November 10, 2025

California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: "Proposed Amendments to the Regulation on Methane Emissions from Municipal Solid Waste Landfills" Comments

Dear Chair Sanchez,

The undersigned organizations appreciate the opportunity to comment on the Proposed Amendments to the Landfill Methane Regulation. These amendments reflect a thoughtful and thorough, though somewhat conservative, step towards a nation-leading, protective regulation. Notable improvements, including enhanced wellhead monitoring and response protocols, strengthened gas collection and control system requirements, and the establishment of a Super Emitter Response Program, will make a measurable difference in preventing fugitive emissions. The Proposed Amendments additionally improve data collection and reporting requirements, which we urge CARB to preserve in the final regulation.

When landfill emissions go undetected, nearby residents – especially young children – are among the first and most severely affected. Methane and toxic co-pollutants released from landfills can worsen asthma, harm developing lungs, and degrade local air quality. In California, over 1.6 million children under the age of five live near a municipal solid waste landfill[1]. Protecting communities and vulnerable populations from these exposures requires an emissions monitoring and capture system that identifies and mitigates every leak and ensures swift corrective action.

However, the Proposed Amendments miss several mission-critical opportunities to strengthen alignment with CARB's mandate to deliver transformative emissions reductions and prioritize the health of California's most impacted communities. Chief among these are:

- Comprehensive improvements to surface emissions monitoring (SEM);
- Transparent public reporting of critical landfill emissions and performance data; and
- More stringent thresholds for preventing disasters and protecting environmental and public health.

The surface emissions monitoring procedure, which is the primary source of surface leak detection, remains largely unchanged. Despite major advancements in monitoring technology and a deeper understanding of landfill emissions dynamics over the past fifteen years, these lessons are not sufficiently reflected in the Proposed Amendments. A pathway toward mandatory adoption of remote sensing technology for SEM, combined with more frequent (monthly) monitoring and tighter SEM spacing (less than 25 feet), is essential.

In 2025, it is indefensible that CARB provides no readily available public access to landfill data or reported problems –you must currently submit a public records request– undermining transparency and public trust in environmental oversight. While the Proposed Amendments significantly expand data collection and improve reporting formats, they fail to make any progress on sharing this data with the public, particularly the communities directly affected by landfill pollution. All landfill data reported to CARB, including the remotely detected plume data, should be made publicly available so communities can understand what is happening in their

[1] U.S. Census Bureau. *American Community Survey (ACS) 5-Year Estimates, 2023.* Census tract boundaries defined using U.S. Census Bureau TIGER/Line® Shapefiles, 2023.

neighborhoods, as is already standard in other states like Oregon. Furthermore, CARB should require all landfills within a 10-mile radius of communities to implement live, fenceline monitoring to ensure communities can take timely action when toxics or air pollutants are present.

Finally, methane concentration and landfills gas temperature thresholds must reflect the lessons learned and technological improvements since these standards were first established. The surface emissions methane threshold should be reduced from 500 ppmv to 200 ppmv, as stakeholders advocated for in the 2010 rulemaking and has been proposed as a staff concept in LMR workshops since 2023. At the very least, numerous methane concentrations greater than 200 ppmv found in a single grid should trigger further inspection for cover integrity or other issues. Additionally, the wellhead operational temperature threshold of 145°F and temperature monitoring framework risks allowing high subsurface temperatures to persist for far too long, potentially triggering or worsening SET events or landfill fires.

Landfill fires and (SET) events present an especially urgent and preventable threat. Once ignited, these fires can burn for months or years, releasing toxic air pollutants and volatile organic compounds that endanger nearby residents. Several communities in California have endured or are enduring prolonged exposure to hazardous air pollutants, evacuation orders, and long-term health and property impacts from these events. Beyond public health consequences, landfill fires and SET events inflict significant financial costs, disrupt local waste systems, and damage the credibility of operators and regulatory agencies. Proactive monitoring and tighter operational thresholds are among the most effective tools to prevent these events before they escalate into large-scale disasters that are exponentially more costly to mitigate and control. Strengthening early detection and mitigation requirements will protect communities and preserve public confidence in both operators and CARB's oversight role.

The sections below provide detailed comments by issue area, elaborating on our key recommendations and identifying further opportunities for improvement in the Proposed Amendments. We also highlight the many important elements of the Proposed Amendments that represent major and welcomed progress that should be maintained in the final regulation.

ISSUE AREA I: Utilizing Remote Sensing and Advanced Monitoring Technologies

1. **Required use of alternative technologies for the entire surface of the landfill.**

   We strongly support CARB's proposal to require the use of alternative surface emissions monitoring technologies for areas of the landfill surface deemed unsafe to walk as proposed in § 95469(a). This amendment is an important shift away from the broad exemptions that have historically limited the scope and effectiveness of methane detection and oversight. Additionally, we are supportive of CARB's framework for approving alternative emission monitoring procedures (§ 95471(e)) that establishes clear requirements and performance standards.

However, we urge CARB to extend this requirement beyond “unsafe-to-walk” areas and apply it across the entire landfill surface. As research from FluxLab and others has shown, the current manual walking SEM method is outdated, labor-intensive, prone to human error, and less efficient compared to modern technologies that can provide more frequent and comprehensive emissions monitoring and more reliable data[2][3].

While we understand the importance of having robust data from these technologies prior to requiring them for full-surface SEM, we recommend a clear transition pathway toward mandated utilization. Specifically, we recommend requiring the use of approved alternative SEM procedures once three or more technologies have been approved by the Executive Officer. This would ensure a smooth and clear transition from labor intensive, less efficient manual walking surveys. It would also incentivize continued innovation, provide regulatory certainty for operators, and accelerate the adoption of more accurate, data-rich monitoring methods.

