Potential Amendments to District Requirements for Leak Detection and Repair (LDAR) at Oil and Gas Production Facilities (Rules 4401, 4409, 4455, 4623, 4624)

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Decades of Stringent Air Quality Regulations

- District has long evaluated and implemented stringent control measures across all sources under its jurisdiction in efforts to attain federal standards
  - Adopted over 650 rules and rule amendments in order to control emissions from stationary sources and other local sources
  - District’s New Source Review permitting regulation requires the use of the Best Available Control Technology (BACT)
- District stationary sources subject to Best Available Retrofit Control Technology (BARCT) since 1980s
- Robust and ongoing analysis necessary to demonstrate that District’s rules continue to meet state and federal requirements, including BARCT
  - Increasingly stringent air quality standards
  - Control technologies continually evolving
BARCT Assessment for Rules 4401, 4409, 4455, 4623, and 4624 Under AB617

• AB 617 requires expedited Best Available Retrofit Control Technology (BARCT) review and implementation schedule for facilities in CARB’s Cap-and-Trade Program

• BARCT is an air emission limit for existing sources and is maximum degree of reduction achievable, taking into account environmental, energy and economic impacts

• Based on results of comprehensive analysis, District proposing more stringent Leak Detection and Repair (LDAR) requirements for sources subject to Rules 4401, 4409, 4455, 4623, and 4624

• Current control technology requirements found to meet or exceed BARCT levels of control
  – No further requirements proposed
Rule 4401 Overview

• District Rule 4401 first adopted April 19, 1991
  – Has been subsequently amended 5 times

• Purpose of rule is to limit VOC emissions from steam-enhanced crude oil production wells

• District Rule 4401 requirements
  – VOC emissions from wells, or tanks if wells have closed vents, reduced by 99%
  – Leak detection and repair program required for minimizing leaks with specific repair thresholds and timelines
  – Vapor control required with VOC destruction or removal efficiency of at least 99%
  – Operator Management Plan describes components subject to the rule and schedule of inspections
  – Record keeping requirements

• With implementation of this rule, VOC emissions reduced by 99%
Rule 4409 Overview

• District Rule 4409 adopted April 20, 2005
• Purpose of rule is to limit VOC emissions from light crude oil production facilities, natural gas production facilities, and natural gas processing facilities
• District Rule 4409 requirements
  – Leak detection and repair program for minimizing leaks with specific repair thresholds and timelines
  – Operator Management Plan describes components subject to the rule and schedule of inspections
  – Record keeping requirements
• With implementation of this rule, VOC emissions reduced by 65%

Image credit: BIC Magazine, Oct 2020
Rule 4455 Overview

• District Rule 4455 adopted April 20, 2005
• Purpose of rule is to control VOC emissions from leaking components at petroleum refineries, gas liquids processing facilities, and chemical plants
• District Rule 4455 requirements
  – Leak detection and repair program for minimizing leaks with specific repair thresholds and timelines
  – Operator Management Plan describes components subject to the rule and schedule of inspections
  – Record keeping requirements
• With implementation of this rule, VOC emissions reduced by 87%
Rule 4623 Overview

• District Rule 4623 first adopted April 11, 1991
  – Has been subsequently amended 4 times

• Purpose of rule is to limit VOC emissions from the storage of organic liquid in tanks with a capacity of 1,100 gallons or greater

• District Rule 4623 requirements
  – Control of organic liquid storage tanks by utilizing a pressure vacuum vent, installation of a vapor control system with 95% control efficiency, or use of a floating roof depending on tank size and True Vapor Pressure (TVP) of organic liquids stored
  – Components must be maintained in a leak-free condition

• With implementation of this rule, VOC emissions reduced by up to 95%
Rule 4624 Overview

• District Rule 4624 first adopted April 11, 1991
  – Has been subsequently amended 4 times
• Purpose of rule is to limit VOC emissions from the transfer of organic liquids
• District Rule 4624 requires
  – Use of a vapor control system to capture and reduce emissions by at least 95%
  – Leak detection and repair program required for minimizing leaks with specific repair thresholds and timelines
• With implementation of this rule, VOC emissions reduced by up to 95%
## Current Vapor Control Requirements in District Rules

<table>
<thead>
<tr>
<th>District Rules</th>
<th>Current Vapor Control Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule 4623 – Organic Liquid Storage</td>
<td>Pressure Vacuum Relief Valve, Internal Floating Roofs (IFR), External Floating Roofs (EFR), or Vapor Recovery System (VRS) with control efficiency of 95%</td>
</tr>
<tr>
<td>Rule 4624 – Transfer of Organic Liquids</td>
<td>Bottom loading, closed VOC emission control system, Vapor Collection and Control System (VCCS), or containers and VRS that meet Rule 4623</td>
</tr>
<tr>
<td>Rule 4401 – Steam Enhanced Wells</td>
<td>VOC collection and control system with 99% VOC destruction or removal</td>
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<tr>
<td>Rule 4409 – Light Oil/Gas Plants Rule 4455 – Petroleum Refineries, Gas Processing Facilities, and Chemical Plants</td>
<td>These are LDAR rules only</td>
</tr>
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</table>

