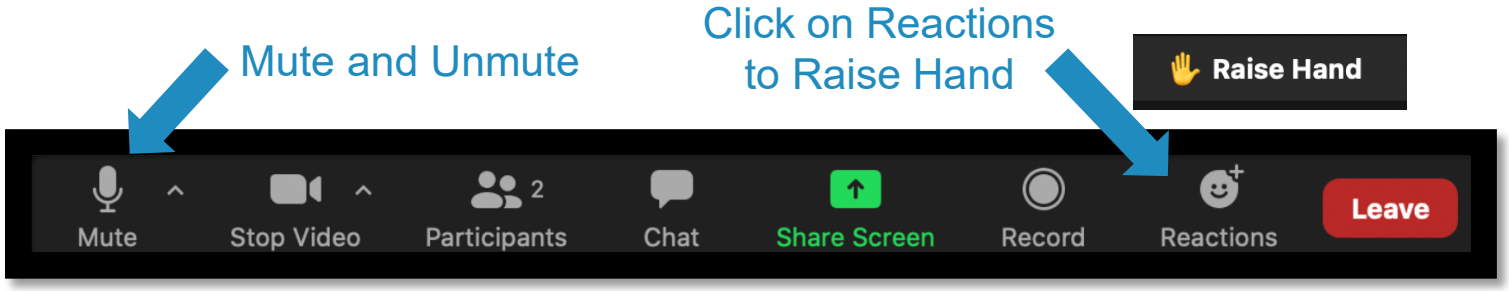
Preliminary Concepts for Potential Improvements to Landfill Methane Regulation

PUBLIC WORKSHOP

MAY 18, 2023

Participation

- We will pause for questions and feedback throughout the presentation
- Use the “Raise Hand” function
- Mute and unmute yourself by clicking the microphone button
- When staff calls your name, please introduce yourself
- Written feedback can be submitted through the LMR Meetings and Workshops webpage



Greenhouse Gas and Short-Lived Climate Pollutants Policy Framework

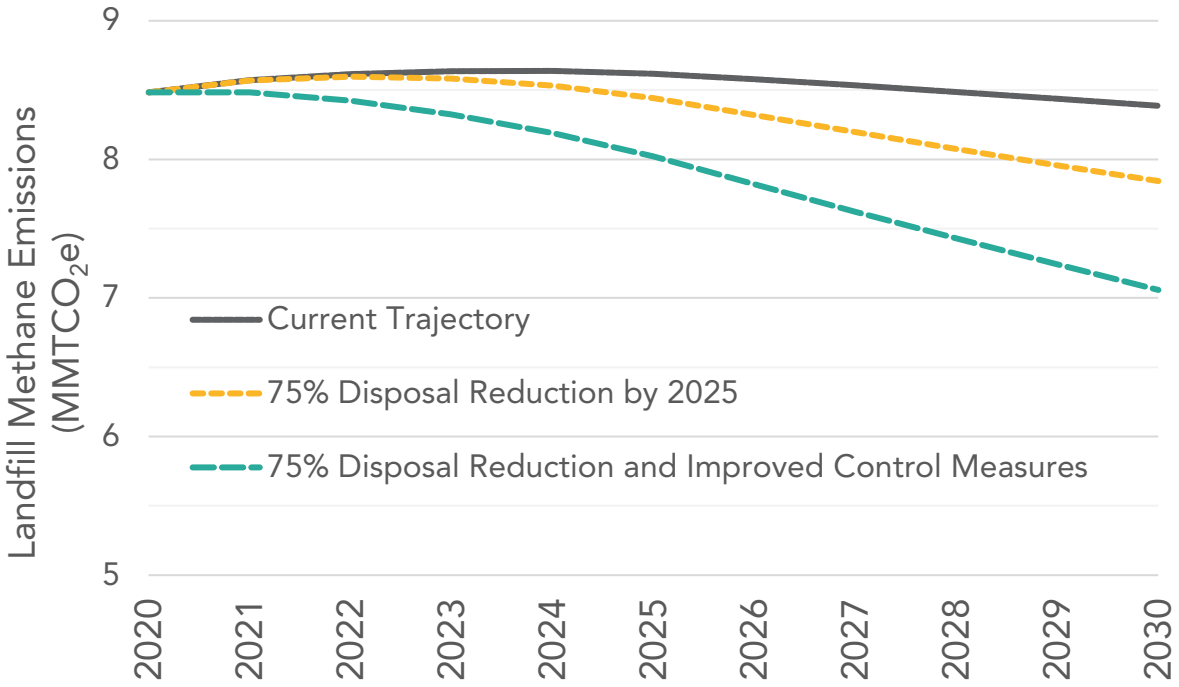
- AB 32 (Nuñez, 2006) required the State to reduce greenhouse gas (GHG) emissions to 1990 levels by 2020. SB 32 (Pavley, 2016) requires GHG emissions reduced to 40% below 1990 levels by 2030
- SB 605 (Lara, 2014) and SB 1383 (Lara, 2016) required CARB to implement a Short-Lived Climate Pollutant Reduction Strategy that achieves a 40% reduction in total methane emissions by 2030 as well as organic waste disposal reductions:
  - 50% reduction in disposal (from 2014 levels) by 2020
  - 75% reduction (from 2014 levels) by 2025
- AB 1279 (Muratsuchi, 2022) establishes the goal to achieve carbon neutrality and an 85% reduction in anthropogenic GHG emissions below 1990 levels no later than 2045