Furthermore, the Proposed Amendments do not adjust the SEM frequency or path spacing requirements to reflect the improved capabilities of these technologies. Maintaining the existing quarterly monitoring schedule and 25-foot spacing fails to leverage the technologies’ inherent advantages and makes compliance easier without improving emissions detection.

To address these issues, we recommend that CARB:

- Establish a phased transition plan to full-coverage monitoring with alternative technologies as the Executive Officer approves alternative SEM procedures.
- Reduce the SEM path spacing to less than 25 feet and increase the monitoring frequency to monthly across all procedures to enhance emissions detection and encourage utilization of advanced technologies while under the voluntary standard. Furthermore, we recommend increasing the frequency of SEM to bi-weekly (twice a month) for alternative SEM procedures.

2. Remotely Detected Emission Plumes - § 95469(b)

We strongly support CARB’s inclusion of a notification and response framework for remotely detected emission plumes. This framework, (hereinafter referred to as the *Super Emitter Response Program* or SERP) is an important shift from voluntary response to super emitter events to mandatory follow-up and mitigation. The requirement for controlled landfill operators to conduct follow-up surface emissions monitoring (SEM) and component leak inspections within 5 calendar days of CARB notification and reporting within 8 days on findings and mitigation actions is a valuable mechanism that will help ensure prompt corrective action when large plumes are detected.

[2] Flux Lab. *“Advanced Leak Detection Technologies for Landfill Methane.”* California Air Resources Board, December 2024. https://ww2.arb.ca.gov/sites/default/files/2024-12/Session-2_FluxLab.pdf

[3] Omidi, Athar; Bourlon, Evelise; Khaleghi, Afshan; Tarakki, Nadia; Martino, Rebecca; Stuart, Jordan; Risk, David. *“Most Landfill Methane Emissions Escape Detection in EPA21 Surface Emission Monitoring Surveys.”* Waste Management, Vol. 207, 2025, Article 115104. ISSN 0956-053X. https://doi.org/10.1016/j.wasman.2025.115104

However, we have concerns about the current structure of the SERP:

- **Delayed timelines for uncontrolled landfills - § 95469(b)(3):** Under the draft amendments, uncontrolled landfills are given 30 days to complete follow-up SEM after notification of a plume from CARB and 35 days to report to CARB on their findings and mitigation actions. In CARB's Initial Statement of Reasons (hereinafter referred to as "ISOR"), staff explained that this longer timeline is intended to provide additional coordination time to complete monitoring over the landfill surface. However, this delay is inconsistent with the urgency and scale of emissions to be captured under the SERP. *Super emitter* events represent major, active methane releases that can persist and intensify if not addressed quickly.

  We recommend shortening this timeline to 14 days for follow-up SEM and 21 days for reporting. This adjustment would ensure that response actions occur promptly while still allowing adequate time for planning and logistics.

- **Lack of community and local agency notification:** The current SERP framework does not include any requirement for notification to local agencies or community groups when large methane plumes are identified through remote sensing technologies. Under CARB's proposed framework, plume detections may originate from any approved source, which could include satellites, aerial flyovers, or other advanced monitoring systems that meet CARB's detection criteria. At present, satellite data (like that collected by Carbon Mapper) is communicated to the public through their online data portal, but there is a lag of several weeks between plume detection and public access. Under the proposed SERP, CARB would receive this data within days of detection and promptly notify the landfill owner or operator to investigate and mitigate the emission event.

  Large methane plumes are not just climate signals—they often indicate substantial releases of co-pollutants such as volatile organic compounds and hazardous air pollutants, posing real and immediate risks to surrounding neighborhoods. Residents living near landfills—many of whom already face compounding odor, air quality, and health burdens—deserve to know when such events occur and what actions are being taken to address them. Including local Air Quality Management Districts (Air Districts) and making information public would improve transparency, accountability, and trust– ensuring that *all* stakeholders have timely access to critical information.

  To strengthen accountability and public trust, we recommend that CARB:

  - Require notification to local Air Districts when operators are alerted of a large plume and any actions taken to mitigate leaks to ensure timely enforcement follow-up if needed.
  - Develop a public notification protocol for large emissions events detected by third parties. Notifications should be distributed via CARB's website or a public-facing dashboard that displays the date, location, general status

of confirmed high-emission events and any mitigation measures implemented.
    - Establish threshold-based alert criteria for plumes exceeding a certain methane concentration or persistence level, triggering more robust reporting and community updates.

- **Shift the burden of data purchasing agreements to landfill operators.** CARB's current approach of purchasing third-party remote sensing data has been essential in identifying high-emitters within the Oil & Gas sector and will be critical in mitigating super-emitter events in the waste sector. However, this model depends on uncertain state funding and may not be financially sustainable in the long term. To ensure program continuity and equity, we recommend that CARB require landfill operators to fund ongoing third-party methane monitoring, with data transmitted directly to CARB, the landfill operator or owner, and the Air District.

  Under this model, CARB would:
    - Approve or accredit third-party monitoring vendors to ensure data quality and consistency.
    - Receive emissions data directly from vendors alongside operators, preserving regulatory oversight.
    - Implement public transparency measures for events reported under the SERP.

  This approach would reduce reliance on public funds while maintaining CARB's oversight and ensuring data remains accurate, standardized, and publicly accessible.

