April 17, 2026

Dr. Steven Cliff, Executive Officer
California Air Resources Board
1001 I St.
Sacramento, CA 95814

RE: Proposed 15-day Amendments to the Landfill Methane Regulation

Dear Dr. Cliff,

Thank you for the opportunity to provide comments on the proposed 15-day amendments to the Landfill Methane Regulation (LMR). Waste Management of California, Inc. (WM) provides waste and recycling collection, processing, and disposal services to communities across California, supported by a network of landfills subject to the LMR.

The amended LMR will result in unprecedented monitoring, recordkeeping, and reporting of a variety of data generated at landfills across California. CARB will take on a new level of oversight over systems that are also regulated by other agencies, resulting in an urgent need for interagency coordination and streamlining of compliance approaches to ensure operators are not caught in the middle of interagency disputes. Given that, even under the current LMR, operators could be subject to daily penalties for non-compliance, CARB must ensure that responsible operators investing in compliance – striking the difficult balance of controlling both methane and oxygen – while operating critical public infrastructure safely and efficiently are not unfairly penalized.

We would like to thank you and your staff's engagement and willingness to meet to discuss the proposed rule. During the 45-day comment period, WM submitted comments that urged the California Air Resources Board (CARB) to adhere to five major principles with the intent of achieving balance between feasibility, cost-effectiveness, asset protection, and a desire to advance innovation:

- The Regulation must not constrain CARB, sister agencies, and operators to address and manage site-specific conditions associated with subsurface elevated temperature (SET) events.
- The Regulation should not require costly additional data collection and reporting unless such data is necessary and useful to diagnosing conditions at the landfill.
- The Regulation must not conflict with federal, state, and local landfill regulations that are intended to reduce emissions from landfills.
- The Regulation must accommodate the landfill's core functions and best practices for health and safety.
- The Regulation should provide a framework for operators to use emerging technologies for purposes of finding and fixing discrete emissions.

WM submitted extensive feedback on specific provisions of the LMR with the intent to streamline administration of the rule. We would like to thank CARB for several elements of the 15-day rulemaking. First, the 15-day rulemaking does not require costly additional fenceline monitoring, which is not warranted for most facilities, where, in many cases, air monitoring already occurs, and which is more properly under the jurisdiction of local air districts. Second, we appreciate CARB making several changes responsive to concerns raised by WM that protect the spirit of the regulation while providing for greater practicality in implementation.

However, WM remains concerned that issues that were raised during the 45-Day comment period were not resolved in the 15-day rulemaking, and has concerns with some of the new items that have been added.

As a general matter, the voluminous data that the LMR would require be generated and analyzed as a result of the 15-day package will likely require staffing increases at landfills across California and, we imagine, at CARB and the Air Districts who share implementation responsibilities, raising costs for solid waste ratepayers in California. CARB has not yet provided adequate justification for the appropriateness of data collection required.

Wellhead Temperature Provisions

WM remains concerned that the LMR prescribes significant investigative and corrective requirements following a wellhead detection above 131°F, which significantly deviates from existing practice and will bring in many more wells and landfills than are currently subject to federal enhanced monitoring. Most critically, the LMR continues to lack a variance process that recognizes that individual wells may operate above 145°F for greater than 120 days within normal average CH_4/CO_2 and hydrogen ratios, demonstrating there is neither a subsurface oxidation event nor a SET event. We urge CARB to provide landfill operators a reasonable compliance pathway for wells where it can be positively demonstrated that elevated temperatures are not a symptom of a larger issue. Failure to include such a provision could result in violations being issued to landfills with wells that are otherwise operating within normal parameters.

WM remains concerned about requirements related to downwell temperature monitoring. While we think it is appropriate that the 15-Day changes rely on metrics other than solely temperature to govern the frequency of downwell temperature monitoring, our concerns about the extent of such monitoring required, from both a cost and a health and safety perspective, remain. The LMR takes an overly prescriptive approach to monitoring and reporting, which will create significant amounts of work for both operators and staff at the agencies responsible for enforcement. CARB has not provided sufficient justification for this prescriptive approach. Furthermore, the economic analysis does not fully account for the initial expense and recurring maintenance costs for equipment that could be used to conduct downwell monitoring at the frequency required.

Surface Emissions Screening Procedures for Unsafe-to-Walk Surface Areas

The LMR continues to lack necessary flexibility to address worker health and safety concerns for surface emissions monitoring and corrective action in unsafe-to-walk surfaces. WM strongly urges CARB to provide landfill operators a process by which the operator may notify the Executive Officer if conditions exist which pose risk to worker health and safety which would preclude the operator from conducting handheld SEM or corrective action and provide a reasonable timeline where those risks will no longer preclude the operator from performing the required actions.

Regulatory Overlap

The LMR will still result in significant overlap with other regulatory programs that control the same issues – be it gas temperature, cover integrity, design plan preparation, or a host of other items. There must be clarity between CARB, US EPA, Air Districts, CalRecycle, Local Enforcement Agencies, and Regional Water Quality Control Boards as to which agency is responsible for enforcement where there are overlapping mandates. CARB cannot solve this issue on its own; however, the LMR should not exacerbate already problematic jurisdictional conflict. The regulatory language itself should make this clear by clearly pointing to regulatory standards referenced by the LMR, rather than relying on memorandums of understanding and enforcement guidance.

Additional Comments

- 95464(b)(1)(1)(2): WM appreciates the exclusion of downtime due to catastrophic events beyond the control of landfill operators but urge CARB to raise the calendar year downtime limit to 240 hours for all landfills no matter the annual GCCS methane collection volume.
- 95464(c)(2): WM appreciates the reduction of the well decommissioning methane trend provision to three years, but continue to urge CARB to reduce this provision to one year to allow for the expeditious removal of low-functioning wells.
- 95464(d): WM urges CARB to align conditional shutdown provisions with NESHAP by requiring operation for 15 years in total and reducing SEM history from three years to one year.
- 95469 – Throughout: WM urges CARB to consolidate corrective action and re-monitoring requirements into a single deadline to align with NESHAP.
- 95469(a)(1)(B)(3): WM urges CARB to remove the notification requirement as corrective action will be noted in quarterly reports. On demand notification will overwhelm the enforcement agency. Additionally, we urge CARB to include a provision to allow a landfill owner or operator to contact the Executive Officer if there are circumstances out of the operator's control that result in delayed installation such as non-availability of equipment or engineers.

- 95469(a)(1)(C): WM urges CARB to move to annual monitoring as every three-quarter monitoring will create unnecessarily complex scheduling and budgeting for landfills with demonstrated compliance records.
- 95469(a)(1)(D): WM urges CARB to provides operators with demonstrated history of compliance opportunity to correct deficiencies within ten calendar days before resumption of quarterly SEM.
- 95469(b)(2)(A)(1): WM urges CARB to reduce the monitoring area to a 100 meter radius to be consistent with CARB's Oil and Gas Regulation.
- 95469(e)(4)(D): It is not standard industry practice for a landfill to have a landfill gas system operations and maintenance manual.
- 95471(k): WM urges CARB to be less prescriptive in the LMR as to the multiple options for remedies offered in response to the cover integrity analyses. Operators should be able to prepare alternative remedies for staff review. It is unclear what is required and what is optional.

Conclusion

WM remains committed to working with CARB to ensure the emission goals of the LMR are achieved without further diminishing landfill capacity in California and ensuring that California's remaining landfills are affordable for solid waste ratepayers. WM also reiterates our interest in continuing to work with CARB and interested stakeholders as remote detection technology evolves to understand how it can be implemented effectively.

Unfortunately, WM continues to feel that the rule will result in significant costs without comparable benefits. WM will continue to work with CARB and its sister agencies at the federal, state, and local level to analyze the data generated through the LMR and other programs to determine what data is most useful in diagnosing issues at landfills and what, if any, is the most useful in preventing expensive corrective action measures.

We are attaching our 45-day comments as reference and additional background. Should you have any questions on our comments, please feel free to contact me at cwolfe@wm.com.

