November 10, 2025

Clerks' Office
California Air Resources Board
1001 I Street
Sacramento, California 95814
Submitted electronically via online comment docket

RE: Solid Waste Industry – Local Government Coalition Comments on 45 day Proposed Landfill Methane Regulation (September 23, 2025)

Dear Quinn,

The undersigned representatives of the solid waste industry and local government appreciate the efforts put forth by California Air Resources Board (CARB) staff in development of proposed amendments to the Landfill Methane Regulation (LMR). While individual members may submit more detailed comments separately, we believe there is benefit in collectively providing input on several common issues that require additional review and input.

Our team fully recognizes the need to update the LMR to incorporate proven new technologies as well as the necessity for enhanced predictive monitoring and data capture. While our coalition is supportive of these goals, they need to be achieved in a manner that allows facility owners and operators to safely and efficiently manage their operations. Feedback is largely provided in line with specific sections of the proposed rule and is intended to highlight the issue while suggesting a general approach to addressing the respective item.

This transmittal focuses on a set of primary issues that are common to the various coalition members. Our coalition anticipates continued coordination with staff as subsequent drafts of the regulation are developed. Our focus is to achieve the stated goal of greater predictive and response capability while preserving a work environment that is safe and practical for our field teams to implement.

General Comments

The updated rule has greatly increased monitoring, recordkeeping and reporting requirements. Our group appreciates the need for comprehensive data capture, analysis and reporting. However, it is important to achieve a balance between extensive data capture and corrective measures while maintaining the primary focus of gathering information that is causal and meaningful. Given that the 45-Day package is the first time we have seen specific regulatory language, we look forward to continued dialogue with staff in order to refine these requirements and achieve this balance.

Industry and local government have carefully reviewed the proposed amendments to LMR. While we support the goal of reducing methane emissions, we have concerns that many of the proposed requirements are not practical, not cost-effective and in some cases, may not lead to meaningful improvements to environmental outcomes. In some instances, the proposed rule adds duplicative or excessive paperwork, which will burden landfill operators and possibly overwhelm CARB's ability to review the information. Data collection and reporting must be directly tied to compliance demonstrations and/or support reduction in landfill emissions. The regulation should not require data collection for purposes that do not result in emissions reductions.

Our coalition is concerned that the proposed revisions may place landfills in a situation of perpetual non-compliance. This would not occur due to a lack of good faith effort on the part of landfill owners and operators. However, it may occur as a result of regulatory and market infrastructure not existing to support the level of prescriptiveness and immediacy proposed. This is not a suitable outcome for landfill operators or the greater solid waste system that relies on these facilities to manage California's waste.

Section 95464(a)(5) - Gas Collection and Control System Requirements – Working Face

While we recognize the intent of accelerating timelines associated with gas collection system installation within active areas of landfills, there are practical limitations to some of the timeframes and activities proposed in this section. Installation of gas control infrastructure in the working area of landfills while waste is being placed presents specific operational and safety challenges. The draft rule notes that either horizontal collectors or caisson wells shall be installed in areas of new waste placement (subsection (a)5). The operation of these features is required to begin after 15 feet of waste has been placed and positive pressure is detected in either component.

Concerns over employee and contractor safety, efficient traffic control and collateral impacts associated with oxygen intrusion into the gas collection system are primary when addressing the issue of gas collection in areas where waste is placed. Limiting the gas collection or control options to these two means of infrastructure greatly limits the ability of a given facility to function safely and install equipment that will be of use over a practical time period.

There are other alternatives for early landfill gas collection and the rule should allow any other options. These include collecting landfill gas from the leachate collection and control system (LCRS), installing collection layers in bottom liners, using shallow verticals, etc. The rule should not limit the options an operator can use for early collection.

Finally, the draft provision requires operation of these collection devices after 15 feet of waste is placed, which may not be enough waste to prevent the well from "short-circuiting" with ambient air and causing compliance issues with other provisions in the rule. We believe the rule should allow discretion to the design engineer and LFG system operator as to when the best time is to operate

these collectors. This shouldn't be based solely on the presence of positive pressure but also on the fact that there is sustainable gas quality without air intrusion when under vacuum.

An alternative means of approaching this issue is to set timelines for installation and operation of gas collection relative to the commencement of waste placement as well as gas composition metrics (ie. 12-15 months from initial placement of waste in each area). These could include caisson wells or horizontal collectors but would also allow for installation of vertical wells or other types of collectors once filling in each area is completed. This approach would avoid safety and oxygen intrusion issues associated with placement of horizontal collectors as well as difficulties associated with placement of caisson wells in geometric cell configurations that don't lend themselves to that application.