Background on Landfill Methane Policies

- The Landfill Methane Regulation (LMR) was initially adopted in 2010 as a discrete early action measure in response to Assembly Bill 32 (Nuñez, 2006)
- California is currently implementing statewide organic waste recycling and surplus food recovery efforts pursuant to Senate Bill 1383
- The need for additional action to directly control methane emissions was evaluated in the 2022 Scoping Plan Update
- Research and technology development has helped to better understand landfill methane emissions and identify effective emissions reduction strategies

With more than 10 years of experience implementing the LMR, CARB has identified opportunities for improvement in consideration of new technologies, lessons learned, and the State's ambitious methane emissions reduction goals

2022 Scoping Plan: Waste Sector Strategies

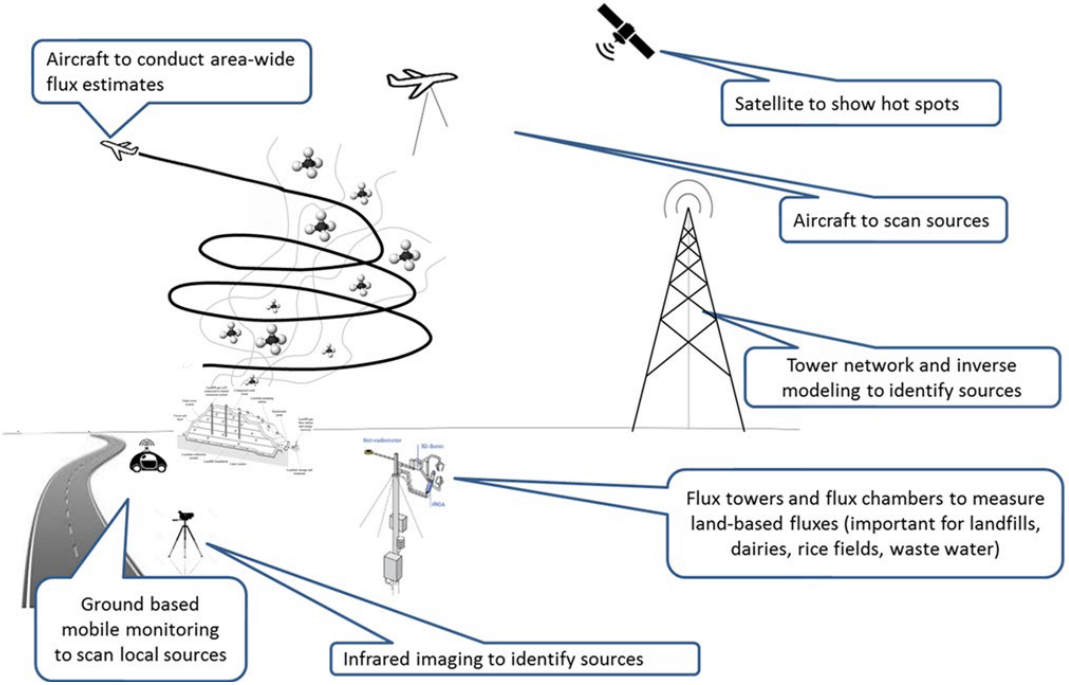


Improved control measures:

- Improvements in operational practices
- Use of lower permeability covers
- Advanced landfill gas collection systems
- Increased monitoring to detect and repair leaks

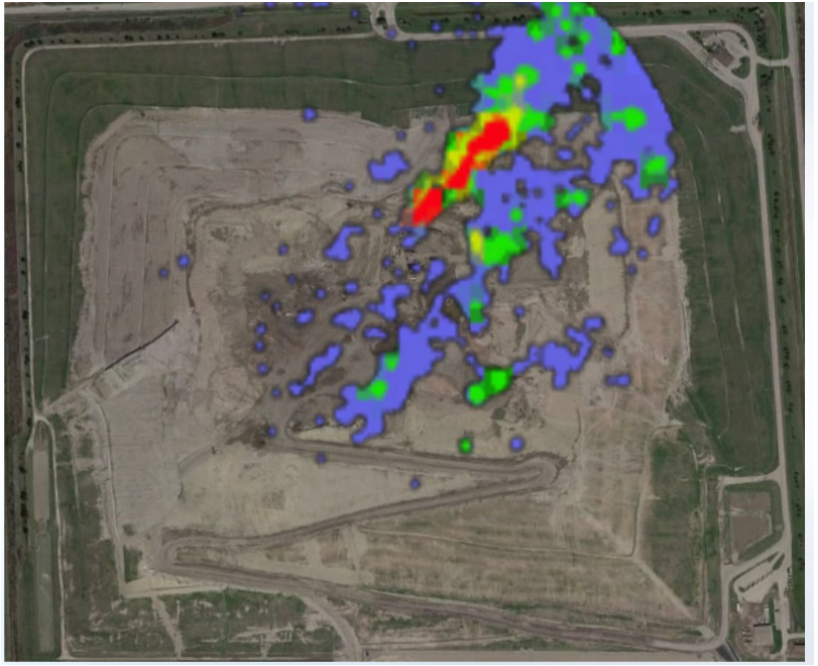
Understanding Landfill Methane Emissions

- Research has shown landfills are complex systems and a wide range of factors may contribute to their methane emissions
- In December 2022, CARB hosted a workshop summarizing the state of landfill methane emissions science [Public Workshop: Landfill Methane Emissions in California]



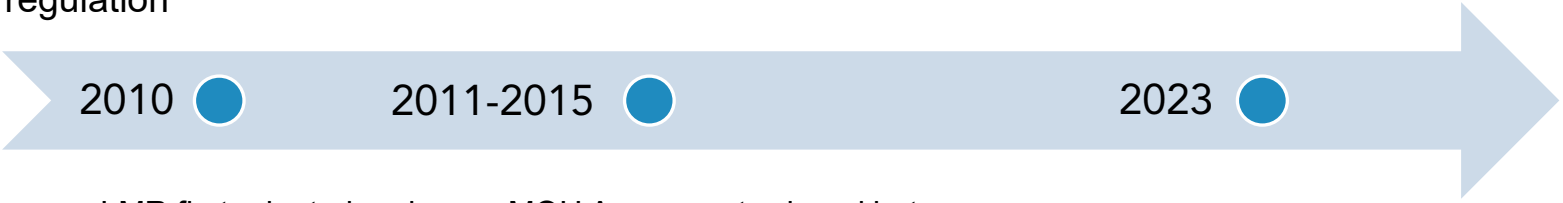
Satellite Methane Detection

- CARB has demonstrated the capability of airborne imaging technology to detect methane plumes:
  - Quickly pinpoint large emissions
  - Support timely mitigation on the ground
- CARB has partnered with the non-profit Carbon Mapper to launch two methane detecting satellites in 2023
- Legislature allocated $100 million for methane detecting satellites through FY 2022-23 budget