Thank you,

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

Attachment 1: WM 45-Day comments on Landfill Methane Rule (November 10, 2025)

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Sacramento, CA 95814
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November 10, 2025

Clerks' Office
California Air Resources Board
1001 I Street
Sacramento, California 95814

Submitted electronically via online comment docket

RE: WM Comments on 45-Day Draft Landfill Methane Regulation (September 23, 2025)

Dear Quinn,

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) September 23, 2025 Draft Landfill Methane Regulation (LMR, Draft Regulation). WM provides waste and recycling collection, processing, and disposal services under contracts with local jurisdictions across California. The waste and recycling programs we offer are supported by California's network of regional landfills, many of which WM owns and operates.

CARB's LMR is a component of the State's multipronged strategy to reduce GHG emissions in California—as the Initial Statement of Reasons (ISOR) notes, "the purpose of the LMR is to reduce emissions of methane from MSW landfills."[1] When CARB workshopped the Draft Regulation in 2023 and 2024, CARB indicated that the intended scope of the proposed amendments would address the feasibility of further reducing methane emissions from landfills based on the increase in data collected by satellites, revising current operational best practices, and utilizing emerging methane detection technologies. While the Draft Regulation includes amendments with such scope, it also includes significant amendments attempting to address the operation and monitoring of landfill gas collection and control systems (GCCS), which has historically not been CARB's area of jurisdiction.

Landfill capacity is diminishing in California, particularly in the greater Los Angeles region. Recognizing that the State is working towards ensuring that all waste can be managed through recycling and composting infrastructure, there are significant barriers to achieving this outcome in the near term.[2] **California cannot afford to lose any more regional disposal facilities – and avoiding unintended consequences requires ensuring California's remaining landfills be affordable for solid waste ratepayers.**[3]

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[1] CARB. 2025a. Public Hearing to Consider the Proposed Amendments to the Regulation on Methane Emissions from Municipal Solid Waste Landfills. Staff Report: Initial Statement of Reasons. p. ES-1. September 23, 2025.
[2] CalRecycle. 2025. California's Zero Waste Plan. Draft. September 2025. https://calrecycle.ca.gov/zerowasteplan/.
[3] See discussion of disposal costs as a barrier to resolving illegal dumping across rural, suburban, and urban communities in Alameda County Illegal Dumping (ACID) Task Force. 2025. ILLEGAL DUMPING SOLUTIONS SURVEY FINAL

It is with the interest of achieving this balance between feasibility, cost-effectiveness, asset protection, and a desire to advance innovation that we offer the following comments, which can be summarized as follows:

- **The Regulation must not constrain CARB, sister agencies, and operators to address and manage site-specific conditions associated with SET events.**

- **The Regulation should not require costly additional data collection and reporting unless such data is necessary and useful to diagnosing conditions at the landfill.**

- **The Regulation must not conflict with federal, state, and local landfill regulations that are intended to reduce emissions from landfills.**

- **The Regulation must accommodate the landfill's core functions and best practices for health and safety.**

- **The Regulation should provide a framework for operators to use emerging technologies for purposes of finding and fixing discrete emissions.**

In addition, a summary of comments specific to alignment with relevant regulations and reflecting operational feasibility is provided in ***Attachment A***.

1. Background

a) Existing Regulatory Landscape

Federal, state, and local agencies regulate and permit California's landfills through regulatory regimes that are structured to ensure that the landfills serve their intended purpose of protecting human health and the environment from the effects of solid waste that would otherwise be illegally disposed, dumped, or otherwise mismanaged. Landfills accomplish these environmental objectives through deploying complex systems of engineering controls. These controls include the construction, operation, and ongoing maintenance of gas collection and control systems (GCCS) and leachate collection systems that collect and contain gas and liquids that are generated through the natural decomposition of waste. The GCCS is an interconnected series of gas wells and pipes that

REPORT – 2025. p. 9. https://district4.alamedacountyca.gov/wp-content/uploads/sites/14/2025/10/Illegal-Dumping-Solutions-Report_FINAL.pdf.

extract gas from the waste mass and direct the gas to a control device, such as a flare, for destruction, and/or an energy recovery device, for the generation of renewable energy.

In California, the construction, operation, maintenance, and decommissioning of landfills' GCCS are subject to federal, state, and local laws regulating air emissions. These include, primarily, US EPA's New Source Performance Standards (NSPS) and National Emissions Standards for Hazardous Air Pollutants (NESHAP) and local regulations adopted by each Air District. CARB's existing Landfill Methane Rule regulates some elements of GCCS operation. Most of WM's landfills in California are permitted by the Air District through a Title V permit that incorporates US EPA's requirements. Many Air Districts have memorandums of understanding with CARB to enforce CARB's existing LMR.[4]

A key element of US EPA's program is the recognition that there may be specific conditions at individual wells that may require more time to resolve than is allowed by the rule. The concept of a higher operating value (HOV) has allowed operators to come into compliance and is an important element of the federal program. Agency responsiveness to requests from operators for HOVs is an important element of ensuring that there are feasible pathways to compliance while ensuring appropriate regulatory oversight.

b) Methane Detection Research

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 target beneficial use of 65% of our captured landfill gas by 2027.[5] 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 technology providers to evaluate satellite, aircraft, drone, fixed, and portable sensors and analytics that support the future development of a comprehensive landfill emissions detection and 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

[4] WM understands these MOUs would need to be updated for Air Districts to enforce the revised LMR.
[5] WM. 2025a. WM 2025 Sustainability Report. https://sustainability.wm.com/downloads/WM_2025_Sustainability_Report.pdf.

events. A summary of our observations is described further in our November 24, 2024 comments.[6]

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. WM has been and will continue to be an active participant in research and development initiatives targeting emerging methane detection technologies. WM has hosted several controlled-release events at its closed Petrolia Landfill in Canada, referred to as the Simulation Facility for Landfill Emission Experiments ("SIMFLEX"). SIMFLEX is a 60-acre landfill with 11 computer-controlled point- and area-sources across 20-acres with capacity to emit up to ~840 kg/hr of methane. Through the controlled release events to date, FluxLab, with support from the Environmental Research and Education Foundation ("EREF") has evaluated numerous vendor combinations and methodologies for performance in detecting and quantifying controlled releases of methane during upwards of 71 experiments. NWRA discussed the results of the first controlled release study at SIMIFLEX in 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). NWRA's response is included as ***Attachment B***.

The second controlled release event took place at SIMFLEX in November 2024. FluxLab focused on the effect of varying weather and wind conditions on measurements in relation to site topography and meteorological influences. The preliminary results are posted on FluxLab's webpage. FluxLab, *Simulation Facility for Landfill Emission Experiments (SIMFLEX)*, https://fluxlab.ca/simflex/ (last visited Oct. 16, 2025). The Final Report for the second controlled release event is under review and expected by end of 2025.

Two additional controlled release campaigns were coordinated at SIMFLEX earlier this year—one from May 12 through 18, and another from June 2 through 15. The first campaign focused on refining the quantification and detection methodologies of eddy covariance towers, UAV-based, vehicle-based, and ground-based systems. The second campaign concentrated on "releasing rates useful for improving satellite- and aircraft-based methane detection technologies," with the objectives of:

[6] WM. 2024. WM comment letter to EPA re: **Docket ID No. EPA-HQ-OAR-2024-0350.** November 27, 2024

- Investigating the impact of area sources on satellite detection capabilities;
- Assessing how weather conditions and atmospheric dynamics influenced satellite-based methane measurements; and
- Examining the relationship between emission rates and spatial distribution in determining satellite quantification accuracy.

The preliminary results are not yet posted to FluxLab's website, but WM will share them with CARB as they become available. FluxLab intends to conduct additional controlled release events in January 2026.

The controlled release events and subsequent data analysis indicate significant improvements with detection accuracy especially with drone technology. Work is also proceeding on developing an open source standard method and procedure for drone surface emissions monitoring with hopes of formal regulatory submittal next year.

