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Anthy Alexiades
Short-Lived Climate Pollutant Policy Section
California Air Resources Board
Submitted electronically to https://ww2.arb.ca.gov/public-comments/public-workshop-potential-updates-landfill-methane-regulation

Dear Anthy,

Thank you for the opportunity to provide comments on behalf of Waste Management of California (WM) in response to the California Air Resources Board's (CARB's) December 18, 2024 workshop to present concepts for the Landfill Methane Regulation (LMR). WM provides waste and recycling collection, processing, and disposal services to communities across California, supported by a network of landfills subject to LMR. WM has comprehensive emissions management systems in place not only to maintain compliance with local, state, and federal law, but also to ensure that we continue to be good neighbors to the communities we serve.

WM was the first U.S.-based company in the solid waste sector to have near-term Scope 1 and Scope 2 targets validated by the Science-Based Target Initiative, in line with limiting global warming to 1.5 degrees Celsius. As such, WM is targeting emissions reduction strategies to support a 42% emissions reduction by 2031 and to increase the beneficial use of landfill gas to 65% by 2026. To support our sustainability goals, WM is engaged in the development of methods to better measure and manage our emissions. WM has welcomed collaborations with various stakeholders to identify feasible improvements in current practices. For example, WM is working with academics, regulatory agencies, non-governmental organizations, and measurement technology providers to evaluate satellite, aircraft, drone, fixed, and portable sensors and analytics services that support the future development of a comprehensive landfill emissions measurement system. Although no such comprehensive solution has yet been identified, WM recognizes that emerging measurement technologies may provide meaningful tools to supplement more traditional monitoring methods and to aid in the identification and correction of emission events. A summary of our observations with research to date is described further in our comments below.

In addition to our efforts driven by climate and sustainability goals, WM employs many operational best practices to mitigate potential effects from our facilities on our neighbors. Landfill operations and site conditions are dynamic; no one landfill operates like another. This complex environment requires management on a site-by-site basis, due to differences in waste composition, topography, and climate. The need to account for site-specific characteristics are reflected in the comprehensive, site-by-site permitting frameworks for landfills. In California, landfill operations are regulated by CARB, CalRecycle, the State Water Resources Control Board as well as the local Air District, Regional Water Quality Control Board, and local enforcement agency. These agencies can and have set standards for landfill operations to minimize air pollutant emissions, odors, groundwater intrusion, stormwater runoff, and dust generation. Each of these agencies, along with US EPA, has the authority to inspect landfills for compliance and to require recordkeeping and reporting to monitor environmental performance.

Our comments as we initiate the process to develop amendments to the LMR can be summarized as follows:

- **Significant uncertainties and inconsistencies remain with respect to the ability of emerging measurement technologies to detect and quantify methane emissions from landfills. In evaluating the possibility of deploying these technologies via rulemaking, CARB must carefully balance the goals of accuracy, efficacy, and costs to ensure that the LMR is cost-effective and feasible.**

- **Methane emissions from landfills and oil and gas facilities are often not comparable. These differences will need to be accounted for in determining appropriate requirements in the LMR.**

- **The LMR needs to allow adequate flexibility such that site-specific compliance solutions can be determined where necessary.**

- **Landfills provide an essential public service through controlled disposal of solid waste in a contained environment. The LMR cannot interfere with operators' ability to safely and quickly dispose of solid waste and to construct new cells, gas collection and control systems, and groundwater protection controls.**

More detail is provided in our responses to data presented and questions raised during CARB's December 18 Workshop, below.

Advanced Leak Detection Technologies for Landfill Methane Study (St. Francis Xavier University)

We appreciate CARB's inclusion of the work conducted by St. Francis Xavier University (referred to hereafter as the "Controlled Release Study") as part of the workshop presentation. Ongoing research and evaluation of emerging measurement technologies is critical to determine whether and in what manner various technologies can be relied on for regulatory purposes. Included as ***Attachment A*** is a detailed summary of the Controlled Release Study as part of the National Waste & Recycling Association's (NWRA's) response to EPA's recent Request for Information, *Use of Advanced and Emerging Technologies for Quantification of Annual Facility Methane Emissions Under the Greenhouse Gas Reporting Program*, 89 Fed. Reg. 70177 (Aug. 29, 2024).