Meeting Purpose

- Over the past decade of implementation and research, CARB has identified opportunities to increase the effectiveness of the regulation and achieve additional methane emissions reductions
- Leading up to today's meeting, we have worked closely with our partners at local air districts, and conducted a detailed review of data submitted over the last five years to identify common issues and areas for improvement in the mechanics of the regulation
- Today's meeting is the first step in gathering ideas and input on potential improvements to the regulation



Goals and Scope of Potential Improvements

- Leverage research and technological advances to increase effectiveness of methane emissions control measures
- Improve alignment with federal requirements and local air district rules
- Standardize and streamline reporting to simplify compliance
- Clarify certain requirements to avoid misinterpretation
- Update procedures, methods, and data
- Set an example for other jurisdictions

Areas of Improvement

Monitoring

Operational

Reporting & Miscellaneous

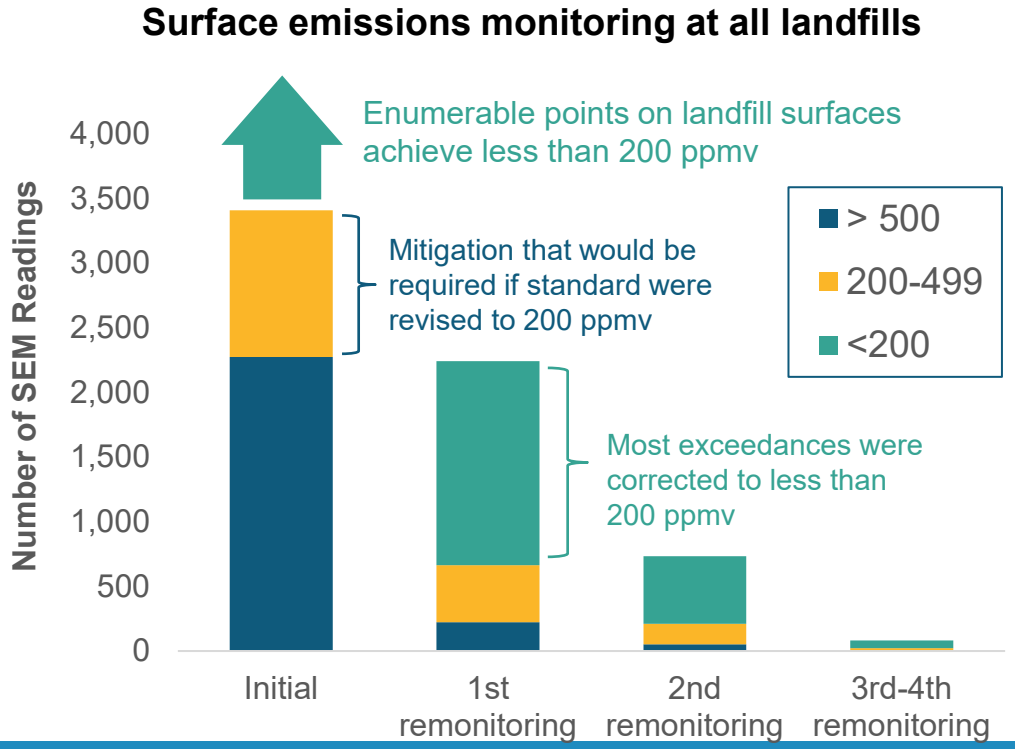
Next Generation Emissions Monitoring Technology

Leverage advances in emissions monitoring technologies to quickly pinpoint large methane sources and mitigate leaks

- Currently, mitigation is required for any methane exceedance detected via ground emissions monitoring following the U.S. EPA Test Method 21 leak detection procedure
  - Staff is considering requiring ground monitoring and mitigation when an operators is notified that a leak has been detected using technologies such as satellites
- The current regulation only allows new monitoring procedures to be approved on a case-by-case basis through an Alternative Compliance Option request
  - Staff is considering a potential process to evaluate and approve the use of new technologies such as drones to supplement surface emissions monitoring

