Public Workshop: Potential Changes to the Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities (Oil and Gas Methane Regulation)

September 20, 2022
Purpose

• Present accomplishments and data collected from the regulation
• Discuss potential near-term changes to the regulation
  • Mostly due to recent US EPA action concerning its Control Techniques Guidelines
• Discuss potential future regulation amendments
• Solicit stakeholder feedback
Workshop Logistics

• Q&A during the workshop
  • Use the “Raise Hand” function in the GoToWebinar toolbar, which should be located to the right of your screen
  • When staff call your name, please “Unmute” yourself by clicking the red button, and proceed to introduce yourself
  • Workshop materials and online docket available on the Meetings & Workshops section of our Oil and Natural Gas Production, Processing, and Storage webpage

• Written feedback may be submitted to the online docket
  • Docket closes October 11 at 5 pm Pacific Time
Methane Emissions in California

- Dairy (enteric+manure), 45%
- Non-Dairy Livestock, 9%
- Landfills, 20%
- Oil and Gas, 15%
- All Other Sources, 11%

Source: 2019 California Greenhouse Gas Inventory; using 100-year AR4 global warming potential.
Why Reduce Oil and Gas Methane Emissions?

- Methane is a potent greenhouse gas (GHG)
- Short-lived: emission reductions have large near-term benefits
- Many cost-effective emission reduction measures
- Other pollutants with potential health implications are often emitted along with methane (e.g., VOCs, BTEX)
  - Reducing methane emissions can reduce co-pollutant emissions

VOCs = Volatile organic compounds
BTEX = Benzene, toluene, ethylbenzene, and xylenes
Oil and Gas Methane Regulation

- Adopted in 2017 to address methane from new and existing oil and gas facilities
- Builds off local air district rules targeted at volatile organic compounds (VOCs)
- CARB and the local air districts have been working together to implement the regulation since 2018
Where this Regulation Applies

Crude Oil and Natural Gas Industry

Regulation Applies

Production & Processing
1. Onshore and offshore well sites
2. Storage tank batteries
3. Gathering and boosting compressor stations
4. Natural gas processing plants

Natural Gas Transmission & Storage
5. Transmission compressor stations
6. Underground storage
7. Transmission pipeline

Distribution
8. City Gate
9. Distribution mains/services
10. Regulators and meters for customers

Source: Adapted from American Gas Association and U.S. EPA Natural Gas STAR Program
Regulatory Requirements

- Quarterly leak detection and repair (LDAR)
- Vapor control on tanks above an emission threshold
- Replacement of high-emitting seals on compressors
- Zero-emitting pneumatics (some exceptions)
- Additional monitoring for natural gas underground storage facilities (UGSFs)
- Measuring liquids unloading and well casing vent emissions
- Record keeping and reporting
CARB and Air District Roles for O&G Methane Regulation

- Local air districts primarily enforce the regulation through Memoranda of Agreement
  - CARB distributes grants to air districts to support implementation
- CARB lends leak detection equipment to districts and provides training on use
- CARB receives/analyzes data reported by regulated parties
Agenda

- Background
- Implementation
- Potential Near-term Changes
- Potential Future Changes
- Next Steps
Highlights Since Adoption

2018
- LDAR begins
- UGSF monitoring plans due
- Tank emission testing due
- Equipment reporting due
- Developed Cal e-GGRT* module

2019
- Vapor collection or equipment replacement
- Ongoing reporting: LDAR, equipment emissions, and equipment reporting updates

2020
- LDAR leak threshold decreased
- UGSFs begin establishing baseline concentrations

2021-2022
- Published 2018 & 2019 annual LDAR summaries
- UGSFs finish establishing baseline concentrations

*California Electronic Greenhouse Gas Reporting Tool
Regulation Reporting

- Over 200 operators and over 800 facilities reporting
- Reporting by equipment type:

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressors</td>
<td>1,000+</td>
</tr>
<tr>
<td>Separators and Tanks</td>
<td>7,700+</td>
</tr>
<tr>
<td>Pneumatic Devices</td>
<td>2,800+</td>
</tr>
<tr>
<td>&gt;95% intermittent</td>
<td></td>
</tr>
<tr>
<td>Open Well Casing Vents</td>
<td>1,700+</td>
</tr>
</tbody>
</table>

