Proposed GHG Emission Standards for Crude Oil and Natural Gas Facilities

California Environmental Protection Agency

Air Resources Board

July 21, 2016 - Sacramento, California

Overview

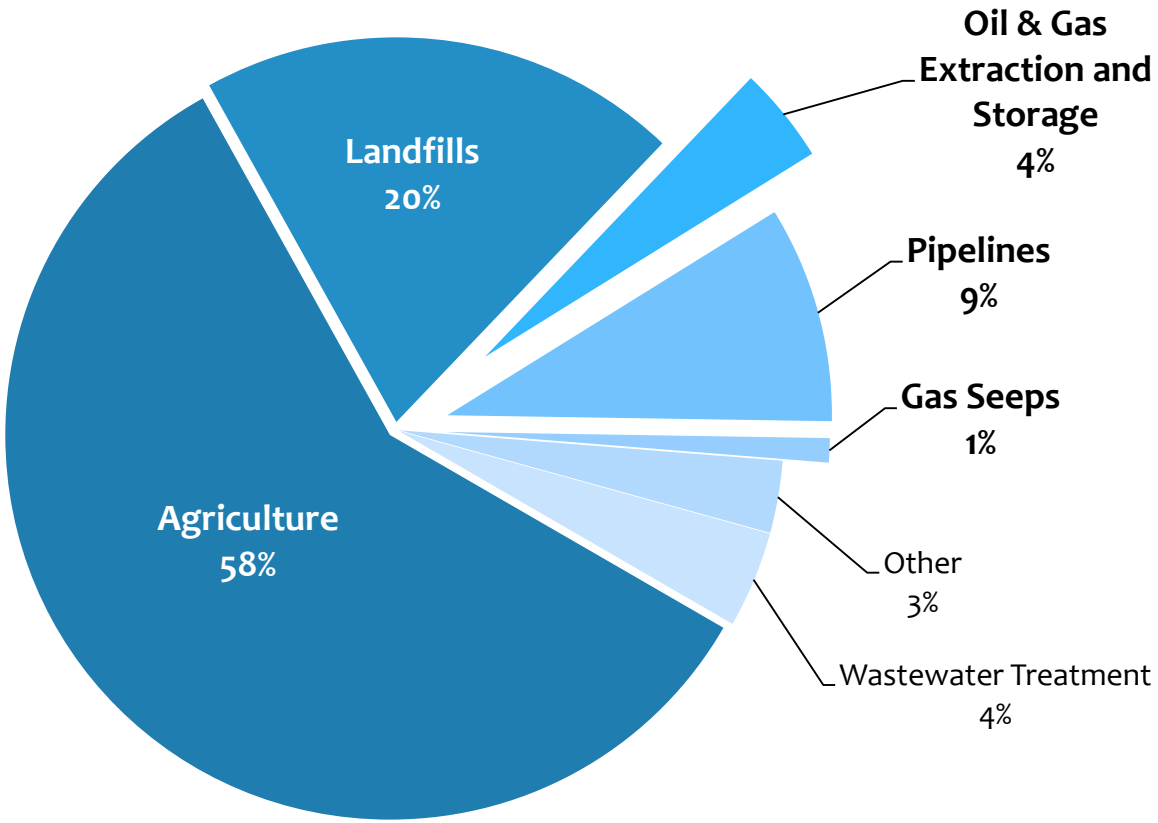
* Background
* Related Oil & Gas Efforts
* Oil & Gas Operations
* Proposed Regulation
* Impacts
* Recommended 15-Day Changes and Next Steps

Background

Policy Drivers

* Climate Change Scoping Plans identify oil & gas sector as large source of GHG emissions.
* Short-Lived Climate Pollutant (SLCP) Strategy includes a 40-45 percent reduction in methane from oil & gas sector as a whole by 2025.
* SB 4's focus on well stimulation addressed by several measures in proposed regulation.