In a recently published study by *Krause et al.*, the quantification capabilities of satellite technologies were evaluated across 60 of WM's largest active MSW landfills from 2022 to 2024. *See* Krause et al., *A High Resolution Satellite Survey of Methane Emissions from 60 North American Municipal Solid Waste Landfills*, Envt'l Sci. & Tech. (July 15, 2025). As a result, *Krause* found that the emissions quantified using satellite technologies in conjunction with site-specific factors aligned least closely with the subpart HH quantification methodologies, which were finalized in April 2024 in reliance on the alleged quantification capabilities of satellites. 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. For more information on the results of the *Krause* study and WM's internal analysis of the data collected, see WM's Response to EPA's RFI, EPA-HQ-OAR-2024-0350-0058, attached hereto as ***Attachment B***.

c) Subsurface Elevated Temperature Events

The ISOR refers to a subsurface elevated temperature (SET) event as "a general term used to describe when temperatures of gas withdrawn from the waste mass are found to be above regulatory thresholds."[7] WM's many years of experience in monitoring and correcting conditions at our more than 300 landfills and 30,000 gas wells across the country indicate that it is important to differentiate between two circumstances leading to

[7] CARB 2025a, p 126

elevated subsurface temperatures within a landfill: 1) near-surface subsurface oxidation (SSO) events that, if unmitigated, can lead to subsurface fires, and 2) what the ISOR describes as "a heat-releasing chemical reaction deep within [a] landfill,"[8] which industry has traditionally referred to as "elevated temperature landfills," or ETLFs. The characteristics of these events are different and need to be managed as such.

The design of federal, state, and local regulations related to temperature thresholds has stemmed from control of SSOs, because these events have occurred for a longer period of time within the industry and are a predictable occurrence of normal landfill operations. ETLFs are rare but can result in serious consequences, as described in the ISOR, if not managed properly.

WM experienced a large ETLF at one of our landfills on the East Coast in 2015, around the same time our competitors were first seeing these events occur. As ETLFs hadn't been experienced up to that time, WM partnered with academic experts to study ETLFs to determine appropriate monitoring, management, and prevention strategies. As a result of external and internal research,[9] WM routinely monitors parameters that have been observed in association with ETLFs, takes proactive measures at facilities exhibiting characteristics that could result in an ETLF, and deploys management activities at confirmed ETLFs.

Two of our most important findings bear on the design of the Draft Regulation:

- We have been actively managing the first ETLF WM experienced back East for the last decade. Parameters defining the event have stabilized over time; however, **temperatures are still elevated 10 years later**.
- Preventing the spread of the reaction area relies upon aggressive removal of gas and liquids from the area. **Regulatory approaches that incentivize or require wells to be turned off run directly counter to preventing spread of a reaction through a landfill**.

ETLFs are a relatively new phenomenon within the industry, and because they are quite rare and occur deep within the waste mass, they are more difficult to study relative to other landfill conditions. As far as WM is aware, we are the only landfill operator with an active research program dedicated to ETLFs; likewise, there are only a handful of academics who have worked on ETLFs. The limited published research on ELTFs should demonstrate that

[8] Ibid

[9] See ***Attachment C*** for a list of published works WM has utilized.

we do not definitively understand everything about these events.[10] Regulatory design should reflect this uncertainty by not presuming cause and effect.

WM is aware that the SET expert cited in the ISOR believes that preventing SSOs can prevent ETLFs. WM notes that we dispute the premise that SSOs cause ETLFs, given that these events occur at depths where oxygen would not reach, as oxygen would have been expended nearer the surface. Regardless, WM believes that both SSOs and ETLFs need to be prevented. We believe we share consensus with regulators on the following:

- Landfill operators should prevent and fix oxygen intrusion.
- Landfill operators should maintain sufficient gas collection and control capacity.
- SSOs can and should be corrected within several months—although allowances need to be made for unique circumstances, as contemplated in the federal regulations.
- Trends consistently showing large temperature jumps indicate conditions that need further investigation. Regulators need to be aware that these trends are being observed.
- Wellhead temperature readings between 131-145F do not necessarily indicate abnormal conditions. Trends are more important, as are other parameters like gas quality. As stated in the ISOR:

> "Thalhamer et al. (2025) suggests that an elevated landfill gas temperature (between 131 and 145°F) that is sustained but stable (not increasing) and exhibits no other indicators of a reaction (e.g., low carbon monoxide, and stable gas composition) may be lower risk of further increasing temperature than a well that increases in a matter of weeks but has not surpassed 131°F."[11,12]

- If there are consistent readings showing wellhead temperatures 160-170F with inhibited methane production (methane/carbon dioxide ratio of less than 1) and physical indicators like settlement, a more comprehensive, multiagency approach is warranted to ensure that the appropriate actions are being taken to prevent the conditions that the ISOR describes on page 126. This includes drilling gas wells

[10] As further evidenced by the limited citations presented in the ISOR's justification for the wellhead monitoring parameters.
[11] CARB 2025a p. 66
[12] WM does not agree that temperature changes resulting in wellhead temperatures below 131F should be cause for alarm, nor that changes should be monitored weekly unless wellhead temperatures are 160F+. We agree that directional changes are more important than absolute values.

deep enough to reach a potential subsurface reaction area, which requires specialized training, equipment, and safety protocols.

It is with the spirit of ensuring the proper management tools are available for both SSOs and ETLFs that WM provides its comments on the wellhead monitoring requirements that have been added to the Draft Regulation.

2. Regulatory Amendments

a) The Regulation must allow for a pathway for deep subsurface chemical reactions to be managed.

The Draft Regulation is focused on the prevention of situations that could adversely affect the GCCS. As noted in the ISOR, "the LMR is not designed to, nor could it, eliminate SET events, the measures staff proposes in the LMR require intensive monitoring and proactive responses to changing conditions to ensure proper maintenance of the GCCS."[13] While we believe significant amendments are needed to those sections of the Draft Regulation to meet this stated objective, we agree that the LMR should be focused on *prevention*, rather than *remedy.* But it does not appear that there is any mechanism to transition from the LMR prevention regime to a management regime, should a deep subsurface chemical event occur despite regulator and operator efforts at prevention.

It is critical that landfill operators have the ability to manage the site-specific conditions that would occur with a deep subsurface chemical reaction, focused on management approaches that have been demonstrated to succeed, which, in many cases, would be hindered by the actions required by the LMR. For example, one of the management strategies WM has relied on is to drill many more wells—in some cases, four times as is typical – to form a barrier around the reaction and aggressively remove liquids and gas. These wells are all intentionally in the "hotter zone" of the waste, so they would likely exceed the temperature thresholds in the Draft Regulation. The wellhead monitoring requirements that are contemplated at those temperatures would interfere with, or prevent, these activities when they are most needed.

We do not think the LMR is designed to dictate management of these events, as no framework is provided that recognizes the extent of management needed or timelines known to be required for these types of events (years, not months). As such, the Draft Regulations should allow the Executive Officer to authorize a corrective action pathway for

[13] CARB 2025a p. 126

confirmed deep subsurface chemical reactions that would be overseen by CalEPA and its relevant boards and departments, including CARB. The Regulation could require regular reporting of progress to the EO as part of this corrective action pathway so there is maximum transparency into how the event is progressing.

b) The proposed wellhead monitoring requirements need to be revised to ensure appropriate oversight without punishing good actors and unnecessarily increasing costs to solid waste ratepayers.

The 45-Day package is the first time that stakeholders are seeing the proposed language on wellhead monitoring. WM understands that CARB is intending to impose more stringent monitoring requirements for the purposes of detecting, preventing, tracking, and correcting conditions characterized by higher temperatures. However, the Draft Regulation's wellhead monitoring requirements would create sisyphean tasks unnecessary to accomplish CARB's objectives. These would stack on top of what is already a(n overly) complicated web of federal, state, and local regulations – which, unless aligned, would all have different timelines for completion and standards of success. The ISOR has not provided sufficient justification for why these misalignments are necessary.

