

# Methane Emission Standards for Crude Oil and Natural Gas Facilities



# Overview

- \* Background
- \* Regulation Requirements and Impacts
- \* Implementation

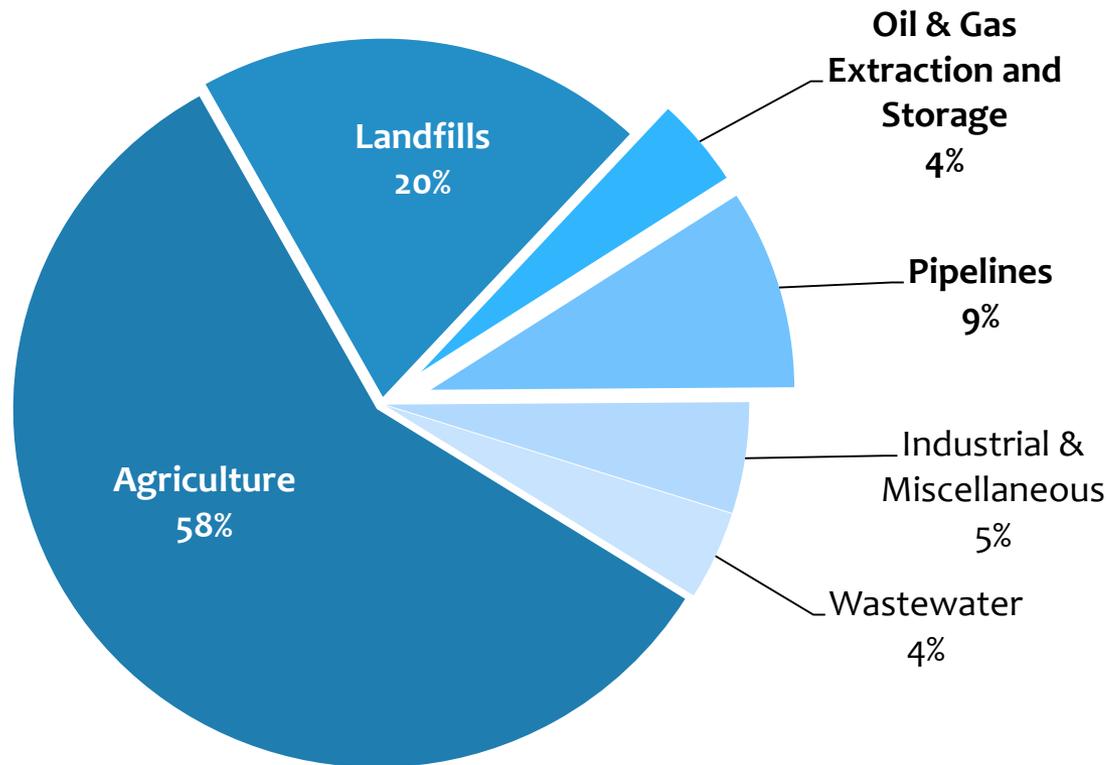
# Background



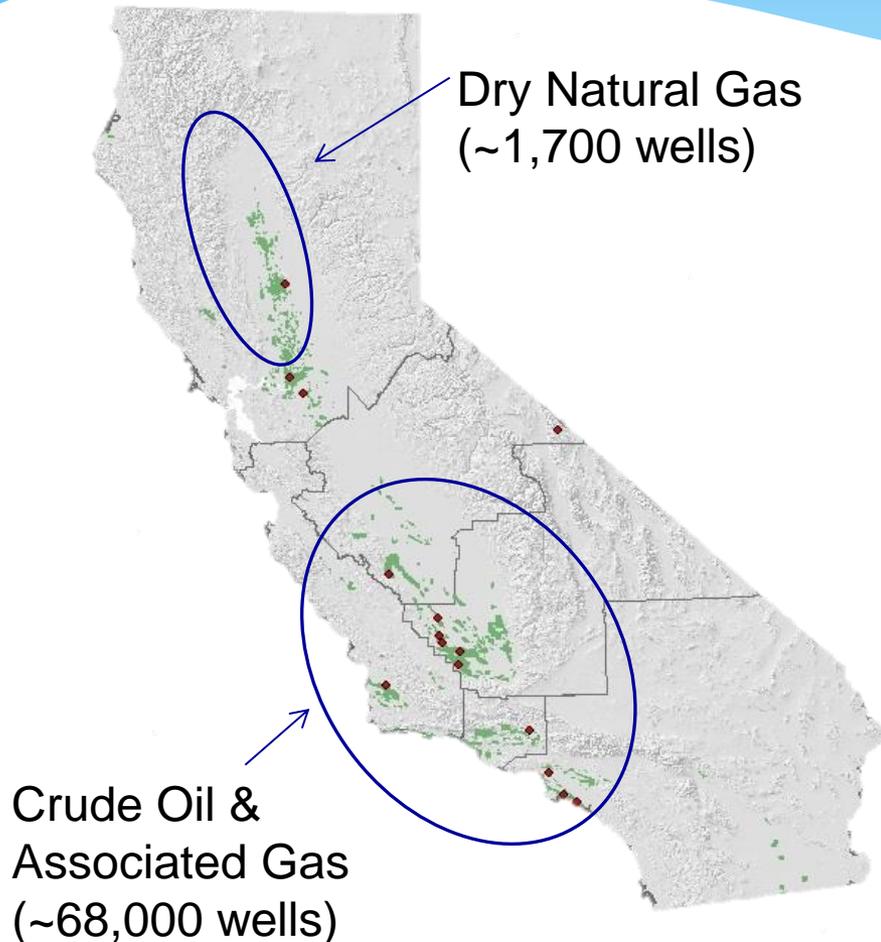
# Policy Drivers

- \* Climate Change Scoping Plans identify oil & gas sector as large source of Greenhouse Gas (GHG) emissions.
  - \* Combustion CO<sub>2</sub> covered by Cap and Trade
  - \* Methane covered by this regulation
- \* Short-Lived Climate Pollutant (SLCP) Strategy includes a target of 40-45 percent reduction in methane from oil & gas sector as a whole by 2025.
- \* Recent, separate legislation addressing well stimulation and underground storage monitoring.

# California 2013 Methane Emission Sources



# California's Oil & Gas Operations



- \* Third largest oil producer, 15<sup>th</sup> largest natural gas producer
- \* Most natural gas is associated gas in California
- \* Oil fields generally old, with enhanced recovery:
  - \* Thermal, well stimulation
- \* Around 300 producers impacted by regulation

# ARB and District Responsibilities

- \* ARB primarily responsible for mobile sources, fuels, and GHGs.
- \* 35 Local Air Districts responsible for stationary sources.
- \* ARB's responsibility can include stationary sources when Toxic Air Contaminants (TACs) or GHGs involved.