In summary, the Controlled Release Study highlights a lack of precision and consistency among the technologies being evaluated for the detection, measurement, and quantification of methane emissions from landfills. Until standardization exists, the results achieved across technologies is inconsistent, with no way to determine which methodology produces the most accurate and precise results. Further, the quantification methodologies employed by the various technologies are often proprietary, and therefore are difficult for landfill owners and operators to interpret. As

detailed in NWRA's response to EPA's RFI, comparisons of the methodologies on a side-by-side bases can lead to drastically different results that cannot be reasonably reconciled at this time.[1]

As an example, we note that UAV/Aerial Flux Plane method performed better in the Controlled Release Study than at active landfills. The controlled release study was a very simple simulation of a landfill environment, but when we have deployed this technology in complex active landfills, it has performed poorly because it is unable to handle the scale and complexity of emission sources and meteorology.

WM has worked closely with EPA's Office of Research and Development (ORD) to describe and analyze the findings of its site-specific Comparative Methane Measurement Study, which will be published in 2025. For more information on WM's Comparative Methane Measurement Study, see WM's Response to EPA's RFI, EPA-HQ-OAR-2024-0350-0058, attached hereto as ***Attachment B***. The results of this study provide further support for the contention that additional review and procedures are necessary to ensure that emerging measurement technologies are appropriate tools for the detection and quantification of emissions, and that remotely measured data can be interpreted reliably and consistently.

Accordingly, while WM believes that certain emerging technologies can be deployed on a voluntary basis to support overall site management, additional research and development is needed before such technologies are able to be reliably implemented into CARB's LMR for determinations related to collection efficiency values or mass emission rates.

With all of the existing data and information in mind, it is imperative that CARB, the solid waste industry, and other stakeholders understand the appropriate uses and limitations of emerging measurement technologies, and ensure that such technologies are as accurate and reliable as possible before implementation into the LMR updates, because even discrete changes to required calculation procedures have impacts to reported emissions on a larger scale.

Accuracy of Drone Measurements

The capabilities of drone technologies are still under review. The only drone technology that has been deployed for purposes of regulatory compliance under federal rules is Other Test Method (OTM)-51/ALT-150. This technology has been developed by Sniffer Robotics, LLC and is currently approved as an alternative test method to Method 21, for use in surface emissions monitoring (SEM) under the federal regulations applicable to MSW landfills.[2] Note that the method is only approved for use by one vendor, which significantly restricts commercial use and creates compliance risk. Alternative methods and vendors are critical to advance use of drone technology.

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[1] NWRA. 2024. NWRA response to EPA's recent Request for Information, Use of Advanced and Emerging Technologies for Quantification of Annual Facility Methane Emissions Under the Greenhouse Gas Reporting Program, 89 Fed. Reg. 70177. November 27, 2024. p. 19

[2] 40 CFR 60, Subpart WWW, §§60.753(d) and 60.755(c)-(e); 40 CFR 60, Subpart XXX, §§60.763(d) and 60.765(c)-(d); 40 CFR 60, Subpart Cf, §§60.34f(d) and 60.36f(c)-(e); 40 CFR 62, Subpart OOO, §§62.16716(d) and 62.16720; and 40 CFR 63, Subpart AAAA, §§63.1958(d) and 63.1960(c)-(d).

Four drone vendors were evaluated as part of the Controlled Release Study, with varying results. Two vendors using UAV Point Sensor Emission Assessment technology (UPSEA) had a combined average uncertainty of 48%, and could not operate in conditions with precipitation or wind speeds in excess of 12 m/s. Two vendors using UAV Column Sensor Emission Assessment (UCSEA) technology were evaluated strictly for leak detection capabilities, and had a false positive fraction greater than 0.79 with limited visibility when measuring active emission points on slopes.[3] A follow up to the Controlled Release Study is underway and intends to include and evaluate the capabilities of additional drone vendors, including OTM-51/ALT-150.