Issue Area I Recommendations:

- Establish a phased transition plan to mandatory full-coverage SEM using alternative technologies once three or more have been approved by the Executive Officer.
- Reduce SEM path spacing below 25 feet and increase monitoring frequency to monthly across all methods; require bi-weekly monitoring for alternative SEM procedures.
- Shorten follow-up and reporting timelines for uncontrolled landfills under the Super Emitter Response Program (SERP) to 14 days for SEM completion and 21 days for reporting.
- Alert communities and local AQMDs of all SERP events and publicly post documentation of follow-up and corrective actions taken.
- Shift financial responsibility for third-party remote sensing data collection to landfill operators, with CARB-approved vendors providing data directly to CARB, operators, and local Air Districts.

ISSUE AREA II: Improvements to Surface Emissions Monitoring (SEM)

We appreciate CARB's efforts to strengthen the SEM requirements and recognize the numerous improvements included in the Proposed Amendments. Many of these updates meaningfully improve monitoring accountability, consistency in data collection, and responsiveness to exceedances. However additional fixes are needed to ensure that the SEM framework adequately captures emissions across *all* landfill surfaces and prompts timely corrective actions that reflect the urgency of methane mitigation. The stakes could not be higher – every undetected emission represents both a lost opportunity for methane reduction and a continued environmental and public-health burden on surrounding communities.

We commend CARB for several important updates that strengthen the SEM framework, including:

- **Monitoring of unsafe-to-walk areas - § 95469(a):** As mentioned above in *Issue Area I*, we strongly support the inclusion of previously excluded "unsafe-to-walk" areas like the steep slopes and active face of the landfill.
- **Enhanced recordkeeping and reporting - § 95470(a)(1)(D):** Requiring operators to record all SEM concentration readings, including coordinates, date/time, and a minimum collection frequency of one hertz, is a significant improvement in accountability and data quality.
- **Site conditions - § 95471(c)(2)(D) and '(3)(C):** We support the new barometric pressure monitoring requirements. CARB's explanation for this change in the ISOR appropriately explains the connection between barometric pressure variations to landfill gas dynamics and emissions, and the inclusion of this data will provide important context for interpreting SEM results, ensuring that SEM is conducted under appropriate site conditions.
- **Advance notification to CARB - § 95470(b)(5):** We strongly support requiring operators to notify CARB at least 15 days prior to conducting SEM. We are confident this change will facilitate more effective agency oversight and will enable CARB to conduct timely audits and compliance checks, as needed.
- **Structured corrective action and re-monitoring framework - § 95469(a):** We commend CARB for establishing clear timelines and escalation procedures for addressing SEM exceedances. The proposed structure – requiring corrective action with 3 calendar days, re-monitoring within 10 calendar days, and escalating responses for repeated exceedances – provides essential clarity and consistency and will promote more timely and effective mitigation responses to emissions exceedances.
- **Defined process for alternative corrective actions - § 95469(a)(3):** CARB's establishment of specific application, approval, and disapproval timelines for alternative corrective actions is a welcome improvement that ensures timely, effective responses to recurring emissions exceedances and prevents prolonged emissions while operators await CARB approval.

Despite these improvements, several areas of the Proposed Amendments warrant additional strengthening to ensure robust detection and timely mitigation of surface emissions:

- **Monitoring frequency and path spacing:** As discussed above in *Issue Area I*, we continue to recommend reducing SEM path spacing to less than 25 feet (ideally 10 - 15 feet), and increasing the monitoring frequency to monthly. Additionally, for Alternative SEM Procedures, CARB should consider requiring more frequent monitoring for technologies capable of covering the whole surface of the landfill efficiently – we recommend bi-weekly (every two weeks) SEM. These updates would substantially improve emissions detection and serve as an effective transition mechanism towards utilizations of more efficient, remote sensing technologies.
- **Methane mitigation threshold - § 95465(a)(1):** While we appreciate the requirement for operators to record all concentration readings during SEM, maintaining the 500 ppmv exceedance threshold limits the ability to identify and address smaller but persistent emissions that cumulatively contribute to methane output at landfills.

  We encourage CARB to revisit its earlier proposal to lower the mitigation threshold to 200 ppmv. Alternatively, CARB could require targeted follow-up actions when a grid shows multiple readings above 200 ppmv. This could include mandatory cover integrity and gas collection system assessments for grids with repeated detection of leaks over 200 ppmv, or increasing SEM frequency, similar to the framework outlined for “Recurring Surface Exceedances” in § 95469(e)(2). This would ensure that excessive, smaller leaks are investigated in a structured and consistent way while addressing concerns that lowering the mitigation threshold could increase the likelihood of overpulling, resulting in oxygen intrusion and potentially creating the conditions conducive to subsurface fires.
- **Monitoring frequency for closed areas - § 95469(a)(1)(C):** CARB’s revisions to the monitoring frequency for closed areas under final cover (reducing the relaxed schedule from annual to every three quarters) represent an improvement. CARB should clarify that *any* exceedance, including those identified through follow-up monitoring prompted by the SERP, would trigger a return to quarterly monitoring. Explicitly including SERP-related exceedances in this provision would close a potential oversight gap and ensure consistent treatment of emissions data, regardless of how it was detected.
- **Monitoring of the working face - § 95471(c)(1)(A):** We support CARB’s proposal to include the working face in quarterly SEM for the first time, recognizing this area as a major source of emissions. However, the proposed exclusion of the working face from monitoring for 180 days after waste placement is excessive considering methane generation can begin well before six months. We recommend reducing this exclusion period to 90 days after waste placement, which would limit the exclusion to a single quarterly SEM event while maintaining operational flexibility for active disposal areas. We also encourage CARB to evaluate additional strategies in future updates to further improve monitoring and emissions detection at the working face.
- **Recurring Surface Exceedances Framework - § 95469(a)(4):** We support CARB’s efforts to establish a “recurring surface exceedance" framework that triggers increased monitoring frequency and corrective actions when repeated high readings are detected within the same grid. Specifically, requiring monthly monitoring and collection system

