Potential Updates to the Landfill Methane Regulation

Public Workshop

December 18, 2024

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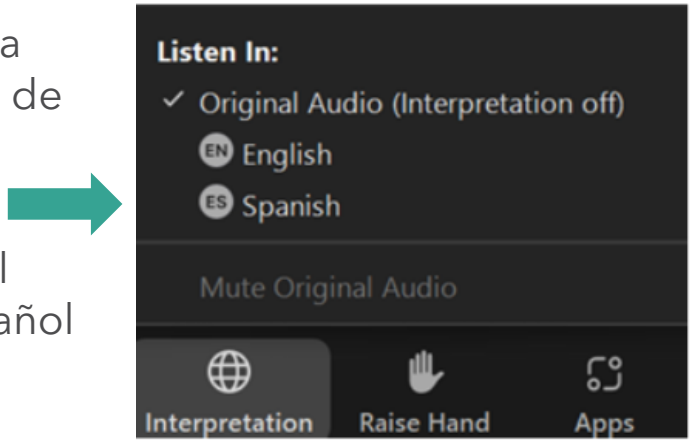

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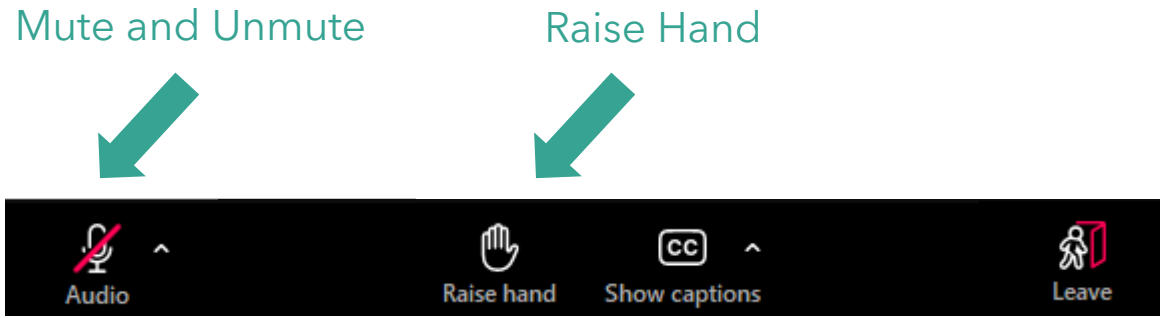
Select English in the interpretation menu to enable hearing simultaneous English interpretation of any comments provided in Spanish. If you are listening in English, do not select Mute Original Audio.

Participation

- This meeting is being recorded 

- 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
- Questions during the workshop can also be emailed to LMR@arb.ca.gov
- Written feedback can be submitted through the LMR Meetings and Workshops webpage



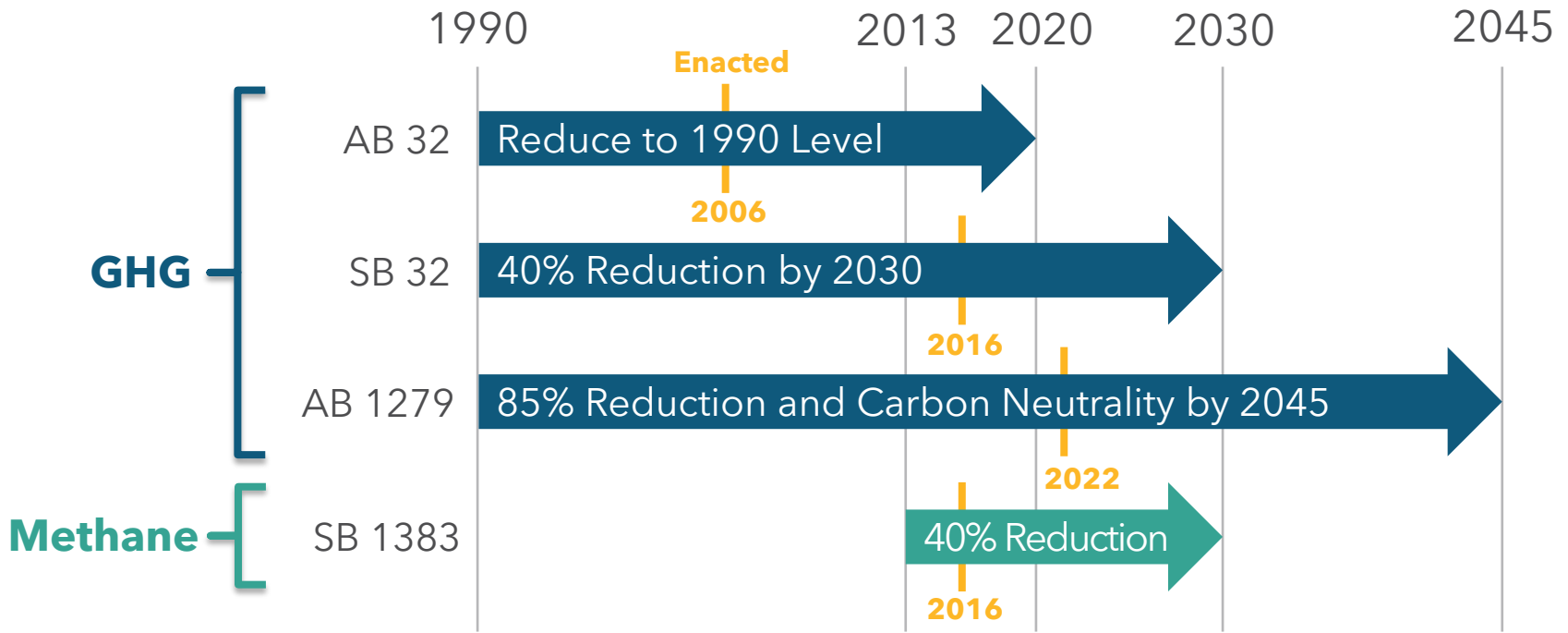
Agenda

Potential Updates to the Landfill Methane Regulation

- Background and status of landfill methane policies and regulation
- Goal and scope of potential changes
- Summary of concepts
- Detailed concepts
- Open discussion
- Next steps & adjourn