Having designed programs to monitor the tens of thousands of wells across our national landfill network, WM knows from experience that the frequency and type of wellhead data sought is not necessary to achieve the objectives of tracking potential SSO or SET events. The structure of monitoring program seems to suggest that – by providing a more rigorous regime for wells with repeat temperature or oxygen exceedances or positive pressure detections – operators failing to correct repeat issues will be subject to more oversight. WM does not disagree with this in concept; however, wellhead conditions that are not actually indicative of a more serious temperature issue should not be subject to the same punitive monitoring requirements, and CARB must recognize the conditions that do reflect a persistent issue.

Moreover, the monitoring provisions as proposed will impose unnecessary costs to both operators and the regulatory agency with oversight requirements, be that CARB or the Air District. WM anticipates that our workforce to conduct this work in the field and to analyze data could increase two- to fourfold, depending on the site. WM estimates that the costs to hire third-party contractors to do the field work ranges from $60-100/hr (CARB's Economic Analysis assumed $59/hr).[14] The costs of implementing the Draft Regulation will be incorporated into disposal rates for individual landfills, which are in turn paid by

[14] CARB. 2025b. Appendix B: Economic Analysis. Proposed Amendments to the Regulation on Methane Emissions from Municipal Solid Waste Landfills. September 23, 2025.

commercial/industrial customers, waste haulers contracted to jurisdictions, and/or local municipalities, who set waste and recycling rates paid by residents and businesses that incorporate the costs of disposal.

To arrive on a cost-effective regime, WM encourages CARB to revise the wellhead monitoring provisions to:

- Measure trends of temperature and gas constituents over periods of time and within adjacent, rather than individual wells, to allow for statistically significant trend analyses indicating degraded methanogenesis and to prevent requiring corrective action based on anomalies;
- Better align with existing regulatory requirements that require the same work;
- Significantly reduce the amount of downwell gas monitoring prescribed; and
- Allow for applications to the Executive Officer for extended time periods for individual wells.

i. Suggested Revisions to Wellhead Temperature Provisions

With respect to wellhead temperature, Section 95469(e)(3) of the Draft Regulation prescribes significant investigative and corrective requirements following a wellhead detection above **131° F.** Setting the compliance threshold at 131F significantly deviates from existing practice, which requires progressive monitoring at wellhead temperatures of 145F and 160F, and could bring in many more wells (and landfills) than are currently subject to NESHAP's enhanced monitoring.

In promulgating the NESHAP regulations applicable to MSW landfills,[15] US EPA stated that "[t]he purpose of wellhead temperature monitoring is to prevent fires and avoid conditions that inhibit anaerobic decomposition of the MSW" and therefore "chose 145 °F because it is high enough to provide flexibility to MSW landfill owners and . . . is low enough to promote efficient anaerobic decomposition and is protective enough to prevent fires and not damage GCCS equipment."[16]

US EPA then revised subparts XXX (NSPS) and Cf (EG) to reflect the higher temperature standard, allowing "landfills affected by the NSPS and EG" to "demonstrate compliance with the 'major compliance provisions" of subpart AAAA "in lieu of complying with the analogous provisions in the NSPS and EG" to allow landfills to "follow one set of

[15] *National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills Residual Risk and Technology Review (Proposed Rule)*, 84 Fed. Reg. 36670, 36691 (July 29, 2019).
[16] *Summary of Public Comments and the EPA's Responses for the Proposed Risk and Technology Review and Amendments for the Municipal Solid Waste Landfills NESHAP*, at 6-3--, 6-4 (Mar. 26, 2020), EPA-HQ-OAR-2002-0047-0143.

operational, compliance, monitoring, and reporting provisions for pressure and temperature."[17] US EPA expected, and it has been the case, that the revisions "reduce[d] the number of requests and burdens associated with submitting and reviewing the requests for higher operating values (HOVs) for temperature, as well as reduce[d] the frequency of corrective actions for exceeding the temperature limit."[18]

On this basis, wellhead temperatures of 131°F should not trigger the investigative and corrective actions that the Draft Regulation would require. A wellhead temperature threshold of 145°F threshold would be an appropriate trigger for GCCS and cover integrity assessments. Once these assessments have been completed, and if the temperature cannot be reduced within the agreed period, enhanced monitoring could be initiated to further evaluate the occurrence. However, initiation of these assessments or enhanced monitoring should be the result of data gathered over a 90-day period encompassing multiple measurements.

To better evaluate whether a SET event is occurring, CARB should impose more stringent monitoring requirements when the following conditions are present within a discrete area, based on data collected over two consecutive quarters:[19]

- Two or more immediately adjacent wells demonstrate:
  - average wellhead temperatures of 145° F or greater and
  - average CH_4/CO_2 ratio less than or equal to 0.9
- Differential settlement
- Presence of cracks and fissures

Only when wellhead temperatures are equal to or greater than 145°F and a methane to carbon dioxide (CH_4/CO_2) ratio less than or equal to 0.9, should the facility begin enhanced monitoring, including weekly well readings of O_2, CO_2, CH_4, and CO, and evaluating whether physical observations (smoke, etc.) are occurring, consistent with the NESHAP.[20]

[17] *National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills Residual Risk and Technology Review*, 85 Fed. Reg. 17244, 17248 (March 26, 2020).
[18] *Ibidd.*
[19] Two quarters worth of data is necessary to assess the underlying factors driving the conditions at elevated temperature wells and, thus, how to properly manage the wells (i.e., whether to shut the wells off or increase draw on the wells).
[20] *Summary of Public Comments and the EPA's Responses for the Proposed Risk and Technology Review and Amendments for the Municipal Solid Waste Landfills NESHAP*, at 7-1 (Mar. 26, 2020), EPA-HQ-OAR-2002-0047-0143.

If a wellhead temperature exceeds 160°F and has a CH_4 to CO_2 ratio of less than 0.9, the facility should be required to monitor and determine if the elevated temperatures are expanding to include physical observations. Two quarters of well-field data should be trended to determine optimum landfill gas collection. Since the balance gas concentration typically includes some percentage of hydrogen, speciation will be necessary. Once the hydrogen concentration is determined, the elevated temperature well should be tuned to a maximum of 10-15% balance gas (typically assumed to be Nitrogen). If the wellhead temperature increases to equal or greater than 170°F the facility should be required to perform a 24-hour notification in accordance with NESHAP.

Lastly, wellhead temperatures should be used for compliance purposes, rather than any temperature within a well. WM would rather discuss a more robust framework based on wellhead temperatures than rely on extensive downwell temperature monitoring for the reasons described below.

A. Concerns with downwell temperature monitoring

WM believes CARB should reduce the instances in which downwell temperature monitoring is required, given operational concerns and the availability of alternative approaches. Firstly, downwell temperature monitoring disrupts operation and poses safety concerns. Most downwell temperature monitoring would be conducted by technicians in the field (installing temperature probes in the number of wells the Draft Regulation contemplates for evaluation would be prohibitively expensive, as they are tens of thousands of dollars each, depending on the depth). These activities vent landfill gas (including methane) to the atmosphere and disrupt the operation of the well. This runs counter to the stated purpose of the LMR.

Secondly, gas flow within the wells makes it impossible to determine the “origin” of heat, taking downwell temperature measurements every 10 feet will not allow CARB or an operator to find the “hot zone” that may be of concern. Waste temperatures, as measured from boring logs obtained during new well drilling, would be more diagnostically appropriate.

NESHAP requires annual downwell temperature monitoring for wells with wellhead temperatures at 165F or above. The Draft Regulation could require downwell temperature monitoring every two years for wells with wellhead temperatures 145-165F and/or the installation of temperature probes within select areas of concern, in coordination with the operator. Monthly downwell temperature readings are not warranted under any condition.