# Other Regulations

- \* Districts regulating oil & gas for Volatile Organic Compounds (VOCs) for decades; exempt methane.
  - \* ARB's regulation covers leaking equipment not already covered by air district rules.
- \* Public Utilities Commission developed best practices to be consistent with ARB's regulation.
- \* ARB regulation covers **new and existing** sources, and is generally more stringent and broader than federal requirements.

# Regulation Requirements and Impacts



# Applicability

- \* The regulation addresses fugitive and vented emissions of methane from both new and existing oil and gas facilities.
- \* The covered facilities include:
  - Oil and Gas Production, Processing, and Storage
  - Gathering and Boosting Stations
  - Natural Gas Underground Storage
  - Compressor Stations

# Regulation Standards

## Separator and Tank Systems

- \* Applies to systems at all regulated facilities.
- \* Requires flash testing to determine annual methane emissions.
- \* Requires systems with annual emissions above 10 metric tons (MT) methane to install vapor collection.
- \* Exemptions for low throughput systems and small gauge tanks.



# Regulation Standards

## Circulation Tanks

- \* Tanks used as part of a well stimulation treatment.
- \* Operators institute a Best Practices Management Plan, followed by a control equipment technical assessment.
- \* If technical assessment proves out, tanks controlled for emissions by January 1, 2020.