Control technology requirements found to meet or exceed BARCT levels of control and no further requirements being proposed
Affected Oil and Gas Production Operations

- District Rules 4401, 4409, 4455, 4623, and 4624 apply to oil and gas production facilities
  - Rule 4401 (Steam enhanced production wells): 48 facilities
  - Rule 4409 (Components at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities): 61 facilities
  - Rule 4455 (Components at Petroleum Refineries, Gas Liquids Processing Facilities, and Chemical Plants): 17 facilities
  - Rule 4623 (Storage of Organic Liquid): 335 facilities
  - Rule 4624 (Transfer of Organic Liquid): 58 facilities
- VOC emissions from these sources: 4.54 tons per day (tpd)
Proposed Regulatory Updates

• Instead of creating a new leak detection and repair rule as previously proposed at the last workshop; due to the complexity of combining requirements from five unique Rules (Rules 4401, 4409, 4455, 4623, and 4624), District is proposing to amend each individual rule as follows:
  – Lower leak thresholds
  – Require more frequent inspections
  – Clarify definitions
Proposed Amendments to Rule 4401

• Lower leak threshold from 2,000 ppmv to 500 ppmv for gas leaks
  – Maintain leak threshold for Pressure Relief Devices at 400 ppmv
• Change frequency of inspection from an annual inspection to quarterly inspections
• Establish an extended repair period (up to 30 days) for rare instances where a rig-up operation is required to complete repair
  – Consistent with State California Oil and Gas Regulations
• Update/clarify/add definitions for consistency across other District LDAR Rules
Proposed Changes to Rule 4409

• Lower leak threshold from 2,000 ppmv for Gas/Vapor and 1,000 ppmv for liquid service components down to 500 ppmv
  – Maintain leak threshold for Pressure Relief Devices at 200 ppmv
• Maintain quarterly inspection frequency requirement
• In rare instances, allow an extended repair period (up to 30 days) where a rig-up operation is required to complete repair
  – Consistent with State California Oil and Gas Regulations
• Update/clarify/add definitions for consistency across other District LDAR Rules
Proposed Amendments to Rule 4455

• Lower leak thresholds for pumps, compressors, other component types from 1,000 ppmv to 500 ppmv for components in gas/vapor service
  – Maintain lower leak thresholds for other components (100 ppmv to 500 ppmv)
• Maintain quarterly inspection frequency requirement
  – Remove option for annual inspections
• Update/clarify/add definitions for consistency across other District LDAR Rules
Proposed Changes to Rule 4623

• Establish a leak threshold starting at 500 ppmv
• Establish allowable number of leaks (between 500ppmv - 10,000 ppmv)
  – 5 allowable leaks for 200 components or less
  – 2% allowable leaks for more than 200 components
• Establish quarterly inspection requirement for fixed roof tanks
• Update Voluntary Tank Preventive Inspection & Maintenance Tank
  Interior Cleaning Program to only include Floating Roof Tanks
• Fixed Roof Tanks will be required to comply with maintenance and tank
  cleaning provisions
• Update/clarify/add definitions for consistency across other District LDAR
  Rules
Proposed Changes to Rule 4624

• Establish a leak threshold of 500 ppmv
• Establish allowable number of leaks (between 500 ppmv > 1,000 ppmv)
  – 5 allowable leaks for 200 components or less
  – 2% allowable leaks for more than 200 components
• Establish quarterly inspection requirement for fixed roof tanks
• Update/clarify/add definitions for consistency across other district LDAR Rules
Estimated VOC Emission Reductions and Cost-effectiveness

- Emission Reductions from Rule 4401 & 4409 combined
  - 0.207 tons/day, 75 tons/year

- Emission Reductions from Rule 4623
  - 0.951 tons/day, 347 tons/year

- Emission Reductions from Rule 4624
  - 0.184 tons/day, 67 tons/year

- Emission Reductions from Rule 4455 (under evaluation)

- Total Estimated VOC Emission Reductions 1.34 tons/day and 490 tons/year

- Average Cost-effectiveness of $67,285 for rule compliance
Proposed Compliance Deadlines

• Proposed new LDAR requirements would be effective starting January 1, 2024
• Authority to Construct (ATC) applications will be required January 1, 2023
Public Engagement Process for Rule Amendments

- Public Workshops: Requesting comment on draft rules by March 20, 2022
- Publication of proposed rule package to the District web: March 22, 2022
- Public comment period
- Governing Board Public Hearing: April 21, 2022

Public Participation and Comment Invited throughout Process
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