Finally, the carbon monoxide ("CO") monitoring requirement to use Method 10 is not technically feasible. The EPA approved two alternative methods (ALT153 and ALT 154), which are based on laboratory sample analysis, impose a tremendous administrative burden and lag time with no corresponding benefit when compared to the much more practical field-based stain tube methodology. First, there are few labs that perform ALT 153 or ALT54; we are only aware of one in Southern California. Second, landfill gas collected in tedlar bags is classified as hazardous material and cannot be shipped per Department of Transportation regulations; essentially preventing access to the laboratory for most sites. Third, the lag time for laboratory analysis of CO samples is often greater than two weeks. Fourth, the labor and lab costs for extracting weekly samples at well greater than 131F will be excessive; WM already has one dedicated technician for a single site just to manage the NESHAP enhanced monitoring for CO at 145F. If all wells across WM's California sites with readings at or above 131F require CO readings, it will quadruple WM's labor needs and costs where finding technicians is already strained market. Also given the DOT shipping restrictions and limited lab services available, meeting the CO sampling and analysis requirements will not be technically or economically feasible.

A more effective alternative would be to retain the federal threshold of 145F and to allow the use of stain tubes to avoid reliance on the lab for analysis and reduce costs. Stain tubes provide instant feedback to GCCS operators in order to make immediate adjustments to the system to address high CO readings.

ii. Wellhead Pressure Provisions

The Draft Regulation should include an alternative timeline provision for those instances in which corrective action will take longer than 120 days. This would align with AAAA which provides a process to submit a root cause analysis, corrective action analysis and implementation timeline to Administrator/EO.

The Draft Regulation would subject landfills with three recurring positive pressure readings at a wellhead during a 12-month period to perform a collection system assessment "in a 200-foot radius around the well" and "correct any issues discovered[.]" Section 95469(e)(2)(A). Operators would also be required to monitor the wellhead pressure on a weekly basis for one year and may revert back to monthly monitoring where positive pressure is detected during no more than 15% of the weekly monitoring events.

CARB has not explained its rationale for requiring assessment within a 200-foot radius, especially where the wellhead pressure has already been corrected. Moreover, the requirement to "correct any issues discovered" is vague and subject to overbroad interpretation. CARB should revise this provision to require assessment of the area within a

5-foot radius of the well, consistent with provisions in other states' landfill methane rules. In addition, CARB should remove the language to "correct any issues discovered" and instead require operators to conduct corrective action in accordance with the wellhead monitoring provisions in Section 95469(e)(1).

In addition, CARB should remove the requirement to conduct weekly monitoring for an entire year because it is overly stringent and not necessary to identify and implement the repairs necessary to prevent positive pressure readings.

iii. Wellhead Trends

WM agrees with using trends and thinks the regulation should rely on trends rather than absolute values or discrete, one-time measurements. However, we are unclear as to how CARB arrived at the trend thresholds established in the rule. As discussed elsewhere, this is an evolving area of research that warrants further discussion amongst researchers and industry before deciding on values that trigger enhanced monitoring and downwell temperature monitoring. Trends should mean changes over multiple monitoring periods, not one instance of change. Enhanced monitoring should only be required if the jump in temperature occurs over quarters, rather than months, and should not be required for wells below 131F. WM requests CARB hold a workshop to discuss parameters and trends to monitor for wellhead monitoring before finalizing them in regulation.

iv. Gas Collection System Pressure Monitoring

Under Section 95469(g) of the Draft Regulation, operators would be required to record the gas collection system gauge pressure on the vacuum side of the blower every 15 minutes and establish a pressure setpoint.

Each time the pressure set point is changed, operators would be required to re-tune all wells within one calendar day. At many large landfills, there are upwards of 480 wells—it would be impracticable, if not impossible, for operators to be able to re-tune all of them within one calendar day of pressure set point change, especially in circumstances where unplanned events trigger set-point reset. There are three general categories of unplanned events that might trigger set-point reset. First, there are short term events, such as vacuum line tie-ins, flare/blower maintenance, sump cleanouts, or carbon vessel changeouts. At large sites, these situations may occur up to twice a week. Second, there are long-term events such as equipment failure, clogged header systems, wellfield upgrades, flare refractory replacement, carbon vessel repairs, or weather events. These situations may occur once a quarter at larger sites. Third, there are unplanned events resulting from coordination with renewable natural gas plants or flares. Where these unplanned events are occurring, operators must focus their attention primarily on resolving the issue. In any

event, mobilization of gas technicians cannot reasonably be expected to occur within 24 hours. Accordingly, CARB should provide operators with at least 5 calendar days.

To comply with the requirement to record gauge pressure every 15 minutes, operators would need to install automated wellheads, which may cost up to $4,500 for the automated sensor per well, $100 per well to maintain the data documentation dashboard, and $1,000 per well for annual calibration. At a landfill with 150 wells, installation would cost roughly $850,000 plus tax and design cost. CARB has not identified the emissions reductions that would result from this provision and therefore has failed to establish that these requirements would be reasonable.

v. Well decommissioning procedures must be revised to minimize risk of SSO events.

Section 95464(c) of the Draft Regulations provides that a well may be decommissioned if (1) the methane content exhibits a long-term declining trend (at least 60 months) and is below 20% by volume; and (2) the full radius of influence of the decommissioned well is covered by the radii of influence of other wells such that active gas extraction is maintained in the area.

Limiting well decommissioning to wells experiencing 60-month decline in methane content will be problematic for several reasons. First, enclosed flare control devices require 30% methane to function continuously. If methane content is below 30%, the flare will need supplemental fuel to operate, which will result in emissions not contemplated by CARB. Second, wells with declining landfill gas will need to be decommissioned sooner than 60 months to avoid oxygen intrusion where gas quality is especially low. Operators should be able to make a site-specific determination as to whether decommissioning is warranted prior to 60 months, especially if doing so would prevent SSO and SET events. Moreover, CARB has not provided any evidence that it is necessary to ensure that the full radius of influence of the decommissioned well is covered following decommissioning.

c) Methane Emission Detection and Control

i. Use of satellite detections should be limited to a find-and-fix program that sets forth technology standards and corrective action timeframes that ensure that detections are accurate and addressable.

WM agrees with CARB on limiting application of satellite detections to high level screening for potential landfill emissions given the current accuracy and reliability of its detection capabilities. Use of satellite data for leak detection purposes is directionally acceptable,

but we encourage CARB to re-consider the field validation and reporting requirements and timelines. The Draft Regulation should strengthen the entrance criteria for remote sensing technology under 95469(b) to ensure that emissions detections are accurate. The barrier is low in the proposed rules; only spatial resolution, data availability and plume visualization are considered. The technology should have proven point of detection for landfill application of 90% or better based on participation in a controlled release study for use as a regulatory compliance requirement. We understand CARB has conducted its own studies and WM participates in CARB's voluntary "find and fix" landfill program. We encourage CARB to work with industry stakeholders on a reasonable and workable solution as we transition from a voluntary program to incorporating remote sensing in the LMR.

In promulgating a remote detection program that is practicable and feasible, CARB must recognize the complexity of accurately and reliably identifying actionable emissions from MSW landfills. Many of these challenges including differences from oil and gas facilities are outlined in WM's comments on EPA's Request for Information (2024).[21]

In summary, 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 satellite 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.

Accordingly, given that landfill emissions can be highly complex and variable in site-specific weather conditions and topography, detection location and magnitude can be equally complex and uncertain. In WM's experience with remote sensing over past several years, we cannot always accurately pinpoint or even locate the source of the plume detection. Where a leak cannot be validated, there will be no corrective action deployable and this should be an acceptable compliant response to the agency.

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

Based on our experiences with remote satellite monitoring we provided several suggestions for revising the rule:

A. Applicability for GCCS installation or decreased operation or system removal

A detection above the SEM threshold conducted in response to a remote detection should not trigger GCCS installation or be used as a prohibiting criterion for semi-continuous operation or conditional permanent shutdown under 95463.

Uncontrolled landfills that are otherwise exempt from SEM requirements should not be required to conduct SEM over the entire surface of the landfill in response to a remotely detected plume. CARB should retain its voluntary validation and notification program for uncontrolled MSW landfills that receive a satellite detection as has been done in the past.

B. Surface Emissions Monitoring and Reporting

The proposed 600-foot by 600-foot (roughly 8.3 acres) field validation area and timeline to respond to the agency for each observation is excessive, especially when the site is required to follow 25-foot spacing for SEM and also perform component leak monitoring.