Section 95464(a)(3) - Gas Collection & Control System Requirements – Design Plan & Installation

This section requires the owner or operator of an active MSW landfill to install and operate a gas collection and control system within 6 months after approval of the design. This reduces the current timeline by one year and does not consider inclement weather, local AQMD permitting delays (most notably authority to construct permits for flares), supply chain limitations, contractor availability and other factors. Issuance of permits from some AQMD's has been of particular concern as several projects are delayed due to Authority to Construct authorizations being issued even after design approval has occurred. The associated absence of a concrete start date results in corresponding delays in availability of subcontractors and component procurement/delivery.

We request that this time threshold be revised to 15 months to allow adequate time for the items noted above. Additionally, if 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 can request additional time for commencement of operation of the GCCS.

Section 95464(b)(1)(A) - Gas Collection and Control System Requirements – System Shut Down

The amended rule allows for 120 hours of gas control system shutdown annually. We presume this allowance is for total system shutdown but that is unclear. Additionally, there is no indication as to whether this threshold is net of any uncontrollable circumstances such as weather events, earthquakes, wildfires or planned/unplanned power system shutdowns. The exclusions allowed in subsection (e) refer only to "individual components" and not an entire system shutdown due to some of these occurrences.

It is worth noting that only one AQMD rule contains a similar provision and that is the Bay Area Air District's rule allowing for a total of 240 hours for total system shutdown. While we would prefer that no total hour limit be in place, should CARB believe that a threshold is warranted we propose that 240 hours of total system downtime be allowed under the revised LMR. Additionally, any limit on total gas collection and control system downtime should include provisions for exclusion of the uncontrollable circumstances outlined above.

Section 95464(b)(3)(A)(3) – Combustion Monitoring at Engines and Turbines

Monitoring requirements for oxygen and temperature are inconsistent with federal rules. The gas control infrastructure is the treatment system under 40 CFR 60 Subpart XXX, 40 CFR 63 Subpart AAAA) exempting engines and turbines that combust treated gas. Also, other federal NSPS/NESHAP rules apply to internal combustion engines and turbines (such as 40 CFR 60 JJJJ, 40 CFR 63 ZZZZ; 40 CFR 60 GG and KKKK, 40 CFR 63 YYYY). The California LMR should be consistent with federal requirements for monitoring and not create new requirements that could conflict with these federal rules and do not directly mitigate methane emissions.

Section 95464(b)(5) and (6) – Component Leak and Cover Monitoring Plans

CARB should delete the requirement for development of a component leak monitoring plan as it is redundant. The rule language itself (95469(c) and 95471(f)) is sufficiently prescriptive for what components are subject to monitoring and how the monitoring must be conducted. The plan would simply reiterate what is already prescribed by the rule – tracking of components is done through as-built and other records and reports.

For cover monitoring plans, CARB should delete 95464(b)(6)(B) as it is not appropriate to reference and enforce another program's regulation.

Section 95469(a)(4) - Recurring SEM Exceedances:

The requirement in Section 95469(a)(4) to assess the condition of the collection system and perform monthly surface emissions monitoring in the grids adjacent to a grid with recurring surface emissions exceedances is not practical or beneficial. By definition, grids adjacent to the grid with recurring surface emissions exceedances would not have had recurring surface emissions exceedances. Surface emissions are a local condition that are remediated by adjusting the wells closest to the exceedance and/or repairing the cover at the location of the exceedance. The requirement to include the adjacent grids simply takes the focus (and labor) away from the actual location of the exceedance.

Section 95469(b) - Remotely Detected Emission Plumes

CARB appropriately recognizes the limitations of satellite technology for detecting emissions. The use of satellite technology for high level screening of potential emissions is generally acceptable. However, given the complexity and uncertainty inherent in characterizing landfill emissions, CARB should re-evaluate the proposed validation, remediation and reporting requirements. Also, technology will continue to advance over time so establishing hard criteria for acceptable technology and investigation in the rule today will likely render these methods obsolete and no longer appropriate over time.

Due to the extent of monitoring required for each remote sensing investigation and likely reliance on third party vendor availability to conduct the monitoring, CARB should limit the area of investigation consistent with industry experience during the voluntary remote sensing campaign. Typically, the site can locate the source of the emissions within a short distance from the plume coordinates and should not be required for all observations to monitor over 8 acres of surface area (600 x 600 feet).