and cover integrity assessments in areas with recurring exceedances represents an important accountability mechanism. To improve efficacy, we encourage CARB to expand this framework to ensure it captures systemic issues rather than isolated grid anomalies. Specifically, we recommend extending the recurring exceedance analysis to identify landfill-wide patterns. If multiple grids across the landfill meet the recurrence threshold within a 12-month period, CARB should require increased monitoring frequency across the entire landfill surface.

While we support the framework as proposed, we emphasize that it should complement—not substitute for—broader increases in baseline SEM frequency. Increasing the frequency of SEM across all landfill surfaces remains one of the most effective tools for identifying and mitigating methane emissions early and preventing recurring exceedances from developing in the first place.

Issue Area II Recommendations:

- Reduce SEM path spacing to less than 25 feet and increase monitoring frequency to monthly, with bi-weekly monitoring for approved alternative SEM technologies.
- Reduce the methane mitigation threshold from 500 ppmv to 200 ppmv, or at minimum require cover integrity and gas collection system checks for grids with multiple identified leaks over 200 ppmv.
- Clarify that any exceedance in closed areas, including SERP-related exceedances, triggers a return to quarterly SEM.
- Limit the working face SEM exclusion to 90 days after waste placement.
- Expand the recurring exceedance framework to identify landfill-wide patterns when multiple grids meet recurrence thresholds.
- Ensure the recurring exceedance framework complements, rather than replaces, frequent baseline SEM monitoring.

ISSUE AREA III: Gas Collection and Control Systems (GCCS)

We commend CARB for the substantial progress reflected in the Proposed Amendments to strengthen landfill gas collection and control systems. These updates represent a significant step forward in ensuring that landfill gas is effectively captured and controlled.

We are highly supportive of the following GCCS improvements and appreciate CARB's thoughtful approach to each:

- **Required installation of horizontal collectors or Casisson wells in new cells - § 95464(5):** We support CARB's requirement that landfills accepting at least 200,000 tons of solid waste per year install horizontal collectors or caisson wells in new waste placement areas. We also commend CARB for coupling this requirement with sensible safeguards– specifically, the condition that collection begin only after 15 vertical feet of

waste is placed and positive pressure is detected. These conditions appropriately balance emissions control objectives with operational safety by ensuring adequate gas generation prior to vacuum connection to prevent subsurface elevated temperature events.

- **Preventing emissions during GCCS downtime - § 95464(b):** We fully support CARB's new requirement that operators automatically shut down the gas mover system when collection or control is not feasible, and that all affected valves be immediately closed. This measure will prevent uncontrolled venting of untreated landfill gas during system outages.

  Additionally, we support CARB's proposal to limit total gas control system downtime to no more than 120 hours per calendar year, as well as the new requirements for gas flow measurement devices on control systems and pressure measurement devices on collection systems. Together, these amendments establish critical performance baselines and best practices to minimize downtime-related emissions.
- **Removal of broad exemptions for construction activities - § 95464(e):** We strongly support the removal of the previous exemption for construction activities from the 500 ppmv emissions standard.
- **Decommissioned wells - § 95464(c)(2):** We appreciate CARB's work to establish a clear definition and criteria for "decommissioned wells." In previous iterations of the regulation, the lack of definition allowed operators to inappropriately classify malfunctioning or poorly maintained wells as "decommissioned," leading to avoidable emissions. By defining a decommissioned well and providing clear criteria for meeting this definition, CARB strengthens regulatory clarity, prevents misuse, and ensures consistency with the original intent of the federal rule.
- **Minimizing emissions during component repairs and temporary shutdowns - § 95464(e):** We appreciate CARB's detailed and pragmatic approach to minimizing emissions during necessary component repairs and temporary shutdowns. Specifically, we support: (1) the requirement that shutdown components be returned to service within five calendar days; (2) the notification requirement when a component cannot be returned to service within that timeframe; (3) the use of SEM data to demonstrate that the shutdown is not creating excess emissions and; (4) the limitation on the amount of wells that can be offline at one time. These provisions strike an important balance between reasonable operational flexibility and meaningful emissions reductions.

Building on these improvements, we also recommend targeted fixes to accelerate GCCS operation and strengthen monitoring requirements:

- **Early installation of GCCS - § 95464(a)(3) and (4):** We strongly support CARB's decision to accelerate the required installation and operation timelines for GCCS following design plan approval. The proposed reduction from 18 months to 6 months (180 days) for active landfills and from 30 months to 18 months for closed or inactive landfills represents a major improvement that our coalition celebrates as a significant win for emissions reductions. We particularly appreciate that this requirement applies to *all*

landfills, not only large facilities as previously proposed, and that CARB went beyond our prior recommendations by adopting an even shorter timeline for active sites. This change will significantly reduce uncontrolled emissions from new and expanding disposal areas and ensure that gas collection infrastructure is operational sooner.

However, we recommend further limiting the early GCCS installation requirement for active landfills to 90 days after initial waste placement, which would complement our recommended reduction of the SEM exclusion for the working face to 90 days. Together, these changes would enable more timely monitoring and mitigation of emissions during the period when generation begins most rapidly.