Where an exceedance of the SEM and/or component leak threshold is monitored, then the site must initiate corrective action and re-monitor within 10 days. The timing of implementing and completing corrective actions under the existing regulatory schemes is already variable and complex—to add another layer monitoring and multiple tiers of reporting as it relates to these types of events would further delay response efforts and should therefore be carefully contemplated.

Due to the extent of monitoring required for each remote sensing investigation, and likely reliance on third party vendor availability to conduct the initial and/or follow-up monitoring, CARB should limit the area of investigation to no more than 100-meter radius.

Moreover, CARB proposes to send notification of the detection to operators within seven business days of CARB's receipt. However, CARB does not require certified remote technology vendors to notify CARB of a detection within any timeframe. Operators must be notified as soon as possible of a detection and be given sufficient time to investigate and correct leaks, as needed. This lack of timeframe may render operators unable to fix, or even detect, the relevant emissions. By the time the operator receives the notice, the emissions event may have ended. Even hours after a monitoring campaign is complete, there may be no evidence of an emissions release through the cover in the detected area. This proposed framework is likely to result in significant wasted time and effort with no environmental benefit. CARB should be notified within one business day of a detection,

and CARB should then provide notice to the operator within one business day, in order to facilitate operators' meaningful investigation.

CARB should also revise the timeline for operators to complete the remote sensing field validation in 95469(b)(2)(A) from 5 days to at least 30 days and remove the re-monitoring requirement to instead rely on the routine quarterly SEM and leak component checks. CARB should also consolidate the remote sensing reporting under Section 95470 (b)(7) with quarterly reporting under Section 95470(b)(4) to streamline the reporting process without limiting the data submitted. This would also allow sites more reasonable time to investigate and remediate, where applicable, without distraction of multiple monitoring and reporting steps and timelines.

Further, CARB should consider limitations to investigate detections that are outside of operators' control, including weather conditions, labor availability, and unsafe areas.

C. Remote Monitoring Technology Providers – Criteria for Program Entry

CARB must also increase the stringency of capabilities required of remote sensing technologies. While Section 95469(b)(1)(A) would require (1) spatial resolution of at least 30x30 meters; (2) transmission of data to CARB within 72 hours of detection; and (3) the ability to create a visualization of the plume, these requirements are not enough. CARB should instead require the following in order for a technology to be approved:

- Ability to provide latitude and longitude coordinates where emissions appear to be originating from.
- Ability to identify and localize methane emissions that originate from a specific location or area at an MSW landfill.
- Demonstrated past performance of methane emissions detection from MSW landfills with accessible data in the public domain.
- Ability to quantify methane emission rates and their uncertainties using established methodologies and publicly available quality assurance and quality control protocols.
- Ability to detect methane emissions without physical access to the MSW landfill.
- Evaluation of the accuracy and performance of a technology through controlled release testing at an MSW landfill.

ii. CARB must allow for technology innovation by employing a streamlined process to review and approve use of alternative technologies in a timely manner.

It is imperative that CARB, the solid waste industry, and other stakeholders understand the appropriate uses and limitations of emerging measurement technologies. Such technologies should be as accurate and reliable as possible before implementation into the LMR updates. However, CARB should not restrict advanced measurement procedures but rather promote a pathway for alternatives that incentivizes innovation and encourages research and development that would lead to more use application and increased reliability of alternative technologies.

WM supports the use of advanced technologies as alternative SEM procedures in Section 95471(e), but requests that CARB create a wider pathway to facilitate greater use of emerging technologies and not limit use as just a screening tool.

Drone technologies have made significant improvements in accuracy and reliability of leak detection through participation in the controlled release studies at SIMFLEX. During the first controlled release study in 2023, UAV Column Sensor Emission Assessment (UCSEA) vendors had a combined 90% probability of detection (POD) (the smallest emission that can be detected > 90% of the time) rate of 60-80 kg/hr. **In 2024, UCSEA vendors had a 90% POD of 5.7 kg/hr, much improved from 2023**.

These vendors continue to work with industry, academics, and regulators to develop an open-source, standardized methodology for regulatory SEM application in Canada. Additional controlled release initiatives were performed at SIMFLEX in 2025 including SEM walking path comparison to drone technologies, though results are not yet publicly available. We anticipate a proposed alternative SEM approach in Spring 2026.

CARB should work with stakeholders to create a more streamlined review and approval process of advanced technologies for alternative monitoring methods and procedures. The proposed rule limits alternative to just a screening approach. This is short sided of the agency, especially given the rapid development of drone application. Section 95471(e) should be allow for other innovative alternatives to surface emissions monitoring requirements such as replacement option to Method 21 – potentially eliminating the requirement for ground validation of instantaneous and penetration readings. Leak component inspections and repairs could possibly benefit from use of advanced technologies.

As part of the streamlined review and approval process, WM requests that CARB impose a deadline of 120 days to review and approve operators' use of technologies to comply with the SEM provisions of the Rule. If, after 120 days, CARB does not approve, disapprove, or request additional information, the request should be deemed approved. Moreover, if operators do not receive a response within 120 days and proceed to implement an alternative compliance option that is subsequently approved, operators should not be considered in violation of the Rule prior to receiving approval. This is particularly relevant for the purposes of monitoring unsafe-to-walk surface areas using alternative technologies; as recommended by WM below, technologies utilized for that purpose should also be subject to a request, review, and approval process to ensure that the technology being used is accurate and standardized.

CARB must also remove the criterion to demonstrate methane emission reduction equivalency. Such equivalency demonstration is neither technically feasible nor appropriate. Standard Method 21 does not measure, quantify or reduce emissions; it monitors methane concentration. Alternative methods also will not serve to quantify emissions reductions, and so there is no mechanism to compare emission reduction equivalency.

Broadening the applicability and streamlining the review and approval process for both SEM and other compliance alternatives would practically and feasibly facilitate a more rapid incorporation of emerging technologies into the compliance obligations in reliable manner and reduce compliance costs and labor hours.

iii. Operators should not be required to monitor unsafe areas until CARB has approved alternative SEM technologies.

The Draft Regulation provides that "unsafe-to-walk surface areas" that cannot be monitored using the methodology outlined in Section 95471(c) must be monitored using an alternative SEM procedure under Section 95471(d) within the same calendar quarter. *See* Section 95469(a). CARB proposes to prescribe several "instrument requirements" on the alternative monitoring technology that can be used for this purpose, including the requirement to record sampling data at "a frequency of at least one hertz." 95471(d)(2)(C). This requirement is inappropriate and technically infeasible because one second intervals would flood both operators and CARB with immense amounts of data with no additional benefit in terms of emissions reductions. Accordingly, WM requests that CARB revise the requirement to reduce the frequency to five seconds.

CARB lists three examples of alternative technologies that can be used for this purpose: (1) a handheld instrument that measures methane column concentration between the user and a point on the landfill surface where the instrument is aimed; (2) a drone-mounted instrument that measures methane column concentration in a downward-facing direction; or (3) a rover-mounted instrument that measures methane volumetric concentration near ground-level. As noted above, WM understands the value of utilizing alternative monitoring technologies to conduct SEM, subject to additional research and development, particularly in order to comply with the approval process under Section 95471(e). It is not clear if, and if so, why the requirements for alternative technologies to use for the purpose of evaluating unsafe-to-walk surface areas is distinct from that of alternative technologies to use for SEM.

Regardless, the technologies suggested by CARB require additional research and development to ensure that they can operate in a standardized, reliable manner. Operators likely will not be able to comply with the requirement to monitor unsafe-to-walk surface areas using these technologies by the effective date of the revisions contained in this Draft Regulation.

Accordingly, CARB should impose the same technology review and approval process for the purposes of monitoring unsafe-to-walk areas under Section 95471(d) that it does for alternative SEM technologies under Section 95471(e). CARB must also delay the requirement to utilize alternative technologies to monitor unsafe-to-walk surface areas until a point in the future, such as July 1, 2027, to ensure that both the technologies are ready for regulatory use, and that CARB has had ample time to review them for their ability to comply with the requirements under both Sections 95471(d) and (e). Until then, CARB should exclude unsafe-to-walk surface areas from quarterly SEM, to preserve the safety and wellbeing of landfill technicians conducting SEM in accordance with Section 95471(c).

iv. The Working Face should be excluded from SEM until it is safe to monitor.