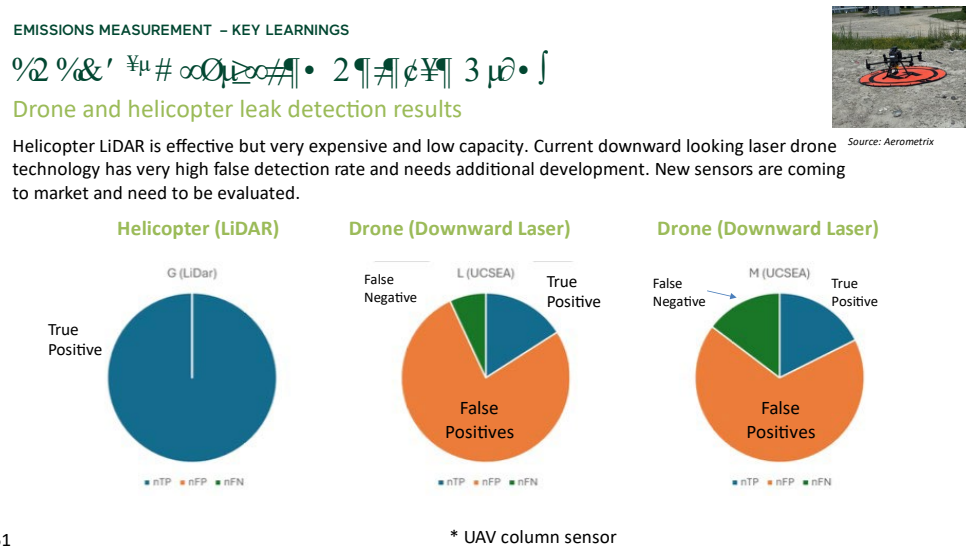

Figure 1 (Hossian et. al. 2024)

To the extent that CARB intends to incorporate drone technologies into the LMR for purposes of conducting surface emissions monitoring (SEM), the agency should first work with industry, vendors, and US EPA to establish standard methods and procedures for using drones. Deployment should continue to occur quarterly in accordance with the current requirements for SEM. Affected facilities should have the option of using drone technology and traditional walking/manual approaches interchangeably, as site-specific considerations may warrant.

[3] Hossian et. al. 2024. *A Controlled Release Experiment for Investigating Methane Measurement Performance at Landfills, Final Report*. July 2024. Attached herein as Exhibit 2 to Attachment A.

Monitoring Requirements

Satellite-Detected Emission Plumes Provision

WM believes that it would be premature to duplicate requirements for oil and gas facilities for landfills. Importantly, landfills are more complex sources than oil and gas facilities, and several overarching factors warrant additional consideration in that regard. ***Attachment A*** provides a detailed outline of the differences between MSW landfills and oil and gas facilities and the behavior of their respective emissions.[4]

Landfill gas is highly variable in its generation rate and characteristics, depending on the operational phase of the landfill. This is exacerbated by the fact that construction is nearly constant during the course of a landfill's existence. To provide uninterrupted essential public services, new cells must be built to accommodate expected waste, while existing cells must be filled, and older cells must be closed. As a result, topography is constantly changing, rendering the circumstances under which landfill gas may be released or escape at MSW landfills likewise variable and complex. Unlike oil and gas facilities, topographic challenges may create above-the-surface fugitive gas migration features that are not well understood or identified via remote measurement, and may not necessarily reflect acute operational releases. Unlike a leak at an oil and gas facility, the possible sources of methane at a landfill are difficult to pinpoint with accuracy, and are affected greatly by diurnal and atmospheric factors, which limits the ability to "find and fix" such emissions on a contemporaneous basis.

To the extent that the LMR would seek to prescribe corrective actions for responding to a reported release event, WM is concerned that the possibility of supplanting site-specific solutions with a one-sized fits all mandate creates a risk of overburdening and frustrating landfill operators' ability to respond effectively to site conditions. Relatedly, the timing of implementing and completing corrective actions under the existing regulatory schemes is already variable and complex—to add another layer as it relates to these types of events would further delay response efforts and should therefore be carefully contemplated as part of LMR development.