Background

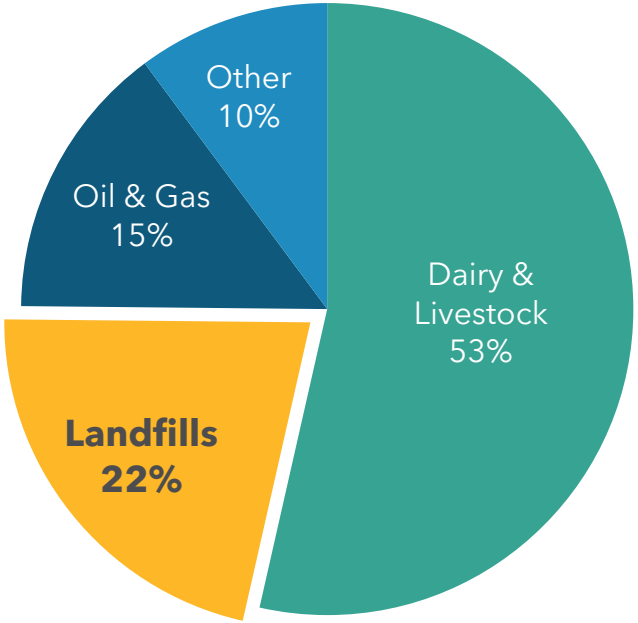
California's Climate Targets



Citations: AB 32 (Nuñez, 2006); SB 32 (Pavley, 2016); AB 1279 (Muratsuchi, 2022); SB 1383 (Lara, 2016). GHG=greenhouse gas

Methane – Why It's Important

- Methane is a potent short-lived climate pollutant responsible for approximately 25% of current global warming effects
- Strong scientific consensus on immediate need to reduce methane emissions to stabilize global warming in this decade
- Waste sector is the second largest methane source in California



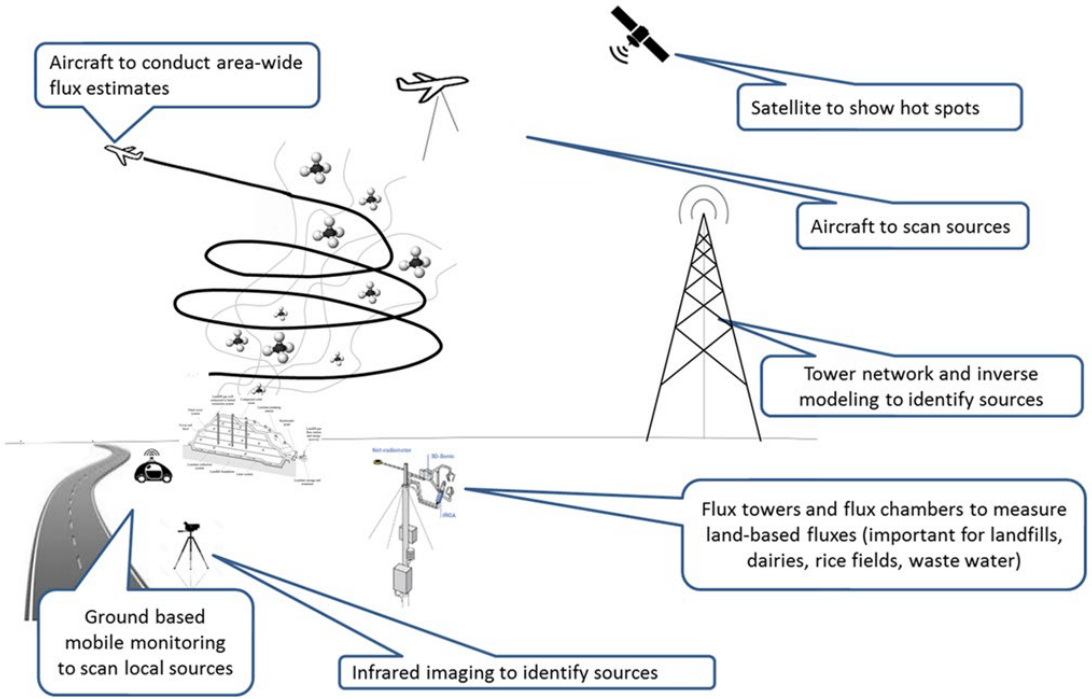
2022 Methane Emissions
36.33 million $MTCO_2e$
California AB 32 GHG Inventory 2000-2022 (2024 Edition)

Current Status of Landfill Methane Policies and Regulation

- The Landfill Methane Regulation (LMR) was adopted in 2010 as a discrete early action measure in response to Assembly Bill 32, the Global Warning Solutions Act of 2006
- In 2021, U.S. EPA issued a federal plan to implement the Emission Guidelines (EG), which includes reporting requirements in addition to those required under LMR
- California is currently implementing statewide organic waste recycling and surplus food recovery efforts to reduce disposal pursuant to Senate Bill 1383
- The 2022 Scoping Plan Update identified the need for additional action to directly control methane emissions
- Research and technology development has helped to better understand landfill methane emissions and identify effective emissions reduction strategies
- Staff has identified opportunities for improvement based on new technologies, lessons learned, and the State's ambitious methane emissions reduction goals