# Regulation Standards

## Leak Detection & Repair (LDAR)

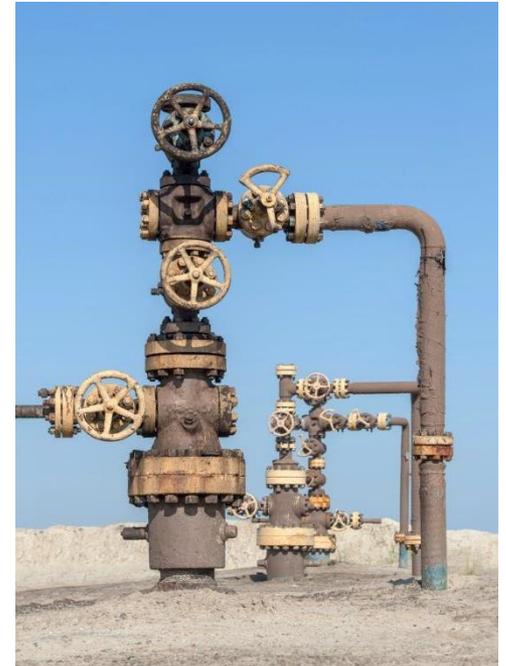
- \* Requires daily inspections and quarterly testing to check components for leaks.
- \* Builds on current requirements by many districts to control VOCs.
- \* Regulation will extend testing to methane at natural gas facilities.
- \* Optical Gas Imaging for screening, but US EPA Method 21 for enforcement.



# Regulation Standards

## Underground Gas Storage

- \* Monitoring program designed for the early detection of leaks:
  - Ambient air monitoring
  - Daily or continuous monitoring at injection/withdrawal wells.
  - Incorporates recent legislative requirements.
- \* Operators submit monitoring plans to ARB for approval.



# Regulation Standards

## Natural Gas Compressors

- \* Emission standards for reciprocating compressor rod packings and centrifugal compressor wet seals.
- \* Requires either (1) replacement of high-emitting rod packing or wet seal, or (2) collection of leaking gas.
- \* All compressors subject to LDAR.



# Regulation Standards

## Pneumatic Devices & Pumps

- \* Continuous to no-bleed:
  - Air or electricity to operate; or,
  - Controlled with a vapor collection system



## Other Measuring and Reporting Requirements

# GHG Emission Reductions & Costs

- \* Overall estimated annualized cost, with natural gas savings, of \$27,300,000
- \* Estimated continuing reductions of more than 1.4 million MT of CO<sub>2</sub> equivalent per year, using a 20 year Global Warming Potential for methane.
- \* Estimated overall cost-effectiveness of \$19 per MT of CO<sub>2</sub> equivalent reduced.

# Emission Reduction Co-Benefits

- \* Over 3,600 tons per year (TPY) of VOC reductions statewide.
- \* Over 100 TPY of reductions statewide of Toxic Air Contaminants, such as Benzene, Toluene, Ethyl-Benzene, and Xylenes.
- \* Neutral statewide Oxides of Nitrogen (NO<sub>x</sub>) impact.

# Implementation



# Implementation Dates

## \* **January 1, 2018:**

- Flash testing
- LDAR inspections
- Natural gas storage monitoring plans
- Registration and permitting

## \* **January 1, 2019:**

- Vapor collection on separator & tank systems
- Pneumatic devices and compressor seal change-outs
- Circulation tank technology assessment

## \* **January 1, 2020:**

- Circulation tank vapor collection, pending technology assessment

# Implementation

- \* Regulation allows both ARB and the districts to implement; district implementation is preferred.
- \* ARB and districts developed a model Memorandum of Agreement (MOA) to specify roles and responsibilities.
  - Coordinate enforcement, and support information and data sharing.
  - MOAs may be tailored for specific district needs.

# Implementation

- \* About half of the MOAs have been signed; rest are in progress.
- \* For most districts, CARB handling one-time facility and equipment reporting; districts handling “on the ground” enforcement.
- \* Will review data being reported under program and monitor program implementation.
- \* Will periodically update Board on status and propose adjustments as necessary.

# Questions?

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