Perhaps most importantly, remote measurement technologies are still in the early stages of development and cannot reliably be expected to both detect and quantify large emission events at landfills. Certain aerial technologies require ideal meteorological conditions or else are prone to uncertainty. Others have proven to be promising in detecting emissions but at burdensomely high costs. Moreover, the reliability of these measurement technologies appears to have been oversold, particularly as predictors of hourly, annualized or other emission rates extrapolated from isolated detections. We have significant reservations about the propriety of methodologies for reducing one or more remote observations to an assumed emission rate based on very limited data sets; especially where observations by WM and others tend to show that more observations would likely lead to more agreement between reported and observed values.[5]

[4] NWRA 2024, pp 3-5, 11-17

[5] *See* ***Attachment A*** and ***Attachment B*** for more information on the shortcomings of advanced technologies.

Should the technology approval criteria be the same for landfills as for oil and gas?

CARB should implement a process to approve advanced measurement technologies for any use under the LMR (*i.e.*, emissions detection, quantification, or extrapolation into annual emission rates) and should require a very high standard for any such demonstration, given the complex nature of landfills and landfill gas emissions, similar to the approval process for technologies to be used in the Super Emitter Program under US EPA's Oil and Gas Methane Rule.[6] CARB's process should allow for the qualification of alternative test methods that can be utilized for compliance purposes even after the rule has become effective. This process allows for the continued development of appropriate technologies without rushing to implement emerging technologies into regulatory programs before they are sufficiently ready. In establishing this process, CARB should prioritize peer-reviewed scientific studies to provide justification for approval of any advanced technology for any use under the LMR. This is especially important for verifying and standardizing technologies for emissions detection, quantification, and extrapolation into annual emission rates as no current validated reference method exists.

Should the notification contents (estimated plume origin, image, etc.) be the same for landfills as for oil and gas?

Satellite technologies are incapable of attributing detected plumes to specific equipment types, facilities, or processes in an automated and reliable manner. Carbon Mapper describes its attribution process as one considering two criteria: "high concentration—typically a spatially tightly constrained area of maximal constrained area of maximal concentration, indicative of a large gas release," and "plausible RGB/GIS infrastructure."[7] Carbon Mapper attributes plumes to "sectors" rather than specific areas within the site. At this time, Carbon Mapper is the only approved third-party certifier under US EPA's Oil and Gas Super Emitter Program, and out of seven alleged super emitter events reported since the Program's inception, it does not appear that EPA has been able to confirm any of Carbon Mapper's attributions.[8]

These shortcomings are especially acute when it comes to landfills, which vary in topography, operational phases, and weather effects. Moreover, landfills are often located near oil and gas facilities, which may further complicate accuracy in methane detection. Researchers have explicitly stated that they may "misallocate emissions to the [studied MSW landfill] instead of to co-located oil and gas operations."[9]

[6] 40 C.F.R § 60.5398b(d)
[7] Carbon Mapper. 2023. *Carbon Mapper Quality Control Description Document*. "Volume 1: Methane and Carbon Dioxide Detection." https://assets.carbonmapper.org/documents/Carbon-Mapper-Plume-Dection-Quality-Control-Public.pdf (accessed January 24, 2025). pp 5-6.
[8] https://echo.epa.gov/trends/methane-super-emitter-program/data-explorer
[9] Nesser et al. 2024. High-resolution US methane emissions inferred from an inversion of 2019 TROPOMI satellite data: contributions from individual states, urban areas, and landfills. *ATMOSPHERIC CHEMISTRY & PHYSICS*, 5069, 5079.

What, if any, activities should be exempt from operator monitoring?

Well drilling, trenching, raising, and construction should be exempt from monitoring because these are essential daily functions of gas collection and control system operation, the safety and efficiency of which are paramount. WM's highly trained personnel employ best practices to complete these activities as protectively and safely as possible. Monitoring during these operations will not provide valuable data to the agencies, because these activities are necessarily limited in time and undertaken in a manner that seeks to minimize fugitive emissions to the greatest extent possible.