- **Component Leak Monitoring - § 95469(c):** We appreciate CARB's inclusion of quarterly component leak monitoring requirements for all components containing landfill gas under positive pressure. Component leaks are a meaningful and under-recognized source of emissions, and requiring operators to identify, tag, repair, and re-monitor leaks within 10 calendar days represents a critical improvement to emissions reductions under the LMR. We recommend increasing the monitoring frequency to monthly to ensure more timely detection and mitigation of component leaks, which will further reduce emissions and enhance overall system performance.

Issue Area III Recommendations:

- Accelerate early GCCS installation to 90 days after initial waste placement for active landfills.
- Increase component leak monitoring frequency from quarterly to monthly to ensure timely detection, repair, and mitigation of emissions.

ISSUE AREA IV: Wellhead Parameter Requirements and Monitoring

We appreciate the extensive work CARB staff have put into improving the wellhead parameter requirements and monitoring framework. These revisions are an essential step forward in identifying and mitigating subsurface oxidation, fires, and other reactions before they escalate. This section of the Proposed Amendments clearly reflects CARB's thoughtful consideration of lessons learned and best practices for protecting the environment and ensuring responsible landfill management. We strongly support this direction and offer the following recommendations to further strengthen the effectiveness and consistency of this framework.

1. **General wellhead monitoring - § 95469(e):** We support the requirement for monthly monitoring of pressure, temperature, flow rate, and gas composition at the wellhead. This level of data collection is fundamental to not only maintaining efficient and safe GCCS operations, but increasing our understanding of landfill operational parameters and trends. However, we strongly encourage CARB to consider requiring automated wellhead tuning systems for all landfills.

These systems enable continuous, real-time monitoring of key parameters already identified in the Proposed Amendments and can automatically alert operators when readings exceed regulatory thresholds[4]. They also integrate with data visualization platforms that support early issue detection and trend analysis, improving operational decision-making and risk assessment. These technologies have also proven successful in reducing system downtime, increasing gas collection efficiency, and improving compliance outcomes.

2. **Pressure monitoring - § 95469(e)(1) and (2):** We support the pressure monitoring and response framework that CARB has proposed. These requirements ensure that operators promptly identify and address positive pressure events that could indicate systems failures or leaks, and we believe they will contribute to improved GCCS performance overall.
3. **Temperature Monitoring and Response - § 95464(d) and 95469(e)(3):** We appreciate CARB's comprehensive approach to temperature monitoring and response. However, we are deeply concerned that the current 145°F threshold and the associated response timelines may not adequately prevent subsurface elevated temperature (SET) events. Wellhead readings can be misleading and temperatures above 131°F are indicative of active reactions and warrant immediate corrective action.

   We commend CARB for linking exceedances of 131°F to collection system and cover integrity assessments, and for developing the wellhead trend analysis framework. However, the current 60-day delay before enhanced monitoring and downwell temperature monitoring are triggered is too long and does not account for potentially rapid head development below the surface. Additionally, operators conducting downwell temperature monitoring should document not only temperature readings, but also observable well conditions, such as pinched, buckled, or flooded wells, regardless of whether a full collection system assessment is triggered. Documented well obstructions should be followed up with documentation demonstrating that repairs and corrective actions have been taken to address the obstruction and return the well to safe, effective working conditions.

   We also have significant concerns regarding the current definition and implementation of "root cause analysis" throughout the temperature monitoring and trend analysis frameworks in the Proposed Amendment. The provided definition in § 95475(a)(35) is overly vague and does not prescribe the investigative actions necessary to fully understand SET events and landfill fires. Without specific guidance, root cause analyses may fail to capture critical information about waste composition, subsurface reactions, or GCCS issues, leaving operators and regulators without actionable insights into the underlying causes of elevated temperatures. Operators should conduct targeted investigations, including borings in safe areas near suspected or confirmed SET events

[4] US EPA Office of Air and Regulations (2024). White Paper - MSW Landfills: Increasing Landfill Gas Collection Rates. https://www.regulations.gov/document/EPA-HQ-OAR-2024-0453-0008

to assess reactive waste presence, and inspect cores for evidence of charring, discoloration, odors, or other indicators of thermal activity. Boring logs and all associated observations and reports should be shared with CARB, Air Districts, and the public. Documenting these observations is essential to fully understand subsurface conditions, identify the causes of elevated temperatures, and develop effective, appropriate mitigation strategies to prevent, slow, or stop heat migration.

To address these gaps, we recommend:

- Lower the temperature threshold for wellheads to 131°F **or** (1) Initiate downwell temperature monitoring within 30 days of a wellhead exceeding 131°F, rather than waiting 60 days and (2) conduct weekly monitoring of wellhead temperatures exceeding 131°F until readings return below the threshold.
- Require daily or continuous monitoring of all parameters (temperature, gas composition, pressure, flow rate) for wells exceeding 145°F until readings stabilize below 131°F.
- Require operators conducting downwell monitoring to document well conditions (pinched, buckled, flooded), note the type and root cause of any obstructions, and take corrective actions.
- Include targeted investigations for SET events, such as borings in safe areas near the event, inspection of cores for charring, discoloration, odors, or other thermal indicators, and documentation of findings to guide mitigation strategies.

4. **Wellhead trend analysis framework - § 95469(e)(7):** We strongly support CARB's inclusion of a wellhead parameter trend analysis as a proactive tool to identify emerging issues. Trend analysis provides operators and regulators with an early warning system for wells exhibiting gradual increases in temperature, pressure, or other parameters that may not immediately exceed established thresholds.