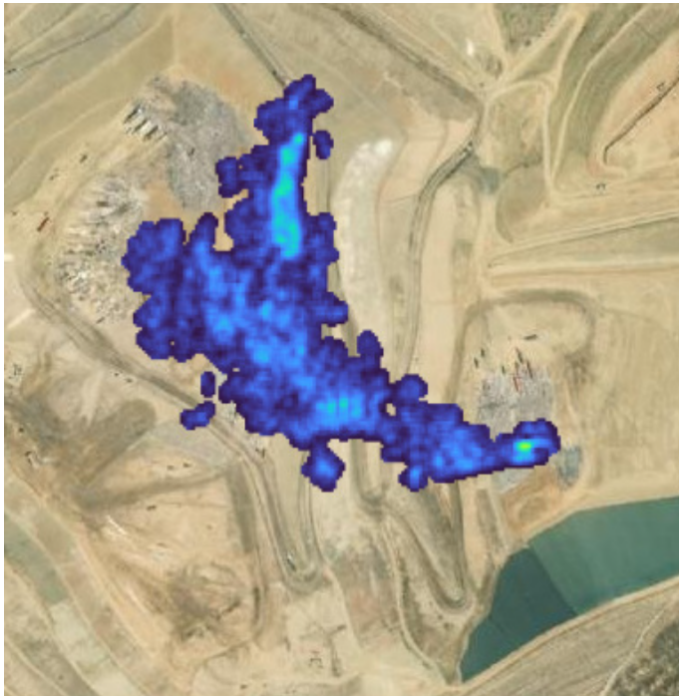
Understanding Landfill Methane Emissions

- CARB has conducted and supported nearly a decade of research and remote sensing efforts to better understand landfill emissions
- Research shows 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



Airborne Methane Plume-Mapping

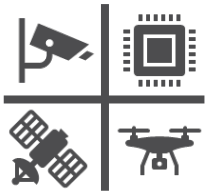
- CARB has utilized airborne imaging technology to detect methane plumes
- In three campaigns from 2020-2023 CARB notified operators of plumes and asked for follow-up action
- Demonstrated that plume imaging can:
  - Quickly pinpoint large emissions
  - Support timely mitigation
- This work has informed the development of targeted mitigation strategies covered in this presentation



Goals and Scope of Potential Changes

Increase Stringency to Achieve CA's Ambitious Climate Targets

Harness Technological Advances



Incorporate Research and Lessons Learned

Improve Alignment with Federal Rules

Streamline Reporting

Set Example for Other Jurisdictions

Anticipated Timeline

May 2023
First workshop on potential LMR updates

Dec 2024 (today)
Second workshop on potential LMR updates

Late 2025
Anticipated release of formal regulatory package

2027
Updated regulation is effective

Preliminary Nature of These Concepts

These concepts are preliminary. Their purpose is to solicit public feedback on potential changes prior to making any formal regulatory proposal.

Submit feedback by January 24, 2025: LMR Meetings and Workshops

Contact us: LMR@arb.ca.gov

Summary of Concepts

Summary of Concepts Related to Monitoring

Staff is considering the following changes to improve monitoring of methane emissions and gas collection wells (LMR section 95469):

- Operator follow-up inspection and repair requirements when notified of a satellite-detected plume
- Process to evaluate alternative technologies for leak detection
- Several changes to increase stringency and improve the frequency and coverage of surface and component leak monitoring procedures
- Additional wellhead monitoring parameters

Summary of Concepts Related to GCCS Operations

Staff is considering the following changes to improve gas collection and control system (GCCS) operations (LMR section 95464):

- Limit periods of GCCS downtime
- Mitigate emissions from unavoidable GCCS downtime
- Maintain steady vacuum for efficient and consistent gas extraction
- Additional monitoring, analysis, and mitigation measures in areas with persistent leaks or other issues
- Manage declining gas generation at closed landfills

Summary of Concepts Related to Applicability, Reporting, and Other Miscellaneous Items

Staff is considering the following changes to clarify applicability, improve reporting, and make other miscellaneous improvements:

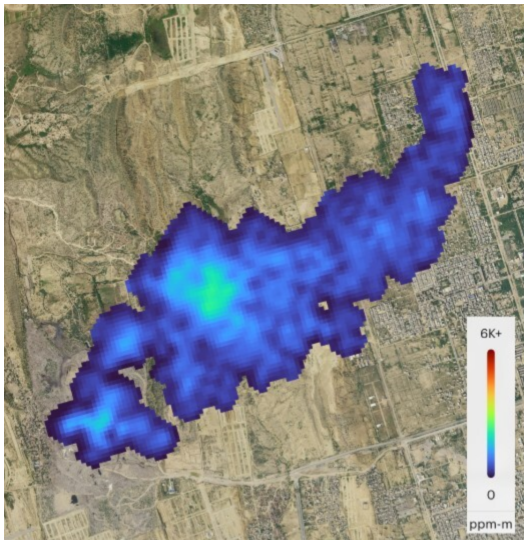
- Clarify responsibilities of third-party gas control system operators
- Support advanced monitoring and automated wellhead tuning
- Standardize and streamline reporting format and require digital maps of infrastructure and emissions monitoring results
- Add reporting parameters to improve CARB's ability to confirm compliance
- Minor miscellaneous changes to clarify certain provisions, update data, improve processes, and improve enforceability

Detailed Concepts for Discussion and Feedback

Potential Changes to Monitoring Requirements

Satellite-Detected Emission Plumes

- Airborne research demonstrates effectiveness of plume notifications
- Satellite data soon available
  - Public-private partnership
  - Commercial vendor through competitive bid
- Oil & Gas Methane Regulation requires mitigation of satellite-detected plumes, as summarized on the next slides
- Concept: Adopt a similar satellite alert and response provision in LMR



Source: Carbon Mapper/PR Newswire

Oil and Gas Methane Regulation's Satellite-Detected Emission Plumes Provision

This and next slide summarize the Oil and Gas Methane Regulation's provision

Executive Officer satellite technology approval

Prior to utilizing for regulatory provision

Based on:

- Resolution of 30m x 30m
- Data available to CARB within 72 hours of collection
- Produces plume visualization