*Emitted average of 132,500 MT CO₂e/yr*

*Metric tons carbon dioxide equivalent using AR4 100-yr GWP of methane*
Regulation Accomplishments

- All separators, tanks, and compressors subject to CARB’s regulation are complying
- No high-bleed pneumatics left; few low-bleed left
- Close to 150,000 MT CO$_2$e* reduced from equipment replacement and emission control systems in 2019
  - Mostly due to pneumatics replacement
- Monitoring plans for all 12 natural gas underground storage facilities have been approved
  - 34 new ambient air monitors installed

*Metric tons carbon dioxide equivalent using AR4 100-yr GWP of methane
### Fraction of Components Subject to CARB Regulation LDAR

<table>
<thead>
<tr>
<th>Subject to Local Air District Rules (46%)</th>
<th>Subject to CARB’s Regulation (20%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Exempt (34%)</strong></td>
</tr>
<tr>
<td></td>
<td>(Heavy Oil &lt; 20 API Gravity)</td>
</tr>
</tbody>
</table>

Note: Exempt category makes up less than 1% of estimated hydrocarbon emissions from leaking components.
2018 and 2019 CARB Regulation LDAR Data

<table>
<thead>
<tr>
<th>Components In LDAR Program</th>
<th>Leaks Found</th>
<th>Emission Reductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018 1.97 million</td>
<td>11,359</td>
<td>135,000 MT CO₂e</td>
</tr>
<tr>
<td>2019 2.29 million</td>
<td>7,208</td>
<td>75,000 MT CO₂e</td>
</tr>
</tbody>
</table>

Source: CARB LDAR Reports for 2018 and 2019, emission reductions using AR4 100-yr GWP of methane
Total Methane Emission Reductions in 2019

Standards
150,000 MT CO$_2$e

LDAR
75,000 MT CO$_2$e

Total
225,000 MT CO$_2$e

Using 100-year AR4 global warming potential of methane (25)
Questions or Comments?

• Q&A during the workshop
  • Use the “Raise Hand” function in the GoToWebinar toolbar, which should be located to the right of your screen as shown
  • When staff call your name, please “Unmute” yourself by clicking the red button, and proceed to introduce yourself
Control Techniques Guidelines for the Oil and Natural Gas Industry (CTG)

2016

US EPA issues CTG
CTG sets requirements for states to revise their State Implementation Plans (SIPs) for ozone nonattainment areas

2018

CARB Submits Oil and Gas Methane Regulation into SIP
Intended to meet CTG for California
Regulation references some air district rules; EPA also evaluated those
US EPA Decision on SIP Submittal

- In May 2022 US EPA proposed “limited approval, limited disapproval” of CARB’s State Implementation Plan (SIP) submittal
- US EPA’s Technical Support Document details deficiencies
- Some deficiencies need to be addressed by amending CARB’s Oil and Gas Methane Regulation, others by amending air district rules
- Amended rules must be submitted into the SIP and approved by US EPA before ~May 2024
- Potential sanctions are driving near-term timeline
Potential Changes: Fully Comply with CTG

• Most potential changes would be administrative or minor
• Some requirements need to be clarified in the regulation
• Additional requirements for vapor collection systems and vapor control devices may be needed to verify 95% efficiency
• Operators may need to develop and maintain LDAR plans
  • Includes lists of equipment and components subject to LDAR
Upcoming Satellite Data

- Two satellites to be deployed in 2023
  - Through Carbon Mapper partnership
  - California to purchase additional satellites in future
- Data not available for 18 months
- Satellites can play important role detecting methane leaks in California and beyond
  - Comprehensive spatial coverage
  - Repeatable measurements
Potential Changes: Remotely Detected Methane Leaks

• Action required for leaks identified by satellites or other remote monitoring technology
  • Operators must inspect facilities if notified of a leak by CARB
  • Leaks must be repaired within specified timeframes

Source: Carbon Mapper (upper) (lower)
Questions or Comments?