   However, it is currently unclear whether the Proposed Amendments intend for operators to evaluate all historical monthly records for each well or only the most recent month of monitoring records. Without clarification, there is a risk that slow-developing trends could go unnoticed, undermining the preventative potential of the framework.

   Recommendation: CARB should clarify that wellhead trend analysis must evaluate multi-month trends for each well to capture gradual parameter increases. Operators should be required to flag wells exhibiting consistent parameter increases over consecutive months, even if each monthly increase remains below the trend standard established in the framework. This approach would provide earlier identification of wells at risk of developing SET events, allow for timely interventions, and better inform necessary assessments or corrective actions.
5. **Oxygen Monitoring and Recurring High Oxygen Events - § 95469(e)(5)–(6):** We support the tiered oxygen content thresholds tied to wellhead temperature and the framework CARB established for addressing recurring high-oxygen events. This approach provides clear operational guidance and aligns well with the overall goal of maintaining safe landfill conditions.

However, we are concerned that the current oxygen content restriction of 5 percent for wells exceeding 131°F may not be protective enough. As noted by CalRecycle staff[5]:

> CalRecycle staff recommends that temperatures above 131°F (55°C) be considered the threshold at which a SET Event is considered to have started. We recognize that USEPA revised its regulation under the National Emissions Standards for Hazardous Air Pollutants (NESHAP) 40 CFR 63.1958(c), effective September 27, 2021, which increased the operational standard temperature from 131°F (55°C) to 145°F (62.8°C). CalRecycle still recommends the more conservative temperature threshold of 131°F (55°C) to initiate a root cause analysis, restrict oxygen to less than two percent, and repair the cover to prevent a SET Event. (pg. 5)

Based on this guidance, we recommend that CARB revise the framework to limit oxygen content to less than 2 percent for wells exceeding 131°F to better prevent SET events and maintain safe landfill conditions.

6. **Liquid level monitoring - § 95469(F):** We support CARB's addition of biannual liquid-level monitoring for all wells but are concerned that the current frequency is insufficient given the potential impacts of liquid accumulation. Liquid logging can lead to high shut-in gas pressures, leachate seeps or blow-outs, and reduced gas flow rates[6]. Liquids in collection systems (wells or piping) can also contribute to heat and pressure buildup, potentially exacerbating SET events.

   Recommendations:
   - Increase the frequency of liquid-level monitoring to quarterly, at a minimum, for wells in active areas or where trends indicate elevated risk.
   - Include liquid-level checks in the enhanced monitoring framework for wells exhibiting concerning trends in temperature, oxygen, or other parameters, as excessive liquids can amplify the severity of SET events.

Issue Area IV Recommendations:

- Require automated wellhead tuning at all landfills
- Lower the wellhead temperature threshold to 131°F **or** initiate downwell monitoring within 30 days instead of 60 days and conduct weekly monitoring for wells exceeding 131°F.

[5] CalRecycle. (2025, March 28). Review of the November 26, 2024, Revised Soil Reaction Break/Barrier Plan for the Chiquita Canyon Landfill Subsurface Elevated Temperature (SET) Event [Letter from Todd Thalhamer to Karen Gork]. California Department of Resources Recycling and Recovery. https://dtsc.ca.gov/wp-content/uploads/sites/31/2025/04/2025-03-28-CalRecycle-Letter-to-LEA.pdf

[6] US EPA Office of Air and Regulations (2024). White Paper - MSW Landfills: Increasing Landfill Gas Collection Rates. https://www.regulations.gov/document/EPA-HQ-OAR-2024-0453-0008

- Require daily or continuous monitoring of all parameters (temperature, gas composition, pressure, flow rate) for wells exceeding 145°F until stabilized below 131°F.
- Require operators conducting downwell monitoring to document well conditions (pinched, buckled, flooded), note the type and root cause of obstructions, and take corrective actions.
- Reduce the initial response timeframe to 14 days for assessments (instead of 30 days) and 30 days for correction (instead of 60 days) following any temperature exceedance above 131°F.
- Conduct targeted investigations for SET events, including borings in safe areas, inspection of cores for charring, discoloration, odors, or other thermal indicators, and document findings to guide mitigation strategies.
- Clarify that wellhead trend analysis must evaluate multi-month trends to identify gradual increases in parameters and flag wells at risk of developing SET events.
- Limit oxygen to 2% for wells exceeding 131°F.
- Increase the frequency of liquid-level monitoring to quarterly, at a minimum, for wells in active areas or where trends indicate elevated risk.
- Include liquid-level checks in the enhanced monitoring framework for wells exhibiting concerning trends in temperature, oxygen, or other parameters.

ISSUE AREA V: Recordkeeping, Reporting, and Data Transparency

We appreciate CARB's work to improve recordkeeping and reporting practices under the Proposed Amendments. CARB has correctly identified that current reporting practices are inconsistent and onerous considering overlapping federal reporting requirements. This misalignment in reporting requirements and formats limits both effective regulatory oversight and operators' capacity to focus on efficient landfill system management. The proposed standardized, digital reporting requirements are a meaningful step forward in improving data accuracy and quality.

Despite the many areas of recordkeeping and reporting progress reflected in the Proposed Amendments (including several provisions that respond directly to recommendations from our previous comment letters) none of the amendments address the dire need for data transparency. We remain deeply concerned that this essential component of oversight and accountability has been entirely left out of the current draft. Transparent data access is not a peripheral issue, but is foundational to public trust and environmental justice outcomes.

