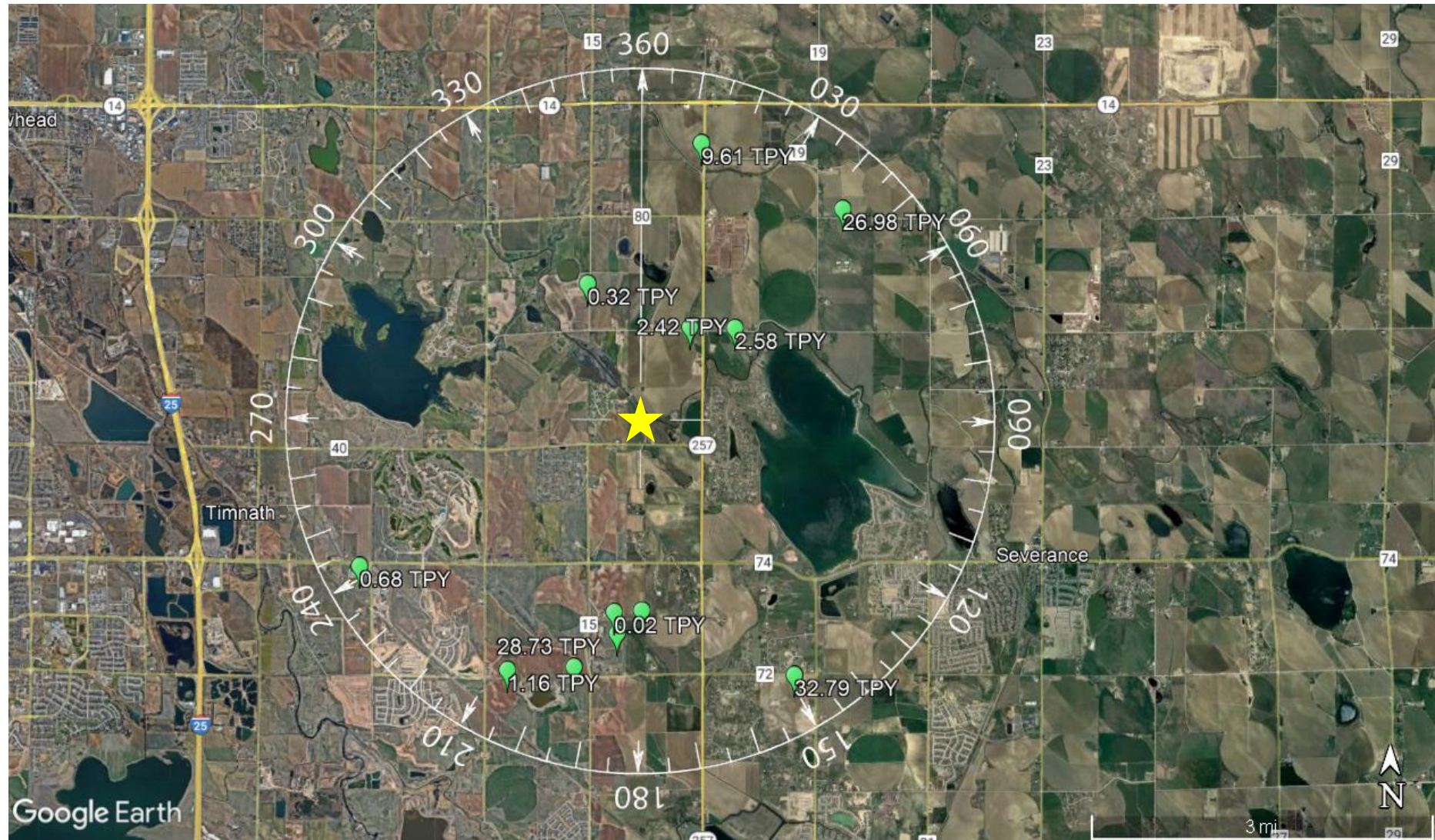


Plans and Reports Available at:

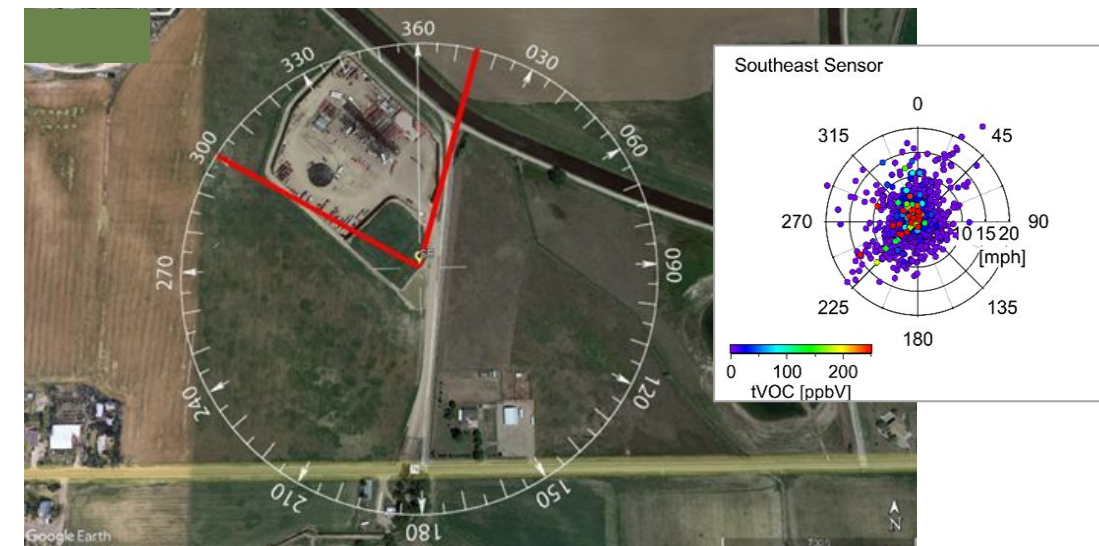