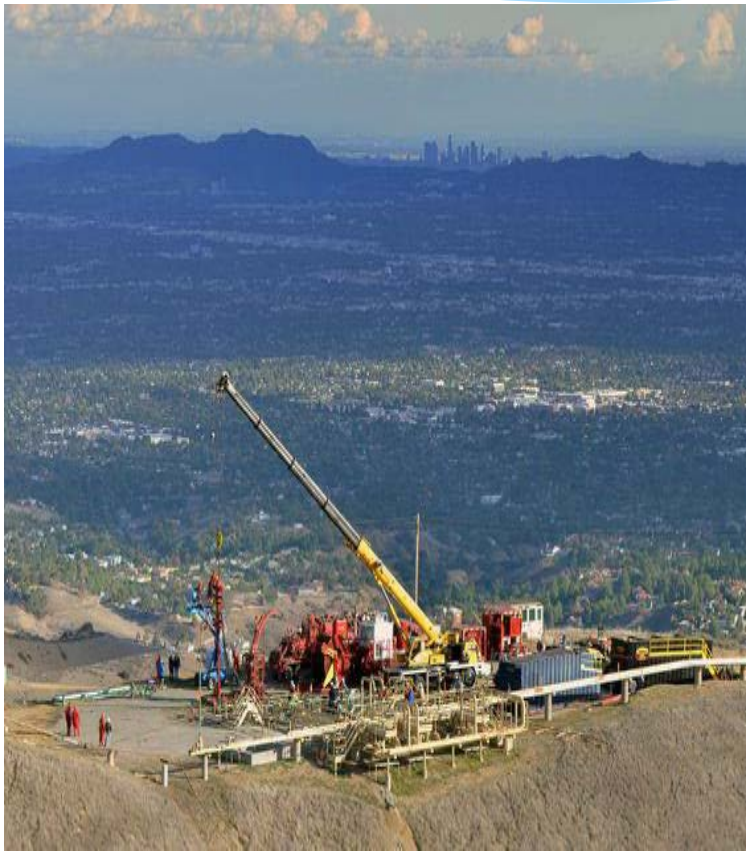
California 2013 Methane Emission Sources (118 $MMTCO_2e$)



ARB and District Responsibilities

* Districts responsible for stationary sources.
* ARB responsible for AB 32, mobile sources, fuels, and consumer products.
* ARB's responsibility can include stationary sources when Toxic Air Contaminants (TACs) or Greenhouse Gases (GHGs) involved.

Related Oil & Gas Efforts



Local Air District Rules

* Local air districts regulate equipment at oil and gas facilities, some since the 1980's.
* Fugitive emission rules primarily aimed at controlling volatile organic compounds (VOCs).
* ARB proposal covers methane, which has been deemed a non-VOC in most district rules.
* ARB staff has been working closely with districts to harmonize the proposed methane standards.

US EPA Actions on Oil & Gas

* In June 2016, EPA finalized methane rules for new sources and is working on guidelines and rules for existing sources.
* ARB proposal covers **new and existing** sources, and is generally more stringent and broader than EPA's.
* Working with EPA and districts to harmonize federal, State, and local regulations as much as possible.