We strongly recommend the creation of a publicly available data portal that provides real-time or near real-time access to landfill monitoring and operational data. This would allow communities to respond to air quality changes in real time and take appropriate actions to protect their health. Publicly available reporting is vital for environmental justice and community trust. At the very least, CARB should publish all annual, quarterly, and other required landfill reports on their

internet website for public access. Impacted communities have a right to know local air quality conditions and the measures being taken to reduce pollution from neighboring polluting facilities. This system should include standardized digital uploads of all relevant data types, including SEM and wellhead monitoring data, GCCS operational data, SERP data, and other metrics.

A data platform would bring several critical benefits. Specifically, it would:

- Allow communities living near landfills to access timely and accurate information about local air quality.
- Empower researchers and advocates to identify systemic issues and improve collective understanding of landfill emissions trends.
- Strengthen CARB's credibility and leadership by demonstrating a commitment to transparency, accountability, and equity in enforcement and oversight – something that all Californians are lacking from the federal government.

Data transparency within the SERP framework: Communities must be informed when large methane plumes are detected. Plume alerts and monitoring data—whether collected by CARB, Carbon Mapper, or other qualified third parties—should be made publicly available in real time through an accessible data portal at the same time it is provided to landfill operators. Communities living near polluting facilities deserve timely notice of super-emitter events that may impact air quality. Access to near-real-time data would allow residents to make informed decisions about their health, such as staying indoors, using air purifiers, or avoiding outdoor activities during high-emission periods.

Fenceline monitoring: In addition to facility-specific monitoring, CARB should require fenceline monitoring at landfills to provide insight into the emissions that escape the landfill property and impact surrounding communities. Landfills are dynamic sources of methane, carbon dioxide, volatile organic compounds, toxic chemicals, and other gases, and even well-operated GCCS can have leaks or fugitive emissions that bypass point-source controls. Without monitoring at the fenceline, these emissions may go undetected as they affect local air quality, creating risks for community exposure that are not captured by internal SEM or wellhead monitoring alone.

Fenceline monitoring provides an independent, continuous measure of ambient air quality immediately outside the landfill boundary, giving regulators and communities a real-world indicator of emissions escaping collection and control systems. This type of monitoring is critical for protecting communities and the data allows communities to take immediate protective actions, such as avoiding outdoor activity or using air filtration, when there are emissions spikes or unusual emissions events.

We recommend that CARB require fenceline monitoring for all landfills. At minimum, fenceline monitoring should be mandatory for any landfill located within a 10-mile radius of an established community and any new landfill cited within 10 miles of existing communities.

Higher Operating Value Waivers: A critical gap in oversight stems from the widespread and often opaque use of Higher Operating Value (HOV) waiver approvals, which allow landfill gas wells to operate above the 131°F and 145°F thresholds intended to prevent SET events. Depending on the timing of the request and Clean Air Act authorities, it is our understanding that these waivers may be reviewed by either the US EPA or the local Air District, creating a fragmented process with inconsistent oversight. In many cases, HOV waivers appear to be approved with minimal scrutiny, limited documentation, and no public transparency. These very conditions undermine regulatory safeguards and may delay corrective action.

At Chiquita Canyon Landfill, the continued operation of high-temperature wells under such waivers with minimal oversight contributed to the escalation of the crisis, allowing conditions to worsen unchecked. As a coalition, we strongly oppose the issuance of these waivers in California. At a minimum, when such waivers are granted, denied, or approved with conditions, operators must be required to promptly notify both local and state regulators and post all related documentation on the landfill's website for public access. Additionally, any waivers granted in California should have documented justification, robust monitoring and response protocols, and mandatory follow-up by both the operator and regulators. This transparency and response framework is essential to ensure timely regulatory intervention and to keep surrounding communities informed of risks that may impact their health and safety.

Issue Area V Recommendations:

- Create a publicly available data portal providing real-time or near-real-time access to SEM, wellhead, GCCS, SERP, and other relevant landfill data. This data portal could be maintained by CARB or by individual operators, as long as data is publicly available and accessible. At minimum, CARB should publish all landfill reports online.
- Include super-emitter event notifications and monitoring data in the public portal at the same time they are provided to operators.
- Require fenceline monitoring for any landfill within 10 miles of an established community and for all new landfills within 10 miles of existing communities.
- Ensure the data portal supports community engagement, researcher access, and transparency to strengthen accountability and environmental justice outcomes.
- Prohibit operators from operating under HOV waivers for wells at elevated temperatures or high oxygen. At minimum, require operators to notify local and state agencies when such waivers are granted, denied, or approved with conditions, and post all related documentation on the landfill's public website to ensure transparency and timely regulatory oversight.

Issue Area VI: Strengthening Cover Standards and Reporting

We appreciate the work CARB has done and their acknowledgement of cover as a critical component of effective landfill gas collection. Proper cover management is essential not only for preventing surface emissions, but also for maintaining slope stability and reducing the risk of

landfill fires and SET events, as cover erosion allows oxygen to enter the wastemass, a key precursor to fire risk.