• Q&A during the workshop
  • Use the “Raise Hand” function in the GoToWebinar toolbar, which should be located to the right of your screen as shown
  • When staff call your name, please “Unmute” yourself by clicking the red button, and proceed to introduce yourself
Agenda

- Background
- Implementation
- Potential Near-term Changes
- Potential Future Changes
- Next Steps
Potential Future Changes: Motivations

- CARB/CalGEM Methane Task Force
- US EPA’s Proposed Emissions Guidelines
- CARB’s Draft 2022 Scoping Plan
CARB/CalGEM Methane Task Force

• Requested by: Governor Newsom
• Participants: CARB and CalGEM
• Purpose: identify and address methane leaks from oil infrastructure near communities
• Recognizing: these leaks can pose potential threats to community health and safety
CARB/CalGEM Methane Task Force

• The Task Force will seek input from:
  • Community members
  • Local air districts
  • Local government entities
• Task Force provides an additional opportunity to receive input on methane reduction strategies
• Separate from the regulatory process
US EPA’s Proposed Emissions Guidelines (EG) for Existing Sources

• In Nov. 2021, US EPA proposed EG for oil and gas facilities
• EG is separate from the CTG discussed earlier

<table>
<thead>
<tr>
<th>CTG</th>
<th>EG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addresses VOC controls necessary in non-attainment areas to improve air quality</td>
<td>Reduces GHG and other pollutant emissions across the existing oil and gas sector</td>
</tr>
<tr>
<td>Finalized in 2016</td>
<td>Initial proposal in 2021</td>
</tr>
</tbody>
</table>
US EPA’s Proposed Emissions Guidelines (EG) for Existing Sources

• If EG is finalized, US EPA would regulate existing O&G sources for first time
• States would need to submit plans to EPA showing how they will meet the EG
• US EPA planning to issue supplemental proposal by end of 2022
  • Timeline for final EG is unknown
• Timeline for states to submit plans to be determined in final EG
Comparison of Proposed EG and CARB’s Oil and Gas Methane Regulation

<table>
<thead>
<tr>
<th>Similar Requirements</th>
<th>Different Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanks</td>
<td>Pneumatic Pumps</td>
</tr>
<tr>
<td>Compressors</td>
<td>Pneumatic Controllers</td>
</tr>
<tr>
<td></td>
<td>LDAR</td>
</tr>
<tr>
<td></td>
<td>Associated Gas Venting</td>
</tr>
</tbody>
</table>
What is the Scoping Plan?

• Scoping Plans are action plans for CA to meet statewide GHG reduction targets
  • Mandated by Assembly Bill 32
  • Outline a suite of climate policies to address emissions across all sectors
  • Required to be updated at least every 5 years
Scoping Plan Targets

• 2017 Scoping Plan set a path to achieve CA’s 2030 GHG reduction target

• Draft 2022 Scoping Plan:
  • Assesses progress towards achieving the 2030 target
  • Outlines a path to achieve carbon neutrality no later than 2045
  • Currently a draft plan, to be finalized by end of year
Draft Scoping Plan Scenario for O&G Extraction

2030 Fugitive O&G Methane Reduction

- Draft target: 50% reduction relative to 2013
- Currently on track for ~41% reduction
- Action needed to reach draft 2030 target
Potential Future Changes

• Responsive to EG and/or Scoping Plan, when finalized
  • Prohibit venting from intermittent pneumatic controllers
  • Prohibit venting of associated gas
  • Allow alternative LDAR approaches that achieve equivalent or better emission reductions
• Responsive to community concerns
  • Reexamine heavy oil LDAR exemption (<20 API gravity)
Questions or Comments?

• Q&A during the workshop
  • Use the “Raise Hand” function in the GoToWebinar toolbar, which should be located to the right of your screen as shown
  • When staff call your name, please “Unmute” yourself by clicking the red button, and proceed to introduce yourself
Agenda

1. Background
2. Implementation
3. Potential Near-term Changes
4. Potential Future Changes
5. Next Steps
Next Steps

• Submit written feedback online through October 11, 2022 (5 pm Pacific Time)
  • Link to submit written feedback found on the Meetings & Workshops section of our Oil and Natural Gas Production, Processing, and Storage webpage
  • Second public workshop will be held later in 2022
  • Sign up for email updates

• Board Meeting tentatively planned for spring 2023
Contact Information

Questions?
Contact Quinn Langfitt:
Quinn.Langfitt@arb.ca.gov

We are available for individual meetings by request