CARB staff notify operator of plume detection

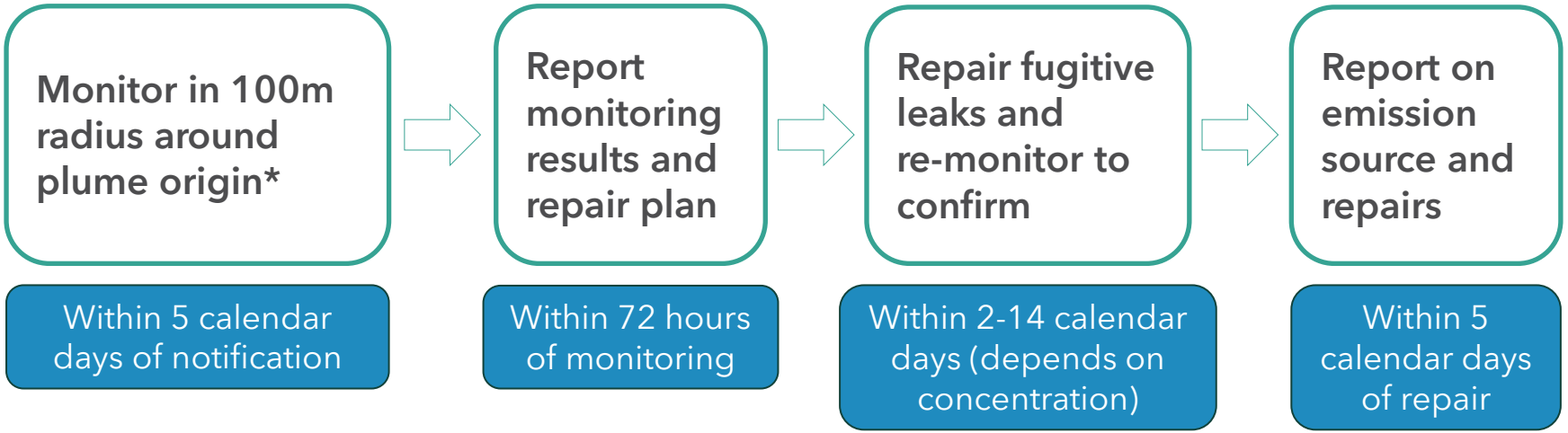
Within 7 business days of CARB receiving plume data

Includes:

- Emission ID
- Latitude/longitude of estimated plume origin
- Date and time of plume detection
- Plume visualization

Oil and Gas Methane Regulation's Satellite-Detected Emission Plumes Provision

Operator response actions under the Oil and Gas Methane Regulation:



* If documented activity-based venting, operator may report information about the source only

Staff is Seeking Feedback on Satellite-Detected Emission Plumes

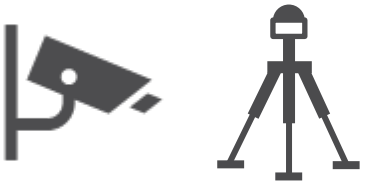
- Should the technology approval criteria be the same for landfills as for oil and gas?
- Should the notification contents (estimated plume origin, image, etc.) be the same for landfills as for oil and gas?
- What operator response timelines are practical for landfills?
- Are additional steps needed in the process?
- What monitoring area around the plume origin makes sense for the LMR?
- What, if any, activities should be exempt from operator monitoring?

Alternative Technology for Leak Screening

Aerial Surveys and Autonomous Vehicles
(e.g., drones, aircraft)

Handheld Devices
(e.g., laser-based)

Continuous Emissions Monitoring
(e.g., cameras)



Alternative Technology for Leak Screening

- Alternatives may offer potential advantages over conventional surface emissions monitoring, including:
  - Increased landfill surface coverage
  - Greater monitoring frequency (due to lower labor needs)
  - Increased safety for personnel
  - Improved consistency (less prone to error)
- EPA has general process to approve alternatives for federal rules
  - E.g., OTM-51 approved for landfill monitoring under this process
  - Alternative means of emission limitation approval process for oil and gas facilities

Feedback from May 2023 Workshop

- Several stakeholders suggested alternative technologies should be required to increase frequency and coverage
- Many operators expressed interest in adopting new technologies and have tested remote sensing technology as a screening tool to supplement on-ground surface emissions monitoring
- Broad agreement on developing a process to evaluate new technologies

Alternative Technology for Leak Screening

- Concept: Establish process for technology providers to apply for alternative surface emissions monitoring (SEM) screening option
  - Approved technologies would be available for use at all landfills

Adding a process for broadly approved alternatives in LMR could accelerate adoption of next-generation technologies

Staff is Seeking Feedback on Alternative Technologies

- What should be required in the application?
  - For example, detector specifications, monitoring procedures, threshold to require ground monitoring, reliability and stringency demonstration, etc.
- How should CARB evaluate stringency?
  - Should the technology be required to have at least one clear advantage over the current LMR procedure (e.g., higher frequency, better coverage)?
- What criteria should CARB set for its review and approval process?
- How many technologies/applications should we expect to receive?
- Should landfill operators be able to apply in addition to technology providers?

Areas Excluded from Surface Emissions Monitoring

- The LMR includes broad exclusions that lack measures to limit impact of missed monitoring events
  - Exclusions for working face and certain construction areas
  - Alternative walking paths to avoid unsafe areas (e.g., steep slopes)
- In remote sensing, CARB observed working face and construction areas as the most common sources of methane plumes
- U.S. EPA has observed operators nationwide excluding more areas than allowed under federal rules
- CARB has also observed that some operators omit required monitoring (e.g., cover penetrations and areas under daily cover)