Aliso Canyon Gas Leak
ARB & Other Agency Roles

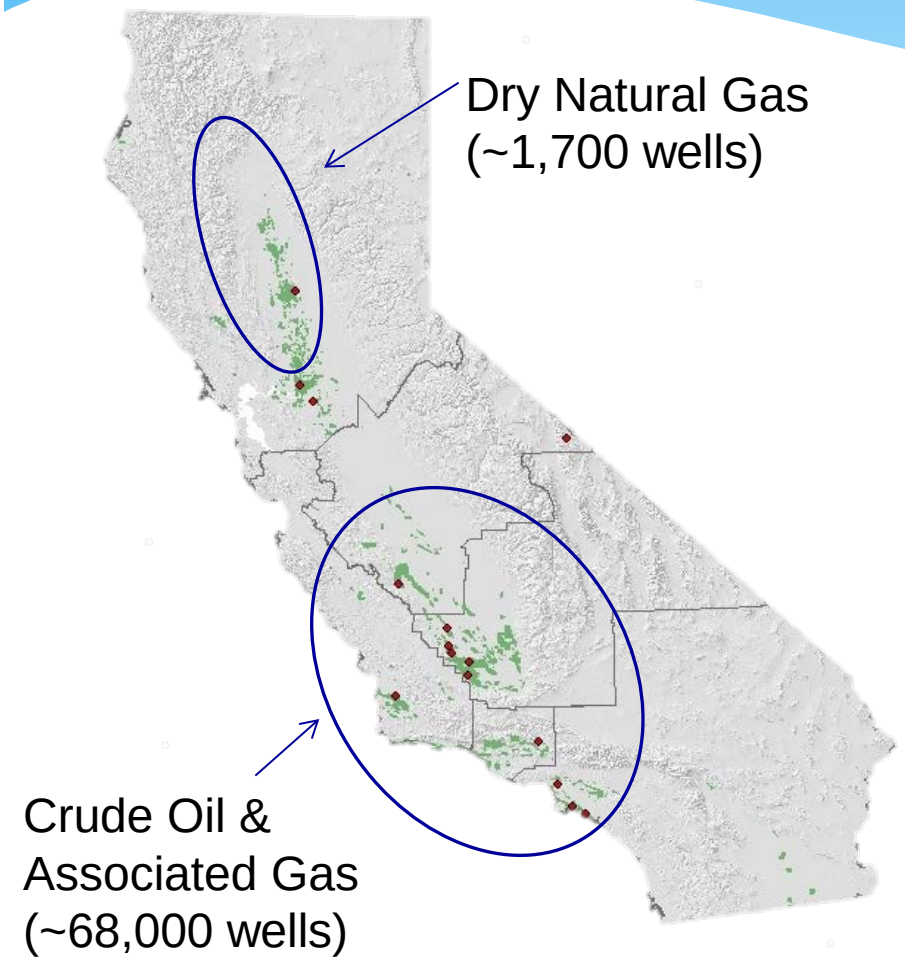
* DOGGR promulgated emergency regulations and published draft permanent regulations.
* Report being developed that assesses the long-term viability of natural gas storage facilities in California.
* ARB staff considered Aliso Canyon and other events when finalizing the proposed regulation.

Other ARB Oil & Gas Efforts

* Well Stimulation Treatments ("Fracking"):
  - DOGGR requires permits for well stimulation treatments
  - ARB staff reviewing permits and recommending air monitoring for a subset of wells.
* ARB overseeing methane hot spot flyovers under AB 1496.
* Oil and gas testing being planned for later this year:
  - Produced water ponds
  - Community air monitoring