Surface Methane Emission Standard

- When the LMR was initially developed in 2009, staff proposed a 200 ppmv instantaneous SEM standard. Currently, 200-499 ppmv readings must be reported but are not required to be mitigated
- Staff analyzed all SEM results from 2016 to 2020 and found that landfills are largely operating below 200 ppmv
  - Staff is evaluating whether a reduced limit is feasible and warranted



Surface Emissions Monitoring

Ensure effective mitigation of surface emissions exceedances

- Currently, the LMR requires surface emissions monitoring (SEM) to be conducted using a walking pattern with a 25-foot spacing interval (or a 100-foot interval after four quarters with no exceedances). However, the full extent of the leak may not be identified, and some corrective actions may divert the leak elsewhere
  - Staff is considering monitoring procedures to determine the extent of the methane leak and ensure the entire affected area is mitigated

Surface Emissions Monitoring (continued)

Ensure prompt mitigation of surface emissions exceedances

- Currently, the LMR requires corrective action and re-monitoring within 10 calendar days of an exceedance detected by the owner/operator
- If a leak is not mitigated and re-monitoring shows a third exceedance, further corrective action (e.g., new well installation) must be complete within 120 days from the date of the third measured exceedance
  - Leaks can often be mitigated more promptly through simple actions such as well vacuum adjustments and cover maintenance. Therefore, staff is considering shortening the 10-day periods for initial corrective action and re-monitoring
  - Within the 120-day period, staff is considering adding intermediate reporting requirements to ensure the necessary planning for corrective actions begins promptly

Component Leak Monitoring

Improve component leak monitoring procedures and clarify reporting requirements

- Currently, the requirements for quarterly leak monitoring of components containing landfill gas under positive pressure lack a detailed procedure, potentially leading to inconsistent and inadequate monitoring
  - Staff is considering adding prescriptive requirements for component leak monitoring, and increasing stringency to require robust leak detection procedures at all components containing landfill gas

Areas of Improvement

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Gas Collection and Control System Downtime

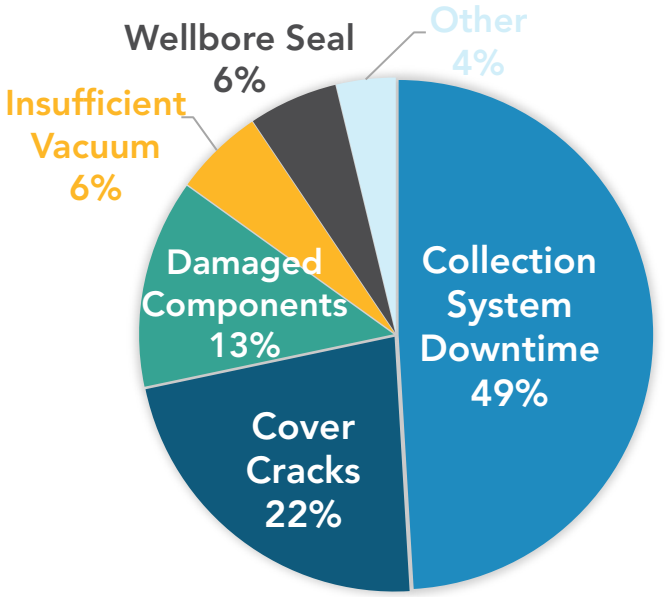
Minimize emissions during Gas Collection and Control System (GCCS) disruptions

- Currently, LMR requires operators to have procedures in place to minimize emissions during repairs, construction, and other situations that may require temporary shutdown
- U.S. EPA Emission Guidelines require the gas mover system and all valves in the collection and control system to be closed within one hour of the collection or control system not operating
  - Staff is considering adding more prescriptive requirements to align with federal requirements and ensure effective mitigation actions are taken during GCCS disruptions