Areas Excluded from Surface Emissions Monitoring

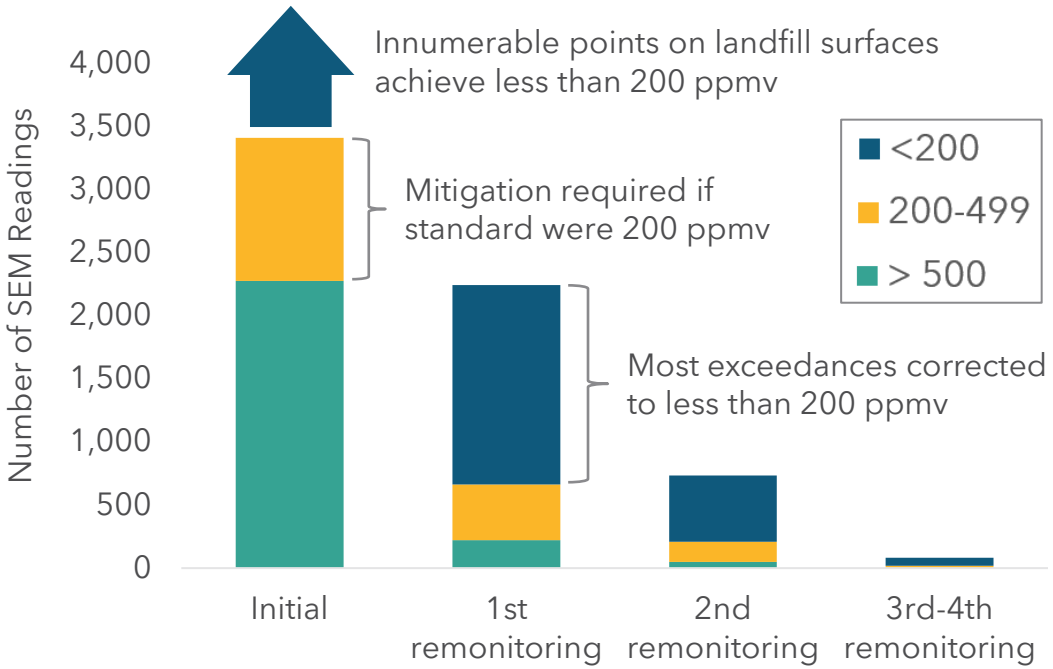
- Under the current regulation, alternative walking paths may be used to perform grid-integrated SEM in areas such as steep slopes for safety
  - However, the regulation still requires monitoring of cover penetrations, cover cracks, and other areas with signs of potential leaks
- Concept: Staff is considering modifying SEM requirements to ensure required monitoring is conducted when safe to do so, or require an alternative technology be used

Staff is Seeking Feedback on SEM Exclusions

- Are there specific situations where working face and construction areas can be monitored without risk to worker safety?
- If we require alternative technologies to be used when traditional SEM cannot be safely performed, which specific technologies should be permitted?

Surface Methane Standards

- Instantaneous SEM data from 2016-2020 shows landfills are largely operating below 200 ppmv
- Concept: Lower instantaneous SEM threshold to 200 ppmv



Surface Emissions Monitoring Records (All landfills, 2020)

Feedback from May 2023 Workshop

- Operators suggested that mitigating these smaller leaks would not amount to meaningful reductions
- Some commenters reiterated concerns that adhering to a more stringent standard could lead to increased air intrusion, increasing risk of subsurface fires and presenting challenges for landfill gas-to-energy projects
- Others agreed that the data show a reduced limit is feasible and there is no evidence to suggest increased risk of landfill fires at this lower threshold

Staff is Seeking Feedback on Surface Methane Standards

- Are there specific situations where it might be difficult to meet a 200 ppmv standard, but not a 500 ppmv standard?
- What corrective actions can be used to achieve a 200 ppmv standard without increasing air intrusion?
- What are the costs associated with the additional corrective actions needed to address smaller leaks?
- What methods could be used to estimate the potential emission reductions that would result from reducing the standard?

Surface Emissions Monitoring
Corrective Action and Re-Monitoring Timeline

- Currently: Corrective action and re-monitoring is required within 10 days
  - Concept: In response to feedback received at May 2023 workshop, staff is considering requiring corrective actions to be initiated within 3 days, but the re-monitoring timeline would remain at 10 days
- Currently: When a new or replacement well is required to be installed, regulators are not informed until after construction is complete
  - Concept: Notify agency within 30 days of uncorrected exceedance to enable effective oversight
    - Provides an opportunity for operator to propose an alternative repair plan

Surface Emissions Monitoring
Corrective Action and Re-Monitoring Timeline

- Currently: If an exceedance is corrected (below 500 ppmv) within the first 10- or 20-day re-monitoring, no further monitoring is required
  - Concept: Perform confirmation re-monitoring 1 month after initial exceedance, as required in U.S. EPA's Emission Guidelines. Proceed to install a new/replacement well if an exceedance is detected.
- Currently: New or replacement well installation must be completed by 120 days after a third exceedance
  - Concept: Change start of 120-day timeline to the initial exceedance, which aligns with U.S. EPA's Emission Guidelines and would ensure prompter repair action

Staff is Seeking Feedback on SEM Corrective Action and Re-Monitoring Timelines

- What items should be included in the construction notification?
  - Is 30 days a sufficient period for notification?
- Should operators have another chance to correct an exceedance detected in 1-month confirmation re-monitoring, or proceed to install a new or replacement well?
- Are there circumstances in which other types of actions (besides a new or replacement well) may be appropriate for fixing an uncorrected exceedance?

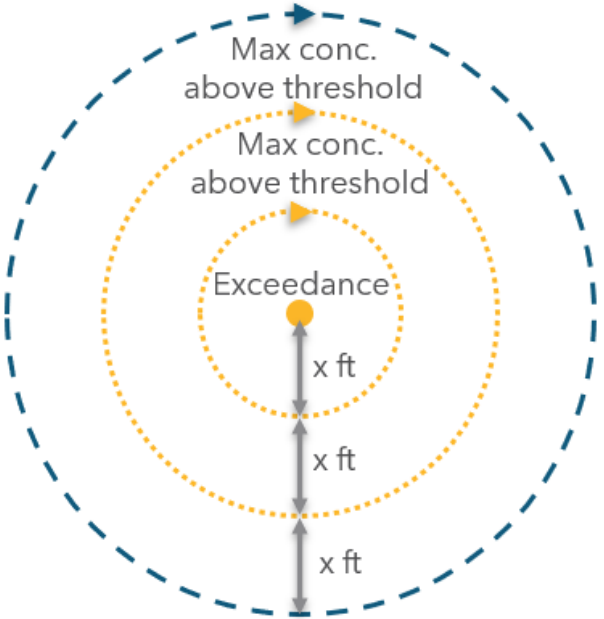
Determine Full Extent of Surface Leaks

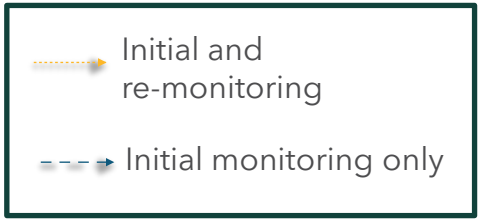
- When an instantaneous SEM exceedance is detected, some operators employ best practice of measuring around the exceedance to find full extent of the affected area
- Integrated SEM records have shown exceedances may “move” from one grid to another after corrective actions