We commend CARB for several important advancements in cover-related requirements in the Draft Amendments, including:

- **Monthly Cover Integrity Monitoring - § 95464(b)(6):** CARB's requirement for regular, monthly inspections is essential for ensuring consistent cover performance and that repairs are completed in a timely manner.
- **Cover Integrity Assessment Plans - § 95464(b)(6):** We support the requirement for operators to develop and implement cover integrity assessment plans for multiple purposes, including addressing recurring surface exceedances, temperature or oxygen exceedances, and demonstrating robust final cover for relaxed monitoring eligibility.
- **Recordkeeping on Cover Materials - § 95470(b)(3)(E)(1):** We strongly support the requirement for operators to track cover material types and to identify areas under daily, intermediate, and final cover.
- **Clear Definitions of Cover Types - § 95475(a)(10):** We support CARB's clear definitions for "cover material," including daily, intermediate, and final cover, which helps standardize monitoring and compliance expectations.
- **Clear Criteria for Correcting Deficiencies - § 95471(k)(1):** We especially appreciate the specificity provided for what constitutes a corrected deficiency, including:
    - Adding and compacting material to achieve required thickness, eliminate cracks, prevent erosion, or repair well boot seals.
    - Replacing alternative daily cover with soil daily cover, or upgrading daily cover to intermediate cover.
    - Adding and compacting intermediate cover to meet fines content, particle size, permeability, and thickness requirements, or replacing intermediate cover with final cover.
    - Incorporating compost or biochar into final cover, maintaining soil moisture, or adding erosion control measures in areas prone to erosion.

Although the Proposed Amendments represent significant progress, several additional improvements would enhance the enforceability, transparency, and overall performance of landfill cover systems. We recommend that CARB:

- **Clarify recordkeeping requirements:** CARB's current recordkeeping language under § 95470(a)(1)(CC) requires operators to maintain descriptions of monitoring procedures and records of completed repairs or maintenance. We recommend clarifying that operators must also document any observed cover integrity issues, including the date, location, observations of odors or deviations, and nature/severity of the issue, in addition to any corrective actions/repairs. This ensures that compliance is verifiable and that corrective actions are properly documented.
- **Require reporting of cover monitoring plans:** Cover monitoring plans mandated in §95464(b)(6) should be submitted to CARB for review rather than maintained solely for recordkeeping purposes. In addition, the results of cover inspections should be reported

quarterly– including any identified issues, observations, and actions taken to repair cover issues. Implementing quarterly reporting for cover monitoring would align with existing quarterly reporting requirements in § 95470(b)(4), all of which are fundamental to assessing the efficiency and effectiveness of landfill gas collection and control systems. This alignment will promote a more comprehensive understanding of landfill performance, ensuring that key elements of GCCS operation are tracked and evaluated together by regulators.

- **Establish minimum standards for Alternative Daily Cover (ADC):** We urge CARB to ban auto shredder fluff as ADC and establish minimum standards for allowable ADC materials. ADC has not been proven to reduce emissions and can increase the risk of fires and SET events due to its low density, high porosity, and flammability. If ADC is allowed, it should be limited to non-flammable, low-porosity materials. Additionally, organic material should not be used, as it contributes to methane generation and should instead be diverted to meet SB 1383 goals.
- **Require slope stability and risk evaluations:** CARB should require quantitative slope stability evaluations for landfills with a history of or susceptibility to slope failure. These assessments are particularly important for facilities that have used leachate recirculation, a practice that significantly increases instability and subsurface heating risks and should be prohibited statewide.

Issue Area VI Recommendations:

- Clarify §95470(a)(1)(CC) to require documentation of all observed cover deficiencies, including the date, location, and corrective actions taken.
- Require quarterly reporting of cover integrity monitoring results to align with existing reporting for SEM, component leak, and wellhead monitoring data.
- Ban the use of auto shredder fluff as alternative daily cover (ADC) and establish minimum standards for allowable ADC materials, limiting use to non-flammable, low-permeability materials.
- Prohibit the use of organic materials as ADC to support SB 1383 organics diversion goals.
- Require quantitative slope stability evaluations for landfills with a history of or susceptibility to slope failure.

ISSUE AREA VII: Leachate Recirculation

Simply requiring recordkeeping and reporting on leachate volumes used for recirculation and areas of application as proposed in § 95470(a)(1)(U) and § 95470(b)(6)(E) is insufficient to address the significant environmental and safety risks associated with leachate recirculation practices.

Leachate recirculation accelerates waste decomposition and methane generation, which can substantially increase the likelihood of fugitive emissions. It also heightens risks of odor issues,

slope instability, and subsurface heat events—all of which undermine the intent of these amendments to reduce methane emissions and improve landfill performance. The goals of leachate recirculation (to accelerate decomposition and extend landfill capacity) are fundamentally incompatible with California's climate objectives and CARB's broader methane reduction strategy.

We strongly recommend that CARB prohibit leachate recirculation at all California landfills. At minimum, CARB should establish a moratorium on new or expanded leachate recirculation operations until sufficient data demonstrate that the practice can be conducted without increasing methane emissions or endangering landfill integrity. Recordkeeping and reporting alone do not provide adequate mitigation for the risks posed by this practice.

Conclusion

This update is an opportunity for California to reaffirm its leadership on climate action and protection of disadvantaged communities, particularly in a year when many environmental rules have been weakened at the federal level. The Proposed Amendments make significant progress in improving data rigor, temperature response, and trend monitoring of landfill data. Our recommendations focus on the additional steps needed to ensure meaningful emissions reductions and regulatory transparency across all landfills, including: establishing a clear pathway to mandatory, frequent remote sensing; creating a robust, publicly accessible system for community data; and setting appropriately stringent response thresholds to protect people and the environment. We appreciate the staff's careful work on this regulation and look forward to a stronger final rule that prioritizes both environmental and public health protections.

Thank you for your consideration. Please contact Erica Parker at erica@cawrecycles.org for any questions or concerns.

Sincerely,

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