Gas Collection System Downtime

Minimize emissions by reducing collection system downtime

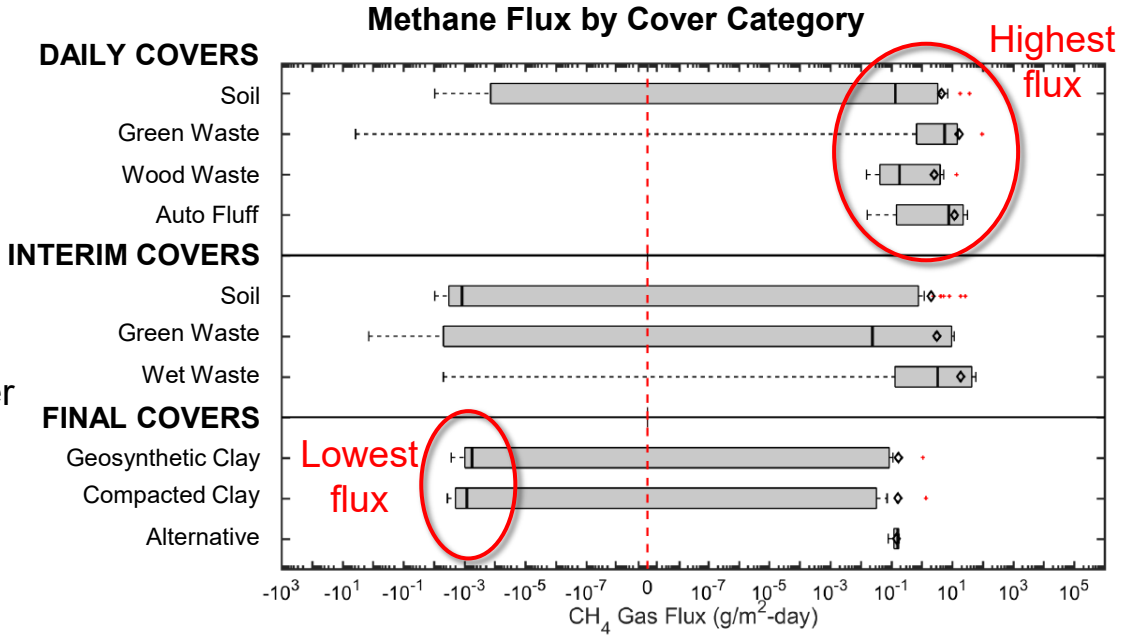
- CARB-sponsored airborne methane emissions surveys identified the working face and construction areas as common sources of large leaks, likely resulting from collection system downtime
  - Staff is seeking feedback on operational practices that could minimize downtime during active filling and construction



Leak causes identified by operators during 2020-2021 airborne survey

Improved Cover Characteristics

- Research conducted by Cal Poly found that cover type was the most significant operational factor affecting surface methane emissions
  - Staff is seeking feedback on how to best minimize the area and duration of daily cover to further reduce methane emissions



https://ww2.arb.ca.gov/resources/documents/landfill-gas-research

Optimize Gas Collection

Improve landfill gas collection to capture additional methane

- LMR currently requires wellfield monitoring and tuning to be conducted monthly. More frequent tuning can improve gas collection
- Automated systems can further optimize gas collection by adjusting to changing atmospheric conditions throughout the day and providing real-time control data
  - Staff is evaluating the extent to which more frequent wellfield tuning can improve gas collection
  - Staff is seeking feedback to better understand the barriers to adoption of automated collection systems