The Draft Regulation would exclude the working face area from SEM obligations under Section 95471(c)(1)(A) for the first 180 calendar days after the initial waste placement at that location and so long as active filling and compacting operations are ongoing. However, this exclusion does not account for the fact that where filling and compaction operations continue past 180 days after initial waste placement, the area will not be safe to monitor immediately upon cessation of filling and compaction operations. CARB should instead provide operators until cessation of filling and compaction in an area has ceased to require SEM.

v. SEM corrective action timeframes should align with existing response timeframes that account for operational realities.

The Draft Regulation would require operators, upon detecting surface emissions above the instantaneous or integrated thresholds, to initiate corrective action within 3 calendar days and complete corrective action within 10 calendar days. The location of the measured exceedance must be re-monitored within 10 calendar days—if a second detection above the threshold is apparent, the same timeline for corrective action applies. If a third detection above the threshold is detected, operators must install a new or replacement gas collection well or device within 120 calendar days of the initial exceedance or utilize an approved alternative under Section 95469(a)(3). *See* Sections 95469(a)(1) and(a)(2).

The Draft Regulation should be revised to be consistent with the federal rules. The federal rules require that "[c]over maintenance or adjustments to the vacuum or the adjacent wells to increase the gas collection in the vicinity of each exceedance must be made and the location must be re-monitored within 10 calendars days[.]"[22] The requirement to "initiate" corrective actions within 3 calendar days is unnecessary and confusing, and detracts from operators' ability to correct detections with site-specific considerations in mind.

Moreover, CARB would impose the same windspeed and precipitation requirements as quarterly SEM events on SEM re-monitoring events—specifically, an average windspeed limit of 5 mph or instantaneous limit of 10 mph and allowing SEM only where there has not been measurable precipitation in the preceding 72 hours. *See* Section 95471(c)(1)(D). It is difficult for operators to ensure that third-party consultants are available for SEM re-monitoring especially if CARB is to impose additional requirements such as windspeed and precipitation that are outside of the operators' control. CARB should therefore remove windspeed and precipitation requirements from re-monitoring obligations.

vi. GCCS downtime provisions should account for practical realities faced by landfills.

GCCS downtime events may result from unplanned circumstances such as weather events, earthquakes, wildfires, or equipment malfunction. Other circumstances warranting shut down include system and equipment maintenance (to minimize unplanned equipment failure), or low gas quality triggering semi-continuous operation. The proposed 120-hour limit of downtime under Section 95464(b)(1)(A), therefore, does not properly account for the realistic amount of downtime that GCCS across regulated landfills that will be necessary on an annual basis. The limit should be removed or revised to allow for 240

[22] 40 CFR § 60.765 (c)(4)(iv); 40 C.F.R. § 60.36f(c)(4)(iii).

hours of total system downtime, consistent with Bay Area Air District's rule 8-34, and the exceptions listed under Section 95464(e) should apply to the total system as well as individual components.

The Draft Regulation would also require operators to close all valves in the gas collection and control system contributing to venting of the gas to the atmosphere "immediately" in the event that the GCCS is not operating. GCCSs are equipped with automatic closure devices, that are programmed to close valves as soon as possible. However, it is not clear whether valve closure would happen "immediately" even where automatic, because "immediately" is not defined. CARB should provide operators with a clearer obligation, such as one hour, that allows for site-specific configurations and acknowledges the dynamic nature of GCCS. Moreover, a one-hour period is consistent with the federal rules and is sufficiently protective.[23]

vii. Early gas collection requirements must provide greater flexibility.

Section 95464(a)(5) would require operators to install either horizontal collectors or caisson wells in areas of "new waste placement," and begin operating the components once 15 feet of waste has been placed and positive pressure is detected. While WM recognizes the benefits of earlier gas collection, there are practical limitations to doing so that the Draft Regulation should account for.

For example, the proposed requirements would necessarily trigger horizontal or caisson well installation at the working face, which presents safety concerns in light of active waste placement and traffic. There are other options for early collection that would alleviate these concerns and be more beneficial over a longer period of time, including utilizing the leachate collection and control system, or installing collection layers in bottom lines using shallow vertical wells.

In any event, efficient early collection is dependent on a host of factors, but primarily on waste composition and age. CARB should establish the deadline to install and operate GCCS to be consistent with the time period in which waste decomposition will occur and begin to generate methane. For example, landfills with an annual waste acceptance rate below 300,000 tons per year could be required to install GCCS in areas where waste has been in place for 36 months. At landfills with an annual solid waste acceptance rate of 300,000 tons per year or more, operators could be required to install GCCS in areas where waste has been in place for 24 months. In addition, gas collection should become operational following the detection of at least 30% methane in two consecutive samplings of landfill gas. These timelines would result in greater likelihood of initiating collection and

[23] 40 C.F.R. 60.763(e); 40 C.F.R. 63.1958(e)(1)(i).

destruction of landfill gas that is of sufficient methane content so as to allow for continuous operation of the system without the need for supplemental fuel. Use of supplemental fuel would result in greater emissions not contemplated by CARB, and generally is an indicator that landfill gas is not at the volume or quality necessary to support continuous active gas collection.

Accordingly, CARB should revise the Draft Regulation to impose early collection deadlines based on solid waste acceptance rates, age of waste, and landfill gas quality to ensure that the GCCS can operate in a manner most efficient for emissions reduction purposes.

viii. The control device monitoring provisions do not serve to reduce emissions and are infeasible.

Section 95459(d)(2)(A) would require operators to record the gas flow rate to each gas control device at least every 15 minutes. If there is any 3-hour period of operation during which the total gas flow rate changes by more than 20% over the average in the prior 12-month rolling period, the cause must be reported in the Annual Gas Collection and Control system Report.

Similarly, the combustion temperature of enclosed flares must be monitored every 15 minutes, and any 3-hour period during which the average temperature difference was more than 28 degrees Celsius below the average combustion temperature during the most recent source test is an exceedance of the combustion temperature. Section 95469(d)(3)(A).

Likewise, under Section 95469(d)(4)(A), the oxygen content and temperature of the exhaust gas stream of internal combustion engines and gas turbines must be recorded every 15 minutes. If there is any 3-hour period of operation during which the average oxygen content or temperature is outside the range of the manufacturer's specifications, it will be considered a violation.

For each of these provisions, CARB has failed to explain the purpose and goal of the monitoring requirement, the emission reduction objective it would serve, how the 3-hour period was chosen, and why the same goal cannot be achieved using a longer time period, such as one day or one week. With respect to flow rates, the addition of these requirements would seem to imply that flow rate fluctuations are actionable or result from a compliance problem, which often is not the case. Gas quality at the outlet of internal combustion engines is clearly beyond the purview of this Rule. Finally, the 3-hour monitoring period also imposes unduly burdensome monitoring requirements that are not proven to reduce emissions.

ix. One detection of methane above the 200 ppmv threshold should not trigger regulatory obligations.

The Draft Regulation would require compliance with Sections 95464 through 95476 of the Rule where a landfill has a landfill gas heat input capacity greater than or equal to 3.0 MMBtu/hr recovered and where there is a measured concentration of 200 ppmv methane or greater using the instantaneous SEM procedures under Section 95471(c)(1) and (c)(2), including monitoring performed in response to a remotely detected emission under Section 95469(b)(3). *See* Section 95463(b)(2). Importantly, Section 95464 contains the GCCS requirements.

This "one-hit trigger" of an instantaneous SEM detection of 200 ppmv to require GCCS installation is inappropriate and must be revised to allow for operators to first conduct corrective action where the methane was detected. Surface detections of methane can occur for a wide variety of reasons, especially at the extremely low detection threshold of 200 ppmv. There is no opportunity or incentive for sites—specifically closed sites—to remediate an exceedance and demonstrate effectiveness of such corrective measures with re-monitoring. Such inflexibility for closed sites particularly limits short-term reduction opportunities. Moreover, particularly for closed sites, the Draft Regulation may actually increase emissions by disturbing certified final cover to require installation of a new GCCS. Such a requirement could also be in direct conflict with federal and/or solid waste requirements.