Determine Full Extent of Surface Leaks

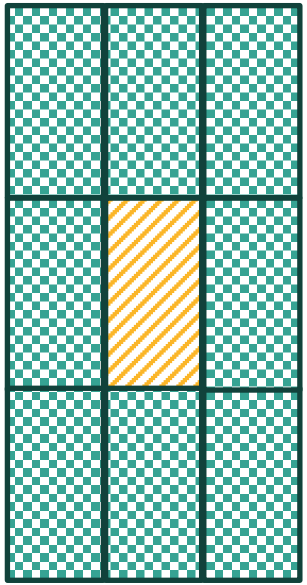
Instantaneous Exceedance Concept

No locations above concentration threshold





Grid Integrated Exceedance Concept



Staff is Seeking Feedback on Determining the Full Extent of Surface Leaks

- Questions for instantaneous monitoring area:
  - What is the appropriate spacing?
  - What is the appropriate walking pattern for this monitoring area (e.g., circles as shown)?
  - What concentration threshold should be used to signal that the full extent of the leak has been located and monitoring can end?
- Questions for integrated re-monitoring area:
  - Should all eight surrounding grids be re-monitored?
    - If not, what indicators could define which grids require re-monitoring?
    - Should grid re-monitoring be limited to specific circumstances (e.g., depending on the type of corrective action, initial integrated concentration, cover type, well locations)?

Surface Emissions Monitoring Frequency

- Currently: Perform SEM **annually** in closed areas after four quarters with no exceedances
- Concept: Perform SEM **quarterly** in all areas of all landfills
  - Research shows seasonal variability/intermittency
  - Closed landfills can experience settlement and erosion compromising wellbore seals and components
  - Compliance inspections have found leaks in areas after several years of no reported leaks
  - Reduces chance that leaks may persist up to a year

Staff is Seeking Feedback on SEM Frequency

- What alternatives could staff consider besides quarterly monitoring for closed areas under final cover?
  - A different increased frequency (e.g., semi-annually or every three quarters)?
  - Rotate which quarter the survey occurs each year?
  - Require periodic SEM re-demonstration (i.e., four quarterly demonstration surveys once every X years)?
  - Other ideas?

Component Leak Monitoring and Repair Plans

- Component leak monitoring (CLM) is required on components under positive pressure
  - Common leak sources include valves, sampling ports, pumps, flanges, gaskets, and other connectors
- Concept: Require component leak monitoring and repair plans similar to those required under the Oil and Gas Methane Regulation*
  - Would assure operators assess which components fall under CLM requirements and guides monitoring personnel

* Section 95669(d)(1)

Staff is Seeking Feedback on Component Leak Monitoring and Repair Plans

- Operators have expressed confusion as to where leak monitoring is required. How can staff assist in clarifying?
- Would component leak monitoring and repair plans improve the consistency of CLM?
- Do similar required plan elements as the Oil and Gas Methane Regulation make sense for landfills (procedures, sitemap, components subject, monitoring frequency, repair timeframes)?
- How frequently should updates be required to the plan?

Wellhead Monitoring to Align with U.S. EPA Emission Guidelines

- Emission Guidelines (EG) are federal requirements implemented by states
  - EG for Municipal Solid Waste Landfills last updated in 2016
- California implements the EG through the LMR
  - U.S. EPA partially approved and partially disapproved the LMR due the omission of certain provisions related to wellhead monitoring
- In 2021, U.S. EPA issued a federal plan to implement the EG, which includes specific reporting requirements in addition to those required by CARB under LMR

Wellhead Monitoring to Align with U.S. EPA Emission Guidelines

- Concept: Add to LMR the additional federal requirements related to monitoring, recordkeeping, and reporting:
  - Wellhead gas temperature
  - Wellhead nitrogen or oxygen concentration
  - Root cause and corrective action analyses
- Specifically, staff is considering adding all requirements referenced in 40 CFR section 62.1115(b)(2)

§62.16716(c)	§62.16722(a)(2) & (3)	§62.16720(a)(4)	§62.16724(k)	§62.16726(e)(2) & (5)

New abbreviations: CFR = Code of Federal Regulations

Staff is Seeking Feedback on Wellhead Monitoring

- Would harmonizing LMR with these federal plan requirements help to streamline compliance and reporting for operators?
- Are there any advantages to leaving these requirements in the federal plan only?
- Should corrective actions or additional monitoring be required for the following:
  - Oxygen/nitrogen concentrations that may indicate air intrusion?
  - Significant changes in gas flow rate or composition that may indicate impaired wells?