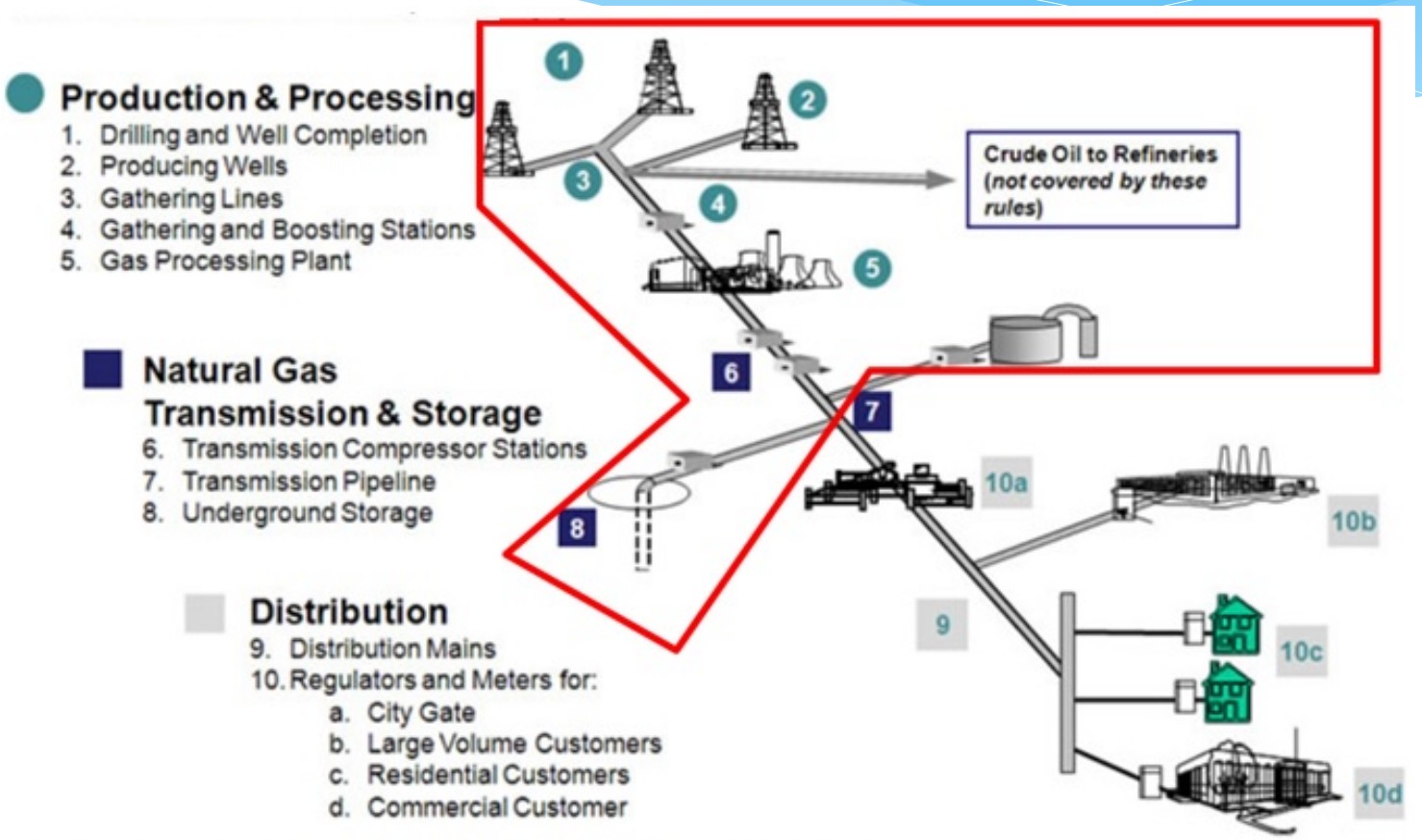
Oil & Gas Operations

California's Oil & Gas Operations



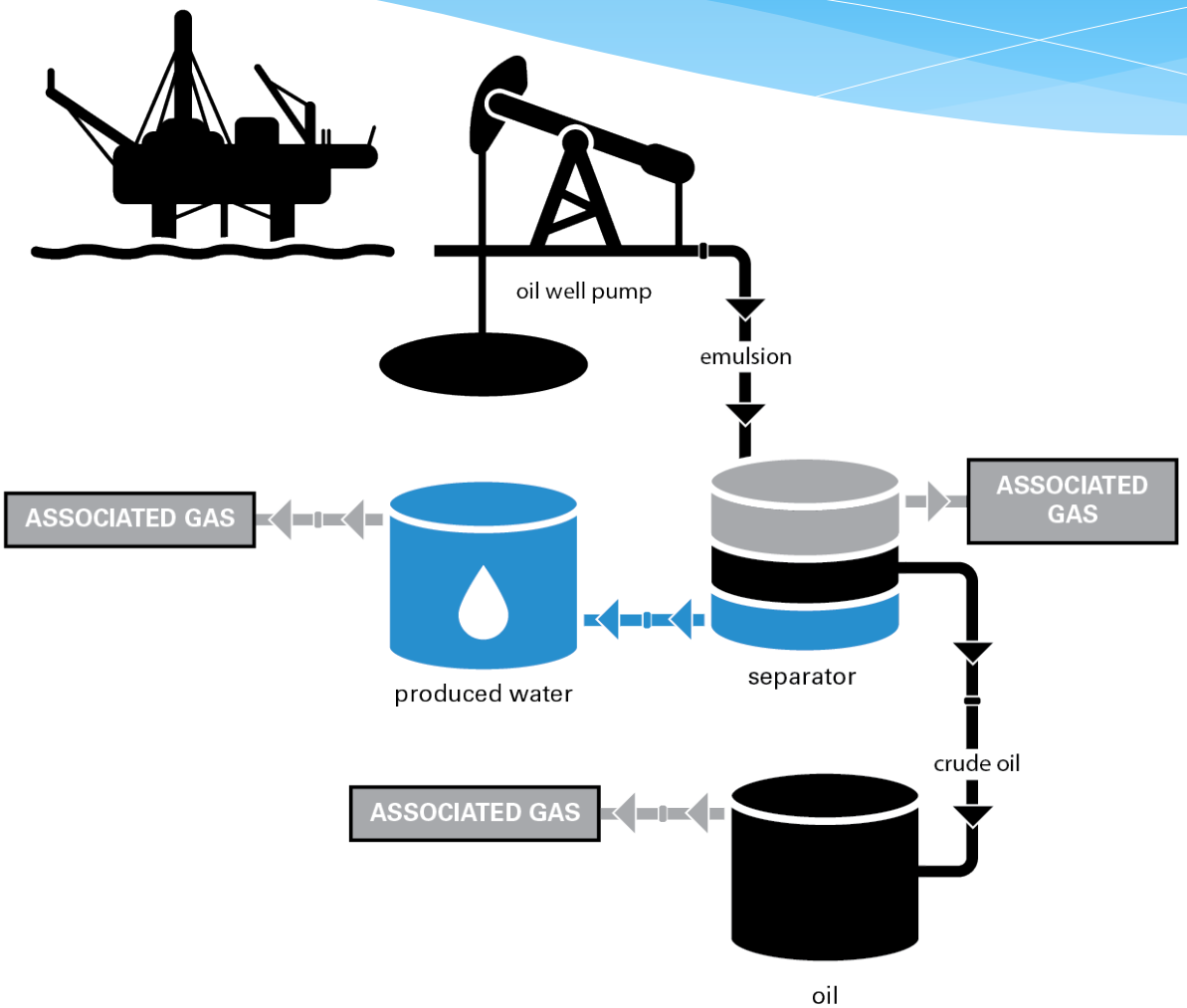
* Oil production in the Central Valley and Southern California.
* Natural gas production in Northern California.
* Natural gas also produced with oil (associated gas).
* Most natural gas is associated gas in California