Likewise, remote monitoring detections are not an appropriate basis for the mandatory application of regulatory requirements, especially the capital and labor-intensive installation of a GCCS. As set forth herein, significant issues remain with respect to the detection capabilities of emerging measurement technologies relative to the unique characteristics of MSW landfills and LFG, and the quantification methodologies that convert such detections to assumed emission rates, are likewise undeveloped, and in many cases, proprietary. These technologies should not be the basis on which GCCS requirements are triggered.[24]

In this respect, only if, after two attempts to conduct corrective action in accordance with Section 95469(a)(1)(B), the leak continues to exist, should operators be required to install GCCS and comply with Section 95464 through 95476 of the Rule.

[24] *See* EPA-HQ-OAR-2025-0186-0311, National Waste & Recycling Association's recent comments on EPA's Proposed Recission of the Greenhouse Gas Reporting Program and Reconsideration of the Table HH-3 Collection Efficiencies: 90 Fed. Reg. 44591 (Sept. 16, 2025).

x. The provisions allowing semi-continuous GCCS operation are prohibitive.

The Draft Regulation would only allow for semi-continuous operation of a GCCS at closed MSW landfills with robust final cover and low methane generation. However, the same issues warranting semi-continuous operations, such as reduced landfill gas flow rate and methane content, may occur at only portions or areas of the overall landfill site. Accordingly, CARB should revise Section 95467(a) to allow for semi-continuous operation at both closed MSW landfills and areas of closed or inactive MSW landfills that achieve the same criteria.

Further, operators would also be required to demonstrate that there have been no exceedances of the SEM limits specified in Section 95465 during the previous three years. *See* Section 95467(a)(3). SEM detections above the relevant thresholds may not always be related to GCCS efficiency or operation but may instead be the result of a temporary cover issue that can be fixed quickly and easily. On this basis, a prolonged period of three years is inappropriate and will inhibit most operators from taking advantage of the semi-continuous provisions instead of utilizing supplemental fuel to maintain GCCS operation. CARB should instead impose a requirement of one year without SEM detections.

Indeed, methane content is a better indicator of gas quality required to maintain operation of GCCS, and WM therefore supports the inclusion of methane content considerations imposed by Section 95467(a)(4); however, requiring that methane content does not exceed 30% by volume for at least five consecutive years will also render the semi-continuous provisions unusable. Further, subsection (a)(4) is dependent on the use of continuous flow rate measurements for a minimum of one year. This requirement is impracticable because it does not seem to allow for system upsets or periods where monitoring cannot be conducted.

CARB also proposes to allow semi-continuous operation only where a professional engineer has certified that there are no available modifications to any control device that would allow for the control device to operate continuously at the methane flow rate and gas composition being collected, and where there is no adjacent facility that can use the landfill gas as supplemental fuel to their own control device. *See* Section 95467(a)(5). This requirement is stringent to the point of being prohibitive of semi-continuous operation because operators will always have the option to utilize supplemental fuel to allow for continuous operation of the control device. However, doing so will result in additional emissions not contemplated by CARB. Moreover, presuming that the landfill gas will be of high enough quality and that the infrastructure exists to transport it to an adjacent facility fails to account for the operational realities associated with control device operation. This

requirement should be revised to indicate that the use of supplemental fuel should not be considered an "available modification," and remove the requirement to consider the existence of an adjacent facility.

xi. The GCCS shutdown criteria should not impose overly stringent SEM requirements.

The Draft Regulation would allow for permanent shutdown of GCCS where there no SEM exceedances occurred during the previous five years. *See* Section 95467(d)(3). Consistent with WM's comments with respect to semi-continuous operation criteria, SEM detections above the relevant thresholds may not always be related to GCCS efficiency or operation but may instead be the result of a temporary cover issue that can be fixed quickly and easily. On this basis, a prolonged period of five years is inappropriate and will inhibit most operators from taking advantage of the shutdown provisions. Accordingly, CARB should reduce the timeframe in which landfills must be without SEM detections above the applicable threshold to three years.

Under Section 95467(d)3), CARB would also require operators to measure the methane content to the inlet of each control device at least every three hours to show that the measured methane content is below 125 metric tons per year methane for at least three years is too stringent. 125 metric tons per year of methane is equivalent to 13 scfm—an impossibly low standard to meet. Instead, CARB should require operators to use weekly GEM recordings for a period of one year and evaluate that data in order to meet the permanent shutdown criteria.

xii. Operators should have more time to install and operate GCCS.

As currently written, operators of active MSW landfills will have only six months to install and operate GCCS following the approval of their Design Plan. *See* Section 95464(a)(2). This timeframe is not technically feasible, because a GCCS cannot be constructed in six months. Operators will necessarily be required to design and begin constructing a GCCS *before* the submission date of their Design Plan, which is due one year after detecting any leak on the surface exceeding 200 ppmv in accordance with Section 95463(b)(2)(B). In this respect, operators will be obligated to construct a system that has not yet been approved, and could be subject to change following CARB's review. Operators should not be required to make what may amount to millions of dollars of capital investment to construct a GCCS, only for CARB to require material, expensive changes following submission of the Desing Plan. The proposed timeline does not consider local agency permitting timelines, inclement weather, supply chain limitations, contractor availability, or other factors.

WM requests that CARB provide operators with 15 months following approval of the Design Plan to construct and operate GCCS in order to allow adequate time for the items noted above. Additionally, in the event that any required permits authorizing construction to commence are not issued in a time frame that allows for this deadline to be met, an owner or operator should be able to request and automatically receive additional time for commencement of operation of the GCCS.

d) Recordkeeping and Reporting Obligations

CARB proposes to implement several new reporting obligations that will not serve to reduce emissions from MSW landfills, including:

- All SEM and component leak monitoring data, including concentration reading, location coordinates, and time and date of each measurement at each one hertz reading. *See* Sections 95470(a)(1)(D), 95470(a)(1)(F), 95470(b)(6)(D), 95471(c)(2)(A), 95471(c)(3)(A). Like the requirement imposed on technologies used for purposes of monitoring unsafe-to-walk surface areas, this obligation is inappropriate and technically infeasible. One second intervals would flood both operators and CARB with immense amounts of data with no additional benefit in terms of emissions reductions. Accordingly, WM requests that CARB revise the requirement to reduce the frequency to five seconds.
- In the Annual GCCS Report, CARB would require the most recent topographic map of the site in a specific format, including the areas with daily intermediate, and final cover, as well as unsafe-to-walk surface areas. *See* Section 95470(b)(3)(E). Locations with daily cover and unsafe-to-walk surface areas change frequently; CARB should therefore specify that the map does not need to be updated every time the cover type changes in an area.
- Quarterly Monitoring Data Reports, which must include records of all SEM data, component leak monitoring data, and wellhead monitoring data. *See* Section 95470(b)(4). All of the information will be submitted in the Annual GCCS Report, making this obligation unnecessary and duplicative. Quarterly reporting would not provide operators with enough time to prepare reports, especially where follow up monitoring and corrective action may be required to actively reduce emissions. CARB should revise this requirement to semi-annually or allow for reporting only in the Annual GCCS Report.
- SEM Notifications 15 days prior to monitoring event. *See* Section 95470(b)(5). This obligation may conflict with subcontractor availability and will provide no emissions reductions. It should therefore be removed.

- CARB would require all submissions to contain certification by a responsible official of truth, accuracy, and completeness. *See* Section 95470(b)(9). This should only be required for submission of reports.

Thank you for your consideration of our comments.

Sincerely,

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

Attachment A: Summary of Comments on Regulatory Alignment and Operational Feasibility

Attachment B:

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)

and

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: Selected ETLF Bibliography

Attachment D: Comments on the ISOR CEQA Analysis