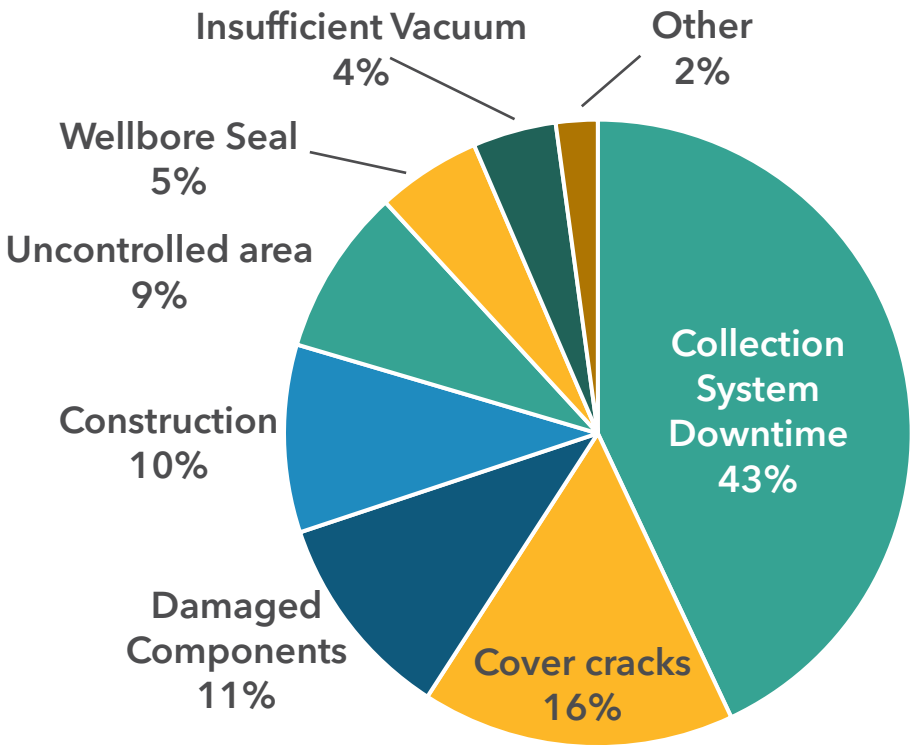
Potential Changes to Operational Requirements

Gas Collection System Downtime

- Individual wells may be disconnected from vacuum to perform well raising and for certain repair and construction activities
- The LMR requires emission mitigation during downtime, but does not specify allowable measures
- LMR reporting shows long periods of well downtime at some landfills for active filling or construction
- Airborne surveys identified collection system downtime as the most common cause of large plumes, typically in working face and construction areas (next slide)

Gas Collection System Downtime

Leak causes identified by operators during 2020, 2021, and 2023 airborne surveys



Gas Collection System Downtime

- Concept: Reduce duration and emissions impact of downtime by requiring best practices employed by some operators, including:
  - Reconnect wells to vacuum at end of each workday
  - Specify mitigation measures for component downtime longer than a specified period
  - Limit number of wells that can be disconnected at once
  - Limit the size of working face/construction area

Staff is Seeking Feedback on Gas Collection System Downtime

- What period of component downtime is appropriate to trigger the need for emissions mitigation measures?
- What mitigation measures have operators found to be effective (e.g., complete and cap wells daily, synthetic membranes, spray-on barriers, emission control boxes)?
- Should the number of wells that can be disconnected at once be an absolute number, a fraction, based on the waste acceptance rate, or something else?
- What strategies can be used to limit the size of the working face and construction areas, without disrupting landfill operations or safety?

Gas Collection System Operating Parameters

- Changes in the applied system vacuum could:
  - Indicate issues with the collection system
  - Lead to diminished performance
  - Lead to biased SEM results
- Regulation currently requires:
  - Monthly monitoring of well pressure
  - Continuous monitoring (flare temperature and gas flow rate) to ensure control devices are operated within the parameter ranges established during source testing – but there is no analogous monitoring for the collection system

Gas Collection System Operating Parameters

Concept: Continuously monitor system vacuum

Install continuous pressure sensor at collection header

Establish pressure setpoint

Maintain pressure within a range of setpoint

Report periods outside pressure bounds

Include date, duration, and reason for change

Staff is Seeking Feedback on Gas Collection System Operating Parameters

- Does normal operation of a GCCS require periodic changes in system vacuum setpoint?
  - If so, for what reasons, and how often is this re-assessed?
- Where is the best location to install a system pressure sensor? Are most existing blowers/compressors equipped with such sensors?
- What percent change from the pressure setpoint should trigger reporting?
  - Should reporting only be required if this occurs for a specified length of time?
  - Should corrective actions or additional wellhead monitoring/tuning also be required when operating outside of the range?
- Are there other system-wide parameters that would be valuable to monitor continuously?

Additional Analyses at Sites with Persistent Exceedances

- Persistent or recurring SEM exceedances in one area may indicate inadequacies in the collection system, insufficient cover thickness, or ineffective cover materials
- Concept: When landfill has greater than a specified number of SEM exceedances in one grid during a specified period (e.g., 10 instantaneous or 5 integrated exceedances in a 3-year period), would need to:
  - Increase monitoring frequency
  - Perform cover integrity and collection system analyses
  - Remediate issues discovered

Staff is Seeking Feedback on Additional Analyses at Sites with Persistent Exceedances

- In setting a "persistent emissions" standard:
  - What should be the area of interest (e.g., one grid, a smaller subdivision)?
  - What numbers of exceedances should trigger this requirement over what period of time?
- What increased monitoring frequency is appropriate and for how long (or until what conditions are met)?
- What should the cover integrity analysis include (e.g., thickness and effectiveness of materials, examination of wellbore seals)?
- What should the collection system analysis include (e.g., evaluation to ensure wells not pinched, watered-in, or broken)?
- What test methods and performance metrics should be used for the cover integrity and collection system analyses?

Additional Monitoring at Sites with Persistent Gas Collection System Issues

- Recurring loss of pressure or gas flow at wellheads can lead to increased emissions
- Technology advancements have led to low-cost, readily available wellhead monitoring solutions that provide actionable real-time data to operators
- Concept: Sites with frequent or persistent issues (e.g., loss of vacuum/flow, high temperature) would need to implement continuous wellhead monitoring and more frequent or automated wellhead tuning

Staff is Seeking Feedback on Additional Monitoring at Sites with Persistent Collection System Issues

- What metrics and thresholds should define “frequent or persistent”?
- Which wellhead parameters should be monitored under this concept?
- Are there other actions (rather than increased wellhead monitoring and tuning) that make sense as an alternative or additional option to improve GCCS operation at these facilities?