Additionally, the timeline for completing the remote sensing field validation in 95469(b)(2)(A) should be extended from the proposed 5 days to at least 30 days and the re-monitoring requirement should be removed to instead rely on the routine quarterly SEM and leak component checks. We also recommend CARB consolidate the remote sensing reporting in 95470 (b)(7) with quarterly reporting per 95470(b)(4). This allows sites more reasonable time to investigate and remediate, where applicable without distraction of multiple monitoring and reporting steps and timelines. Lastly, the rule should include provisions for requesting additional time to complete the investigation due to weather conditions, labor availability and access to dangerous areas.

Remotely detected emissions in this subpart should not constitute a violation or the basis for enforcement action. Instead, the remote sensing program should be part of the effort to assist landfill owners and operators in the early identification and corrective of potential sources of methane emissions.

Section 95469(d) - Gas Control System Equipment Monitoring

Identifying the cause of changes greater than 20% over the average in the total gas flow rate to all devices in a 3-hour period in the prior 12 months is required to be included in the annual report. This analysis is excessive, especially given the impact weather conditions can have on the landfill collection system. Overlap with reporting downtime of the system for maintenance, repair and expansion activities is also redundant.

For engines and turbines - Federal NSPS and NESHAP requirements already apply to landfill gas fired engines and turbines (40 CFR 60 JJJJ, 40 CFR 63 ZZZZ, 40 CFR 63 YYYY, 40 CFR 60 Subparts GG and KKKK). This rule should not create duplicative and potentially inconsistent requirements or add additional costs beyond NSPS/NESHAP requirements. Further, the requirement is redundant where engines and turbines combust treated gas as recognized by the federal landfill NSPS and NESHAPs (40 CFR 60 XXX and 40 CFR 63 AAAA). The gas treatment system requirements would apply to these devices, and our view is that treated gas should not be subject to two control requirements.

Section 95469(e) - Wellhead Monitoring

CARB's intent is to have the revised LMR contain enhanced monitoring, reporting and assessment criteria as well as prompt initiation of correct measures. While we can be supportive of this approach, it is imperative that the remedies associated with exceedances of certain thresholds do not conflict with one another. Additionally, having the LMR align with federal rules is important in terms of various thresholds and specific criteria. For instance, under the revised NESHAP rules, the U.S. EPA is implementing an initial temperature standard of 145 degrees Fahrenheit (°F).

After extensive evaluation, the EPA concluded that LFG extraction system components, including high-operating-value (HOV) wells, are capable of safely operating at temperatures up to 145°F without posing a combustion or subsurface fire risk. Methane production in landfills is governed by microbial decomposition processes, which are active across a wide range of temperatures. Scientific literature identifies three categories of methane producing bacteria:

- Psychrophiles: Optimal at 12–18°C (53.6–64.4°F)

- Mesophiles: Optimal at 25–40°C (77–104°F)
- Thermophiles: Optimal at 55–65°C (131–149°F), with some active up to 70°C (158°F)

While most landfills operate in the mesophilic range, research indicates that thermophilic conditions can yield more efficient gas production. Therefore, temperature increases alone should not be used as a proxy for landfill instability or fire without additional diagnostic data.

We believe the 145-degree F threshold is an appropriate starting point for gas collection control system 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. Additionally, we believe that any initiation of these assessments or enhanced monitoring should be the result of data gathered over a 60-day period encompassing multiple measurements (i.e., minimum 3 exceeding this limit within this period vs. a single data point).

Additionally, the time frames in which remediation of an elevated temperature or oxygen content reading is to be addressed should be re-assessed. While some elevated readings can be mitigated in a short period of time, others may take an extended period due to location, access issues at certain times of the year and subcontractor availability. Also, high temperatures or oxygen readings don't necessarily indicate that a subsurface oxidation event or other occurrence is imminent. Many landfills have individual or small numbers of wells that continually function above the 145-degree F and 5% oxygen content thresholds, and no existence of other impacts are present.

Worth noting on oxygen content is information from a large database of landfills would indicate that 96% of landfills have wells that contain over 5% oxygen and as many as half of the wells on these sites have oxygen content levels above 5%. This can be due to perimeter wells that are in shallow waste but have been installed for the purpose of controlling gas migration from fill areas. Even with this data, there is not a widespread set of subsurface oxidation events occurring throughout California and requiring its reduction to levels that may not be practical will have negative collateral effects (ie. reducing vacuum on the well field to pull in less oxygen but resulting in decreased methane capture).

Section 95469(e)7 - <u>Wellhead Trend Analysis</u>

Section 95469[e](7) of the draft rule includes a requirement for a monthly Wellhead Parameter Trend Analysis. The values prescribed in this section seem somewhat arbitrary with no scientific basis as to why these specific values were selected, how it was determined that those values are relevant to proper wellfield operations and maintenance (O&M), and how these prescriptive numbers will improve compliance.