Oil and Gas Production, Processing, and Storage System

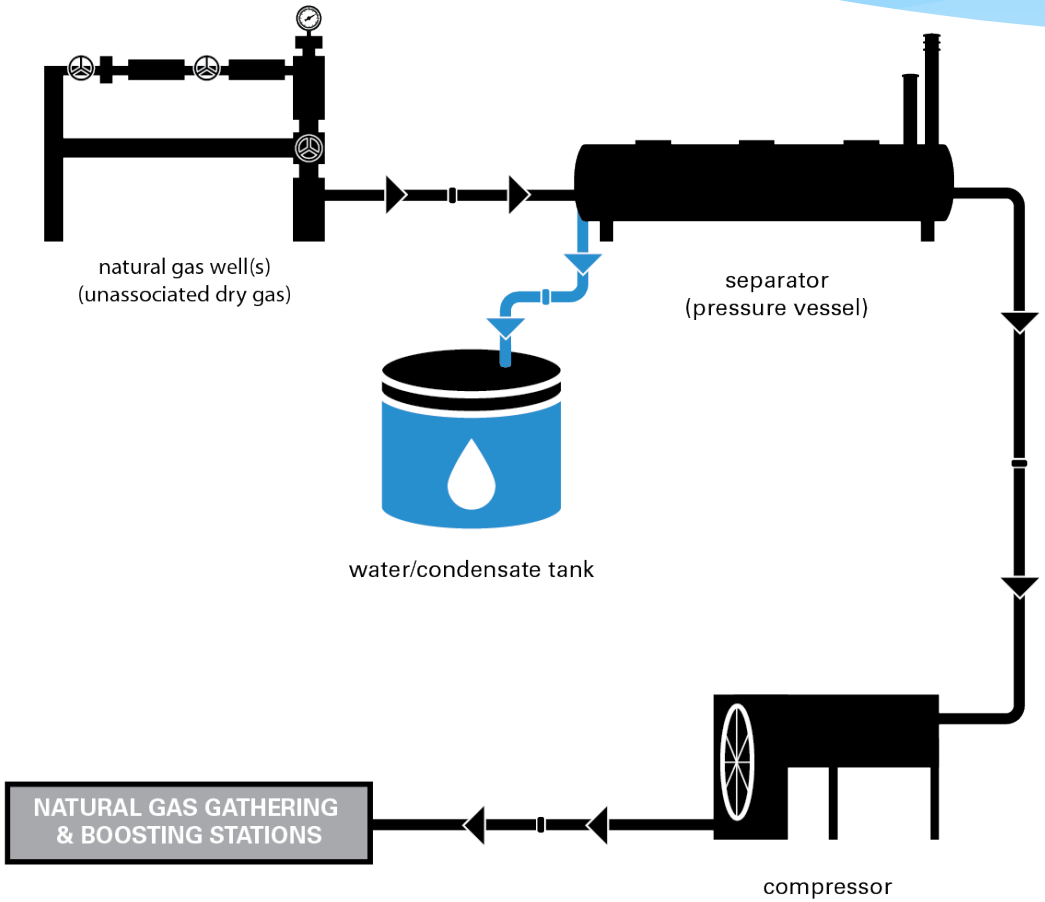


Source: Adapted from American Gas Association and EPA Natural Gas STAR Program

Basic Crude Oil System



Basic Dry Natural Gas Systems



Proposed Regulation

Regulation Development Process

* Staff conducted site visits and field testing.
* ARB staff undertook a comprehensive survey of oil and gas equipment statewide.
* Over two years of separate district, industry, and NGO working groups.
* Five workshops over two years to solicit feedback on proposed control strategies and regulatory language.

Proposed Regulation Overview

Emission Source	Proposed Control
Uncontrolled separators and tanks	Vapor Recovery
Leaking connections and equipment	Leak Detection and Repair (LDAR)
Underground storage facilities	Additional monitoring beyond LDAR
Compressors and pneumatic devices	Leak standards and LDAR

Proposed Regulation Standards

Separator and Tank Systems

* Applies to systems at all regulated facilities.
* Require flash testing to determine annual methane emissions.
* Require systems with annual emissions above 10 MT CH4 to install vapor collection.
* Exemptions for low throughput systems.

Proposed Regulation Standards

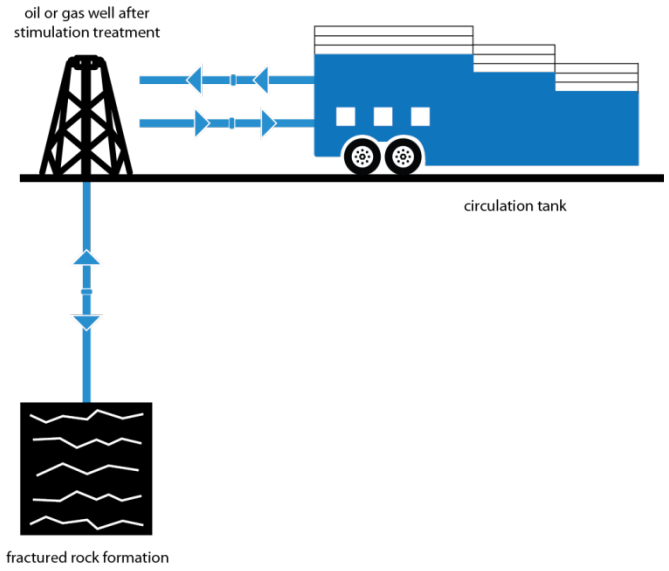
Vapor Collection Systems & Control Devices

* Requires vapors go to an existing sales gas, fuel gas, or underground injection system.
* If these options not available, new or existing control devices must meet a low-NOx standard.
* No additional control devices anticipated.
* Change of existing devices to low-NOx yields NOx benefit compared to current levels.