Alternative Technology for Leak Screening

Should the technology be required to have at least one clear advantage over the current LMR procedure (e.g., higher frequency, better coverage)?

See below – EPA's OTM/ALT process involves a determination of "the same or greater stringency." The technologies may provide additional tangential benefits such as the ability to monitor more acreage in less time or monitor areas that are unsafe or unreachable during traditional walking SEM, performed in accordance with Method 21.

What criteria should CARB set for its review and approval process?

CARB should implement EPA's existing multi-step process for standardizing regulatory test methods applicable to leak screening and SEM. Test methods must first be designated as an Other Test Method ("OTM"), and then an Alternative Test Method, before EPA can point to it as a Reference Method for compliance purposes within the NSPS, EG, or NESHAP programs. To go from an OTM to an Alternative Test Method, the EPA must be assured that the test method alternative provides "a determination of compliance status at the same or greater stringency as the test method specified in the applicable regulation," which should be shown by including the results of a Method 301 (Validation of Pollutant Measurement Methods from Various Waste Media) validation and justification for not using the regulation's specified method, which compares the test method against a validated reference test method to determine the method's bias and collecting multiple or co-located simultaneous samples to determine the method's precision.

The only methodologies currently approved as Alternative Test Method to Method 21 so as to satisfy the SEM requirements under the NSPS/EG is ALT-150/OTM-51: *Approval to Use Unmanned Aerial System Application as an Alternative to Method 21 for Surface Emission Monitoring of Landfills.* Again, this method is vendor- and technology-specific, and only one vendor is available—CARB must ensure multiple technology vendors are available should these requirements be tied to compliance.

CARB could replicate this approval process in the LMR and continue to evaluate OTMs and Alternative Test Methodologies. However, once such technologies are approved for use, affected facilities must maintain flexibility to choose among them as site-specific considerations may warrant.

How many technologies/applications should we expect to receive?

There were 12 vendors at the EPA technology conference in October (drones, fixed sensors, handheld devices, aerial devices, satellites). The Controlled Release Study evaluated 16 combinations of vendors and methodologies for quantification and detection.

Should landfill operators be able to apply in addition to technology providers?

Yes; landfill operators will have the most accurate information as to which technologies have worked the best in real-world conditions.

Areas Excluded from Surface Emissions Monitoring

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?

Fixed, ground-based sensors present a promising option to monitor emissions from the working face and/or construction areas across MSW landfills. However, as evidenced in the EREF Controlled Release Study, fixed sensors have detection capabilities at 0.1 kg/hr or below, but their capabilities are highly dependent on ideal wind and meteorological conditions during daytime hours.[10] Fixed sensors designed for oil and gas facilities will need to be reworked to suit landfill applications.

Surface Emissions Monitoring Frequency

What alternatives could staff consider besides quarterly monitoring for closed areas under final cover?

Operators could demonstrate through less frequent SEM/aerial measurements that closed areas do not have emissions leaks.

Component Leak Monitoring and Repair Plans

Do similar required plan elements as the Oil and Gas Methane Regulation make sense for landfills (procedures, sitemap, components subject, monitoring frequency, repair timeframes)?

Leaks at landfills are not the same as those at oil and gas facilities – they are harder to pinpoint, and therefore harder to "find and fix." Oil and gas leaks occur at a constant rate under significant positive pressure. Landfills are maintained at negative pressure, so leaks are released at near-atmospheric pressure. Landfill leaks are ephemeral and influenced by landfill-specific factors like construction, topography, atmospheric and meteorological conditions, operational fluctuations, diurnal and seasonal considerations, etc. Some landfill emissions are intrinsic and cannot be avoided; whereas all emissions from oil and gas facilities are fugitive and can be mitigated.