For example, if a well temperature increases by 20 degrees, but the well is still under the compliance threshold in the rule, then no action should be required. Operators can be required to focus more on readings like that or possibly increase the frequency of monitoring at that well, to confirm if the trend will continue. However, enhanced monitoring and corrective action should not be required unless a temperature limit has been exceeded.

The same applies to changes in wellhead oxygen. As written, a 2% change could be a very small value, for example, 2% of a value of 2% would be a change from 2% to 2.04% oxygen. Even if the rule

language intended to imply a 2-percentage point change (from for example 2% to 4%), the language is unclear, and a 2-percentage point change is very common. The same thought process applies for all the other values prescribed for pressure, methane, methane/carbon dioxide ratio, and flow rate.

Further, it is very common to get erroneous readings in one month that are ultimately determined to be invalid due to instrument error or other issues. Flow rate data at a wellhead can be very inaccurate and uncertain. As written, such a reading would still trigger extensive additional actions even when the reading was not real in the first place. Therefore, any such actions as part of the Wellhead Parameter Trend Analysis must be based on valid data, including both the current reading as well as for the reading from the previous monitoring period to which the new reading is being compared. Further, the actions should only be triggered after 60 days of confirmed readings, which would cover three consecutive monitoring events confirming the trend is real and ongoing.

Section 95469(e)(3 & 5) - Monitoring Requirements with Reference to Sections 95471(k)

This and other subsections refer to the initiation of cover integrity assessments if certain temperature and oxygen thresholds are exceeded. While the cover integrity assessment is a reasonable next step, there is concern that the requirements of the cover integrity assessments within Section 95471(k) are impractical and may conflict with the requirements in Title 14 and 27 regulations administered by CalRecycle.

More specifically, the references related to measuring thickness of cover, grain size and fines content in subsection (k) are not specific to any location and could be interpreted to cover an undetermined expansive area. On their own they are impractical to assess even within a limited spatial extent. Additionally, Section 95471(k)1(D) goes into extensive detail relative to compaction and maximum particle size requirements, etc.

It is important to note that many landfills are short on cover material and import the material from a variety of sources. The material they do receive is highly variable and intimating that it should meet a certain unspecified set of parameters for grain size, fines content, etc. would not be an efficient use of time. Additionally, disturbance of final cover as part of the cover integrity assessment would require prior approval from the Regional Water Boards as well as introduce a host of potential concerns related to the integrity of the final cover itself (i.e., impacts on synthetic liner systems).

The intent of the cover integrity assessment is to identify areas that may be deficient and augment them so the occurrence that led to the assessment is mitigated. There are many measures an operator can implement to address a given exceedance. The means by which the occurrence is remedied should be left to the facility operator if the threshold exceedance has been remedied or the corrective action plan has been followed. In closing, incorporating prescriptive provisions of the nature contained within these subsections may not be plausible given on-site material sources, spatial expanses that a cover integrity assessment could involve and unanticipated impacts to final cover systems.

Section 95471(e) - Test Methods and Procedures

Subsection (d) could be read to infer that the tools used to monitor surface emissions in unsafe-to-walk areas are capable of measuring methane volumetric or column concentration (i.e., sniffer drones). Discussions to date on use of remote sensing tools have centered upon their application

being directional and not necessarily as quantitative measurement devices. While some of these tools have a limited capability to measure the concentration of emissions, there are concerns over the accuracy of the equipment due to how it is deployed over a variable substrate.

Some remote sensing tools currently employed are highly efficient but may not possess the measurement capabilities noted within this section (i.e., flyover, satellite imagery or standard drone imagery without measurement capabilities). With the goal being identification of emissions from areas that are unsafe to walk, the primary objective of these tools should be directional.

The regulation should allow for multiple approaches to meet the stated criteria for Unsafe to Walk Surface Areas. This should include equipment or methods that don't necessarily include volumetric or concentration measurement capabilities as first level directional screening. While the rule proposes an and/or approach to monitoring emissions in these areas (i.e., SEM or use of remote devices), the remote device option appears to be limited solely to sniffer drone technology.

As technology for monitoring landfill methane emissions advances, so too do the use cases for other types of new technologies. The rule should not limit its use to only screening for surface emissions. Such technology could further supplement and/or replace the current SEM methods and procedures as well as component leak monitoring and cover integrity assessments.