Proposed Regulation Standards

Circulation Tanks

* Tanks used as part of a well stimulation treatment.
* Operators submit a Best Management Practices Plan, followed by a control equipment demonstration.
* Tanks controlled for emissions by January 1, 2020.
* Provides time for facilities to design and test control equipment.



Proposed Regulation Standards

Leak Detection & Repair (LDAR)

* Requires daily inspections and quarterly testing to check components for leaks.
* Currently required by some districts to control VOCs.
* Regulation would extend testing to methane at natural gas facilities.

Proposed 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.
* Operators submit monitoring plans to ARB for approval.

Proposed Regulation Standards

Natural Gas Compressors

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

Proposed Regulation Standards

Pneumatic Devices & Pumps

* Continuous to no-bleed:
  - Air or electricity to operate; or,
  - Controlled with a vapor collection system
* Intermittent-bleed devices are subject to LDAR testing.

Proposed Regulation Standards

Other Proposed Requirements

* Liquids unloading quantification and reporting:
  - Measure or calculate volume of gas vented
* Well casing vents quantification and reporting:
  - Measure volume of gas vented.

Implementation

* Regulation allows both ARB and the districts to implement:
  - District implementation is preferred.
* ARB developing a registration program for equipment not covered by districts:
  - Memoranda of Agreement for data sharing.
* Districts can charge fees and keep enforcement penalties, and we are exploring additional resource options.

Proposed Implementation Dates

* **January 1, 2018:**
  - Flash testing
  - LDAR inspections
  - Natural gas storage monitoring
  - Registration and permitting
* **January 1, 2019:**
  - Vapor collection on separator & tank systems
  - Pneumatic devices and compressor seal change-outs
* **January 1, 2020:**
  - Circulation tank vapor collection

Tracking Progress

* Metrics include equipment and emission levels:
  - Registration and permitting allows for the tracking of equipment.
  - Reporting allows for the tracking of emissions.
* Possible web-based reporting module under the Mandatory Reporting Regulation.
* Research efforts will also support progress tracking.

Impacts

Emission Reductions & Costs

* Overall estimated annual cost, with natural gas savings, of approximately $22,300,000.
* Estimated continuing reductions of more than 1.5 million MT of CO2e per year, using a 20 year GWP for methane.
* Estimated overall cost-effectiveness of about $15 per MT of CO2e reduced.

Emission Reduction Co-Benefits

* Over 3,600 TPY of VOC reductions statewide.
* Over 100 TPY of Benzene, Toluene, Ethyl-Benzene, and Xylenes (BTEX) reductions statewide.
* Neutral statewide NOx impact, with approximately 0.5 TPY reduction in San Joaquin Valley compared to current year.

Environmental Analysis

* Draft Environmental Analysis (EA) completed.
* Released for 45-day public comment period.
  - June 3, 2016 – July 18, 2016
* Next steps:
  - Prepare written responses to comments
  - Present Final EA and written responses to comments on Draft EA to Board (Early 2017)

Recommended 15-Day Changes and Next Steps

Recommended 15-Day Changes

* **Leak Detection and Repair:**
  - Remove annual step-down provision
* **Natural Gas Storage:**
  - Clarifications
* **Cost revisions for idle wells and additional tanks.**
* **Minor clarifications and corrections to text.**

Next Steps and Recommendation

* Will continue to work with districts on resources, NOx, and other implementation issues.
* Will continue to work with EJAC and stakeholders on additional refinements based on comments received.
* Second Board Hearing Early 2017.
  - Board consideration regarding whether to adopt regulation will occur at second Board hearing, not today's
* Recommend approval of resolution with direction to address 15-day changes.