Declining Gas Generation

- Gas collection and control systems (GCCS) are required to be operated continuously
- Landfill gas generation eventually declines in the decades after closure
- Closed landfills with low methane generation may request an alternative compliance option for semi-continuous operation and eventually meet conditions to permanently shut down the GCCS
- Operators and districts have requested additional guidance and standard criteria for well decommissioning, semi-continuous operation, and permanent GCCS shutdown

Potential Steps For Managing Declining Gas Generation

Remediate issues leading to reduced flow rate or gas quality

Ensure the collection system is functioning properly

Modify gas control system

Determine whether modifications can be made to the existing flare to accommodate lower flow

Replace the control device

Evaluate the feasibility of installing a lower-capacity control device

Request semi-continuous operation

Document previous steps and demonstrate compliance with other requirements (next slide)

Request permanent shutdown

Meet requirements for emissions threshold, SEM demonstration, and CARB approval (later slide)

Declining Gas Generation: Semi-continuous Operation

Concept: Add criteria that must be demonstrated in alternative compliance option requests for semi-continuous operation, including:

- A maximum gas recovery threshold in MMBtu/hour
- Document the adjustments, inspections, data analysis, compliance history, and any actions taken to correct issues identified
- Demonstrate that the site would remain in compliance with all State, local, and federal requirements
- Specify a process to increase or decrease operational time in response to collection system parameters

New abbreviation: MMBtu= million British thermal units

Declining Gas Generation: Permanent Shutdown

Concept: Revise and clarify existing criteria for permanent shutdown or removal of the GCCS at closed landfills, including:

- Establish a maximum emission threshold in MT CH_4/yr based on gas collection rate
- Add specificity to existing SEM demonstration criteria before and after shutdown
- Obtain CARB approval for removal request (rather than Equipment Removal Report)

New abbreviation: MT CH_4 = metric tons of methane

Staff is Seeking Feedback on Declining Gas Generation

- What criteria do operators use to determine when a collection well should be decommissioned?
- What metrics could be used to determine when replacement of a control device to accommodate a lower gas flow rate is warranted?
- What maximum gas collection rate thresholds would be appropriate for semi-continuous operation and for permanent shutdown, respectively?
  - e.g., Canadian landfill methane regulatory proposal used a threshold of 125 MT CH_4 collected (~50 scfm @ 25% CH4 or 0.75 MMBtu/hr) for permanent shutdown
- Can temporary shutdowns simulate permanent shutdown to provide assurance of ongoing compliance with the surface methane standard once the GCCS is no longer operating?
- What elements should be included in the permanent GCCS shutdown request?

Potential Changes to Applicability, Reporting, and Other Miscellaneous Items

Third-Party Gas Control System Operators

- Stationary equipment for the combustion or treatment of landfill gas ("gas control systems") are sometimes owned or operated by a different entity than the landfill
  - The LMR definitions of "owner" and "operator" rely on whether the control system owner/operator purchases landfill gas
  - CARB cannot determine applicability except by requiring submission of market sensitive information, such as contracts

Concepts:

- Clarify that gas control system owners and operators that receive landfill gas are subject to LMR
  - Necessary to ensure 99% methane destruction, find and repair leaks, and to understand certain reporting from landfill operators
- Clarify LMR requirements for landfill gas upgrading facilities

Staff is Seeking Feedback on Third-Party Gas Control System Operators

- What is the typical purchasing arrangement for different types of third-party control systems (i.e., in what cases does the third-party typically buy landfill gas vs. being paid to take the gas)?
- Would allowing third-party gas control system operators to simply provide necessary information to landfill operators for reporting streamline their reporting process?
- Are there additional reporting parameters or other considerations specific to RNG upgrading facilities?

New abbreviations: RNG = renewable natural gas

Advanced Monitoring and Automated Wellhead Tuning

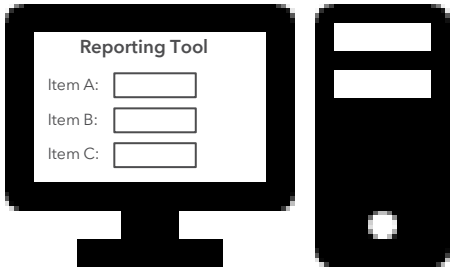
- California landfill operators are increasingly adopting automated wellhead tuning solutions that adjust system parameters in response to dynamic conditions to optimize gas collection
- Real-time monitoring can identify out-of-range parameters and alert operators to sudden changes, providing actionable information so operators can prevent or promptly address issues
- Operators have experienced increased methane capture, reduced downtime, and improved visibility of GCCS disruptions

Staff is Seeking Feedback on Advanced Monitoring and Automated Wellhead Tuning

- What factors have operators considered in choosing whether to use automated well tuning?
- Are there practical limitations or technical challenges associated with implementing these technologies?
- How can potential revenues offset installation costs?
- What regulatory barriers have operators faced when considering installing a continuous monitoring system?
- How can staff address regulatory compliance and reporting concerns to ensure the LMR is not a barrier to adoption of improved technologies?

Standardized Digital Reporting

- CARB frequently receives lengthy, non-uniform reports that require significant staff resources to review and confirm compliance
  - Current regulation specifies what must be reported, but no format
- Concept: Require standardized digital reporting
  - Reporting in fillable electronic forms
  - Spatial data in GIS-supported format
  - PDF attachments for supporting documentation
- Staff is seeking feedback on how to best implement standardized, digital reporting to improve clarity and efficiency



New abbreviations: GIS = geographic information system

Reporting and Recordkeeping Parameters

- Through over a decade of implementation experience, staff has identified potential clarifications and changes to reporting parameters that would:
  - Better support CARB's ability to evaluate compliance
  - Improve understanding of causes of methane emissions
- Additionally, some new concepts would require new reporting parameters, e.g., satellite leak detection follow-up actions
- Concept: Update reporting and recordkeeping parameters
- Staff is seeking feedback on reporting and recordkeeping parameters to improve oversight and transparency

Open Discussion

Open Discussion

- Use the “Raise Hand” function
- Mute and unmute yourself by clicking the microphone button
- When staff calls your name, please introduce yourself
- Questions/comments can also be emailed to LMR@arb.ca.gov
- Written feedback can be submitted through the LMR Meetings and Workshops webpage

Next Steps

Staff welcomes your input and participation as we develop these concepts into a regulatory proposal

- Written feedback is requested by January 24, 2025
- Submit feedback: LMR Meetings and Workshops

Contact us: LMR@arb.ca.gov

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