[10] Hossian et. al 2024, p. 64

The differences between leaks and emissions at MSW landfills and oil and gas facilities are detailed at length in NWRA's response to EPA's RFI. For convenience we have referenced the following:

> *Oil and gas sector emissions are generally easier to detect than landfill gas emissions. First, as noted earlier, oil and gas emissions themselves tend to be either: routine or continuous leaks from processing equipment that (as an equipment class) can be known to leak (i.e., compressor shaft seals, flange connections, etc.); or some kind of non-routine, episodic failure in a location that may or may not be prevalent. For the first type, routine methane detection of processing equipment and flange attachments would likely identify any emission points, leading to precise corrective action, as they are required to do. Because these emissions usually happen as part of a mechanical process at relatively stable and continuous process status, their emission rate can be relatively easily quantified. For episodic emissions, monitoring—such as continuous fence line and periodic drone, plane, or satellite scanning—can give some assurance that these events will be detected, or that no non-routine emissions have occurred. But again, because the oil and gas operations are happening at known/recorded process status, once identified the leak event can be somewhat readily quantified. These types of monitoring are also useful due to the geographic nature of oil and gas operations; there are many facilities that are not regularly manned, so fence line and aerial campaigns can collect data very efficiently.*
>
> *Landfill emissions, however, are neither so reliably detected nor quantified. First, there are generally two areas of landfill emissions: emissions that are recently referred to by EPA as "intrinsic" emissions, such as those that relate to the landfill working face, maintenance activities, and diffuse emissions through landfill cover;* [11,12] *and discrete emission sources such as cover system failures, gas extraction issues, and infrastructure leaks, flare issues, or venting due to malfunctions (including both install and failure).*
>
> *Intrinsic emissions are ephemeral and vary significantly depending on a number of factors, including construction activities, topography, weather, barometric pressure, and diurnal and seasonal considerations. Due to the diffuse and variable nature of landfill emissions, fence line type sensors can have variable reliability in detecting and locating, and low emissions rates are challenging for plane and satellites to detect. Episodic "fugitive" emissions can be somewhat easier to locate, as operators are typically immediately aware of or become aware of discrete infrastructure failures through olfactory and visual inspection as well as routine gas collection and control system monitoring.* [13]

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[11] US EPA. 2024. "Airborne Survey - Use of Next Generation Emission Measurement (NGEM) Technology to Detect and Measure Landfill Methane Emissions." November 19, 2024. https://www.epa.gov/air-research/air-climate-energy-research-webinar-series.

[12] Members of EPA's Office of Research and Development ("ORD") have referred to these emissions as "intrinsic" or "expected" in that they can be partially controlled but never eliminated. See US EPA 2024, slide 13

[13] NWRA 2024, pp. 3-5, 11-17

Wellhead Monitoring to Align with US EPA Emissions Guidelines

The federal regulations currently require certain operational standards applicable to GCCS: (1) negative pressure well-head parameter; (2) temperature well-head parameter; and (3) nitrogen or oxygen measurement parameter.

Temperature is not the most informative parameter to determine compliance and should not be added to the LMR. Interior wellheads within the GCCS are required by regulation to be operated with a landfill gas temperature less than 131 degrees Fahrenheit unless the operator can demonstrate that elevated temperature neither causes fires nor significantly inhibits anaerobic decompositions by killing methanogens.[14] 40 C.F.R. Section 60.763(g) currently requires corrective action where monitoring demonstrates that the operation requirements with respect to pressure and temperature are not met. Pursuant to recent changes to the federal regulations, including under the Federal Plan requirements set forth at 40, part 62, subpart OOO (*Federal Plan Requirements for Municipal Solid Waste Landfills That Commenced Construction On or Before July 17, 2014 and Have Not Been Modified or Reconstructed Since July 17, 2014*), landfills should be able to opt-in to the higher temperature threshold of 145 degrees Fahrenheit, subject to the requirement to conduct enhanced monitoring under certain circumstances. Importantly, neither temperature standard captures the challenges posed by site-specific factors that may affect temperatures within the waste mass at landfills. In particular, the temperature of flowing LFG varies widely under normal landfill conditions, depending on the intensity of the biological reaction that generates it. To reduce temperatures and meet federal operational standards, operators often mut reduce or turn off gas flow to certain wells, which undermines the optimal operations of the GCCS and potentially increases emissions that cannot be rectified by installing more wells.