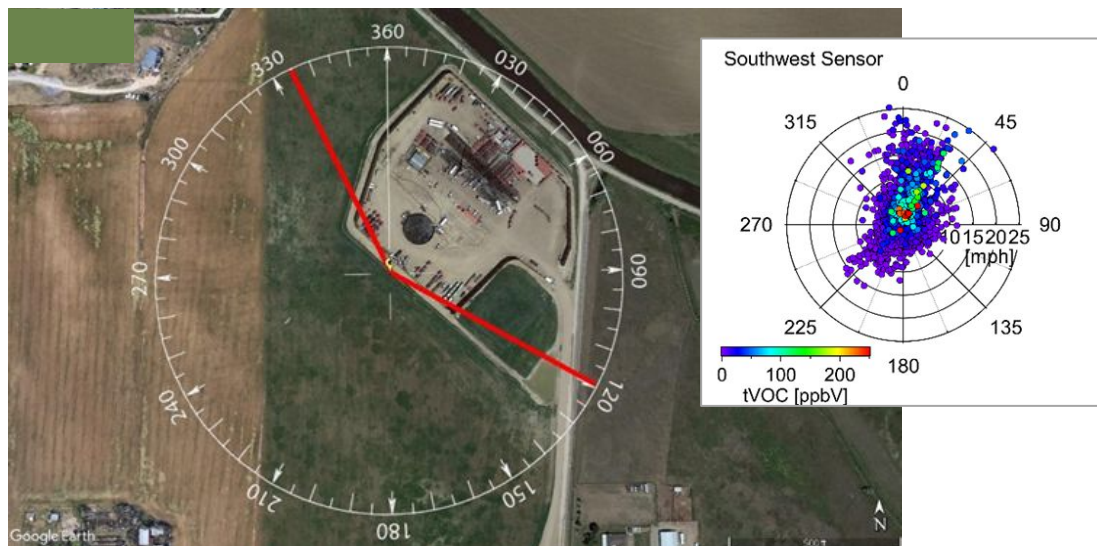
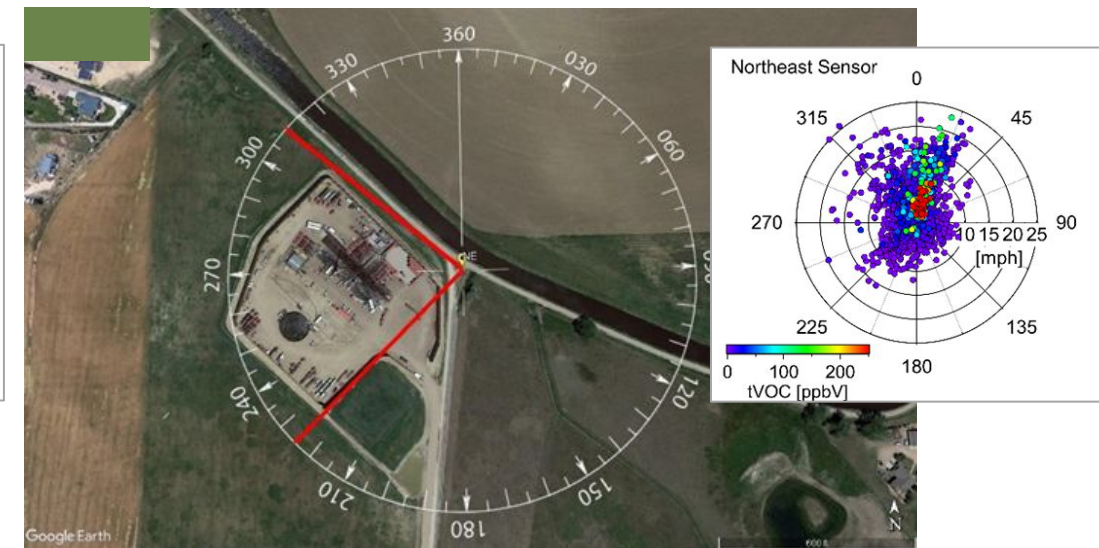
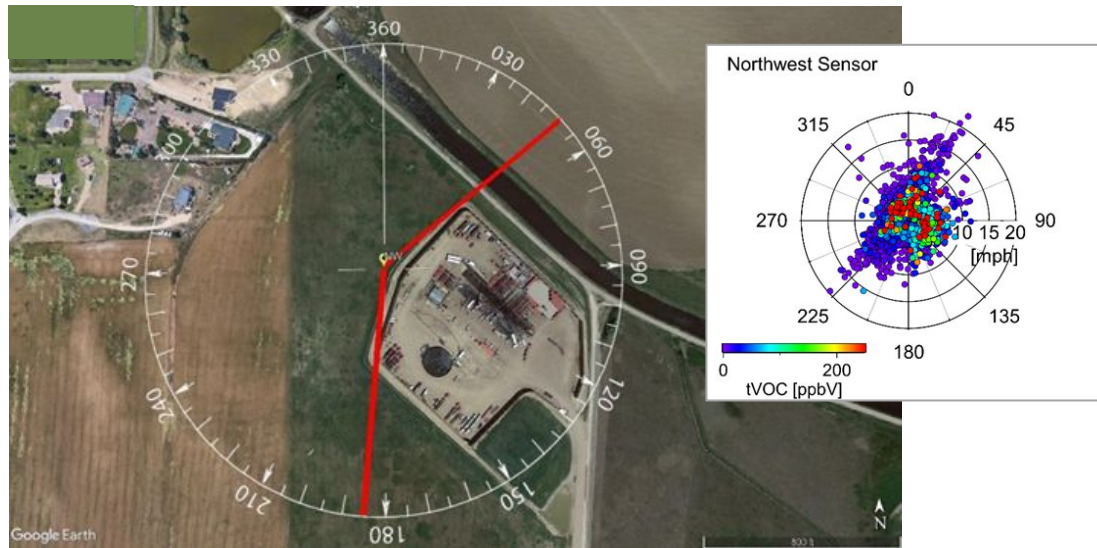
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Regulation 7 – Case Study



Regulation 7 – Case Study



Regulation 7 – Case Study