The proposed application process is also burdensome and potentially not technically achievable which significantly limits potential use of any alternative technology or procedure. Most troubling is the criterion to demonstrate methane emission reduction equivalency. Such equivalency demonstration is not technically feasible nor appropriate. Standard Method 21 does not measure, quantify or reduce emissions; it monitors methane concentration. The standard SEM procedure does not measure emissions; it measures concentration. Further methods and procedures in 95471(c) do not quantify emissions or emission reductions so there is no mechanism to compare emission reduction equivalency.

Broadening the potential use cases and working with stakeholders to establish workable and reasonable criteria to streamline the application approval process will accelerate opportunities for landfill owners/operators to use advanced technologies and monitoring procedures. This could also potentially reduce compliance costs and labor hours.

Section 95475 - Definitions

Owner/Operator definition: If CARB intends to include owners or operators of entities that receive landfill gas from a MSW landfill that also operate any stationary equipment for the management/use of treated or untreated landfill gas or operate any stationary equipment for the combustion of landfill gas in the definitions, then the rule needs to add these entities to the applicability of the rule.

Effective Date of the Regulations

The proposed amendments to the LMR are extensive and will require additional equipment deployment, enhanced field work and corrective action as well as additional regulatory notifications, reporting and oversight. The functionality of the original LMR was largely due to the successful delegation of authority to implement its provisions to the local air quality management districts

(AQMDs). This was a critical step required in the Board Resolution when the LMR was adopted in 2009.

The effort to finalize this delegation of authority through memorandums of understanding (MOUs) took time, with some AQMDs like the SCAQMD amending their Landfill Rule 1150.1 to fully incorporate the LMR requirements. Using the SCAQMD as an example, CARB adopted the LMR in 2009, which became effective in June 2010, the SCAQMD Board adopted the revised Rule 1150.1 in April 2011, and the MOU between the two agencies was signed in May 2012; an effort that overall took almost three years. Of the 22 AQMDs that established MOUs with CARB, the last one was signed in May 2015; six years after CARB adopted the LMR.

While updating the MOU's should be less of an undertaking, many of the AQMD staff members involved in the initial MOU development process may no longer be with the respective agencies. Additionally, discussions with representatives of various air districts have indicated that the resources required for proper oversight and enforcement of the revised LMR will be extensive. This will in turn require thoughtful updates to the MOU's to ensure the AQMDs are properly resourced, trained and the significantly revised scope of the new regulations is fully incorporated into the updated agreements.

It is recommended that the revised LMR not become effective until full delegation and guidance is provided to the local air districts through MOUs or other means. This will also allow time for the regulated landfills to effect the necessary changes to implement the amended regulation in a manner that is consistent with expectations of the amended MOU's.

General Comment - Public Data Reporting

The Draft Regulation will result in an unprecedented volume of data that will need to be collected, analyzed, and administered by both operators and CARB staff (and/or Air District staff should the Air Districts continue LMR enforcement under their MOUs with CARB). Elsewhere in our comments we describe the need to further refine the type and frequency of data collection with its intended purpose. This will avoid the collection of data for the sake of it, resulting in unnecessary costs for the landfills and for the regulators.

Another consequence of this significant increase in data collection is the bearing it has on some stakeholders' requests for increased public transparency. Experience with monitoring and reporting tells us that more data is not necessarily better, particularly if it is not contextualized for each of its intended uses and audiences. If anything, the volume of data generated by this rule could result in a "Prop 65 effect," where there is so much data that it essentially becomes unusable to those who are interested in understanding its impacts.

Similarly, some stakeholders have suggested that the regulation require fence line monitoring at landfills in proximity to communities. These systems are technically complex and extraordinarily expensive; they would require years of engagement between CARB staff, Air District staff, and the operators to install and operate, and would likely require Air District rulemaking as well. The public will soon be able to review emissions from landfills and other stationary sources on an online platform CARB is developing because of CARB's Regulation for the Reporting of Criteria Air Pollutants and Toxic Air Contaminants (CTR). CARB should focus on implementation of CTR rather than pose onerous new requirements on every landfill.

CARB Appendix B – Economic Analysis

CARB's economic analysis downplays the true cost of the proposed changes to the LMR, particularly for smaller or rural landfills that lack resources or flexibility. Industry and local government support responsible regulation and methane reduction. The proposed rule in some cases imposes unrealistic requirements, adds significant cost, and may not achieve the intended environmental benefits. We urge CARB to revise the rule to reflect real-world landfill conditions, focus on proven approaches, and adopt more achievable timelines.

The undersigned share a common interest in achieving the goals of the Landfill Methane Rule in a manner that is focused, efficient and practical to implement. We look forward to continued dialogue on the development of the amended rule.

Sincerely,

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