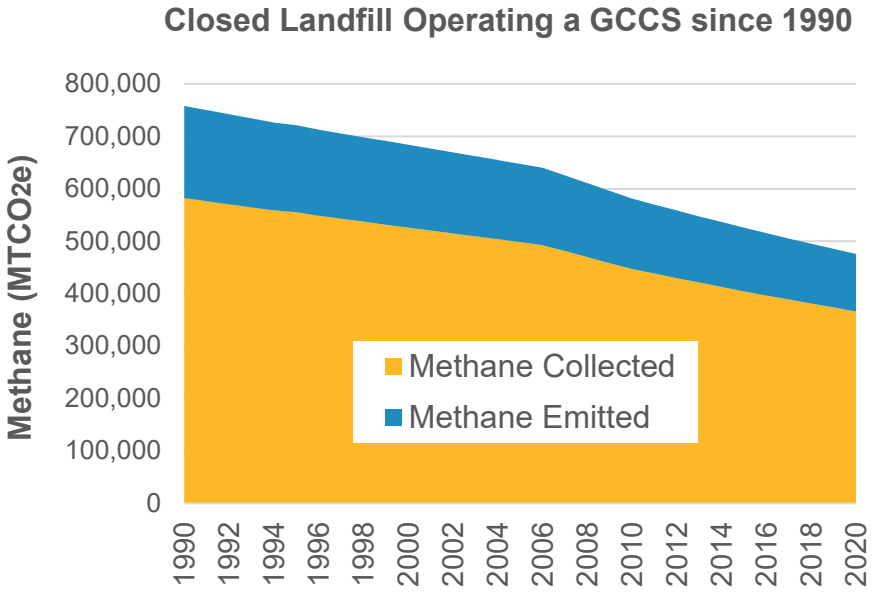
Permanent Shutdown and GCCS Removal

Increase stringency and clarify provisions for permanent removal of GCCS

- Currently, the LMR lists three requirements for closed landfills to cease GCCS operation

  Staff is considering:

  - Replacing the minimum operational time (15 years) with a performance standard;
  - Specifying a procedure for surface emissions demonstration; and
  - Requiring removal report approval



Areas of Improvement

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Standardize Report Format

Standardize and streamline reporting to simplify compliance

- Currently, the LMR does not specify a standard format for Annual Reports, resulting in reports containing lengthy narratives and non-uniform data and operational records, which are challenging and resource-intensive to review
- Report templates developed by CARB in 2021 have been voluntarily adopted by many operators and feedback suggests they simplify compliance and help to reduce errors and omissions
  - Staff is considering developing a system to standardize and streamline reporting

Clarify Reporting Requirements

Clarify reporting requirements to avoid frequent errors and omissions

- Staff has identified common reporting errors, misinterpretations, omissions, and over-reporting in Annual LMR Reports. For example, some operators did not recognize:
  - Quarterly component leak monitoring records are required to be reported;
  - Minimum flare temperature is required to be updated based on the most recent source test;
  - Downtime of each individual control device does not need to be reported, provided that at least one device was operating to treat collected gas
    - Staff is considering numerous clarifications to help avoid inconsistent interpretation that leads to errors and omissions

Requirements for Control Device Operators

Clarify the applicability of LMR for third-party and offsite operators

- Currently, if gas control devices are not owned/operated by the landfill, some device operators have interpreted that they are exempt from the LMR requirements such as quarterly component leak monitoring and annual source testing
  - Staff is considering clarifying that third-party and offsite device operators are subject to monitoring and reporting requirements for gas control devices

Alternative Compliance Options (ACO)

Improve consistency and clarity regarding allowable exemptions to the regulation

- Currently, ACOs are considered approved if no response is received within 120 days. ACOs issued early in the program may be outdated
  - Staff is considering creating a standard request process through the new reporting system, including a process for review or revision of existing ACOs, and removing the approval deadline
- Some requests are overly broad or do not contain sufficient information to demonstrate that an alternative is necessary and would provide equivalent methane control and enforceability
  - Staff is considering developing standard, prescriptive criteria for certain ACO requests (e.g., semi-continuous GCCS operation)

Beneficial Use of Landfill Gas

Reduce flaring and maximize beneficial use of collected gas

- Staff has estimated that approximately two-thirds of landfill gas collected statewide is currently flared. An additional 30 to 50 landfills have been identified that capture sufficient methane each year to cost-effectively utilize gas for energy generation
  - Staff is seeking feedback to better understand the barriers to beneficial use of landfill gas and options for gas use, and what parameters may best indicate when beneficial use is viable?

Discussion & Next Steps

Staff welcomes your input and participation as we further develop these concepts

- Written feedback is requested by June 18, 2023
- Submit feedback: LMR Meetings and Workshops

Contact us: LMR@arb.ca.gov

Subscribe for future updates: Landfill Methane Control Measure

THANK YOU!