The temperature regulations are ultimately intended to be founded in fire prevention, but evaluating the amount of carbon dioxide is more important in determining whether there is a subsurface oxidation ("SSO") event in a well. Carbon dioxide stain tubes are a timely indicator of SSO and eliminate the need to send samples to a lab to determine whether the cause of high temperature at the well-head is a result of a subsurface fire. Implementing requirements to install carbon dioxide tubing rather than temperature-triggered corrective action would be a more practical way to target subsurface fire threats.

The federal regulations requires monthly monitoring of the concentration of nitrogen or oxygen at wellheads.[15] Monitoring is the appropriate control, rather than corrective action measures applicable to nitrogen and oxygen levels, because in the event landfill owners or operators opt to install GCCS earlier than is currently required, they will likely implement horizontal collectors, which allow atmospheric, oxygen-rich air to be pulled into the waste mass. Other instances of high oxygen are not indicative of a subsurface fire—rather, it is more likely that the well is pinched or collapsed or has a loose fitting. Otherwise, decomposition of MSW produces primarily methane and carbon dioxide, rendering corrective action associated with oxygen a red herring with no real preventive impact with respect to subsurface fires. Subjecting landfills to corrective action on such a basis, therefore, would be counterproductive.

[14] 40 C.F.R. § 60.763(c)
[15] 40 C.F.R. §60.766(a)(2)

Potential Changes to Operational Requirements

Gas Collection System Downtime and Best Practices

In reference to the slide on page 52 of staff's presentation, included below as ***Figure 2***,[16] the fraction due to downtime seems high compared to WM's observations and internal data. It would be helpful to further discuss the source and definitions used to create this chart. For example, how many observations were non-detects? GCCS downtime can result in multiple "leaks" on the site because gas follows paths of least resistance, but in general, this type of emission is larger in magnitude but much shorter in duration because the downtime is typically resolved within a day, versus "uncontrolled areas" which are more likely to cause persistent emissions.

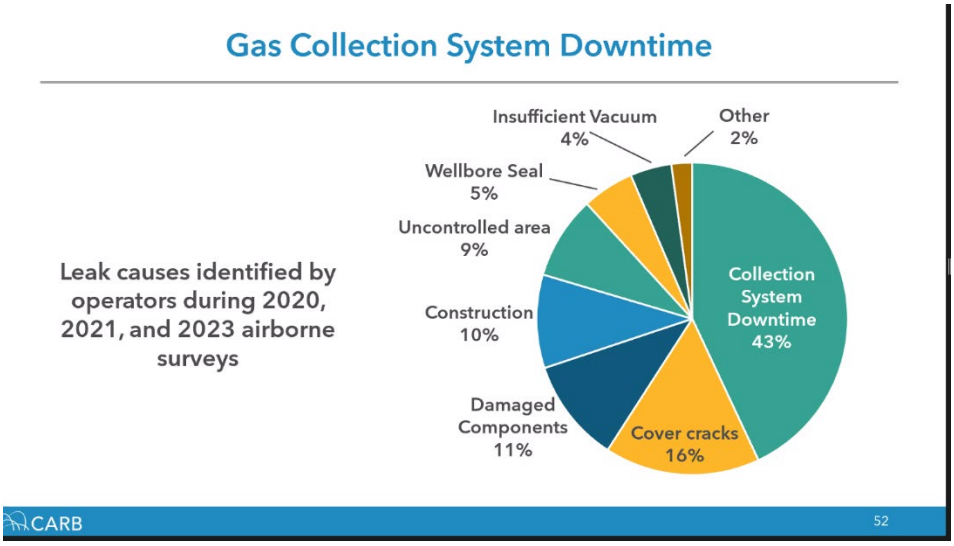

Figure 2 (CARB 2024)

Declining Gas Generation

<u>What criteria do operators use to determine when a collection well should be decommissioned?</u>

Decline of landfills gas generation rates is expected over the lifespan of a landfill. However, declines may be variable in terms of rate of decline and locations within the landfill. For example, a landfill which has an overall NMOC emission rate greater than the removal threshold may nonetheless contain one or more areas where landfill gas generation rates have declined significantly, such that the GCCS cannot function as intended in those areas. Operational flexibility is the most appropriate step to address these areas with declining flows. Without it, maintenance of GCCS in areas with declining flows has caused owners/operators to incur significant hardship, including an inability to comply with wellhead parameters, risk of pulling ambient air into the GCCS (and damaging the system), and significant use of fossil fuels to supplement and maintain flare operation.

[16] CARB. 2024. Public Workshop on Potential Updates to the Landfill Methane Regulation. Staff Presentation. https://ww2.arb.ca.gov/sites/default/files/2024-12/Staff_Presentation_on_Potential_Updates_to_the_Landfill_Methane_Regulation.pdf. December 18, 2024. Slide 52.

Operators need flexibility in managing non-producing areas (*e.g.,* areas with declining or no production of LFG). The LMR should offer flexibility by (1) allowing for capping, removing, or decommissioning portions of GCCS in non-producing areas; and (2) permit the use of SEM to demonstrate that capping, removal, or decommissioning of a GCCS is appropriate based on site-specific surface methane concentrations.

What maximum gas collection rate thresholds would be appropriate for semi-continuous operation and for permanent shutdown, respectively?

CARB should consider allowing venting as an Alternative Compliance Option where collection rate is reduced due to lower methane content. Environment and Climate Change Canada (ECCC) recently proposed regulations applicable to MSW landfills that would allow for the venting of LFG "in portions of the landfill that are under final cover, if the methane concentration in landfill gas in the venting location is below 25% by volume in eight consecutive measurements taken quarterly with an instrument referred to in paragraph 19(1)."[17]

WM supports regulatory flexibility that allows for venting in areas with reduced methane concentration, but asked ECCC in its comment letter (attached hereto as ***Attachment C***) to consider a higher methane concentration threshold than 25% due to safety concerns. Specifically, WM stated that "[a]t 25%, and with the expectation that the closed landfill site would be required to continue to combust the methane through a flare, the danger of explosion and the need for additional/supplemental propane increases . . . at 25%, WM would need to procure and store significant amounts of propane in order for the collection system flare to be functional and safe."[18]

Advanced Monitoring and Automated Wellhead Tuning

What factors have operators considered in choosing whether to use automated well tuning?

WM is not opposed to implementing automated wellhead sensors on a limited, voluntary extent. WM has deployed automated wellhead equipment in research and has found that they can be useful in certain circumstances, but not in all wells or all facilities. For example, WM has observed that there is a potential for these monitors to counter-influence other wells if installed in too many wells in close proximity.

[17] Canada Gazette, Part I, Volume 158, Number 26: Regulations Respecting the Reduction in the Release of Methane (Waste Sector), § 7(2)(c).
[18] WM. 2024.

In addition to our comments above, we note that the LMR intersects with some Air District requirements for regulated facilities. Where there are overlaps in regulatory requirements, these must align so as to not delay timelines for Air District permitting at landfills (the majority of which are for emissions-control technologies).

Lastly, we note that CARB plays an important role in facilitating demand for captured landfill gas to minimize flaring and maximize generation of low-carbon fuels and renewable electricity. We look forward to working with CARB and its sister agencies to build pathways to better incentivize beneficial reuse of landfill gas to meet Scoping Plan objectives for non-fossil generation and deployment.

If you have any questions related to these comments, please contact me at cwolfe@wm.com.

Sincerely,

Christine Wolfe
Director of Government Affairs, California, Hawaii, and Nevada

Cc:
Zoe Heller, CalRecycle
Tung Le, California Air Pollution Control Officers Association

Attachment A: National Waste and Recycling Association Response, Use of Advanced and Emerging Technologies for Quantification of Annual Facility Methane Emissions under the Greenhouse Gas Reporting Program; Docket ID No. EPA-HQ-OAR-2024-0350 (NWRA 2024)

Attachment B: WM Response, Use of Advanced and Emerging Technologies for Quantification of Annual Facility Methane Emissions under the Greenhouse Gas Reporting Program; Docket ID No. EPA-HQ-OAR-2024-0350 (WM 2024a)

Attachment C: WM Response, Canada Gazette, Part I, Volume 158, Number 26: Regulations Respecting the Reduction in the Release of Methane (WM 2024b)