



May 9, 2024

Matthew Botill
Division Chief, Industrial Strategies Division
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Recommendation to Establish a Safe Harbor LCFS Crediting Period to Incentivize Early Adoption of Enhanced Landfill Methane Collection Systems

(Comment submitted electronically)

Dear Mr. Botill,

On behalf of Loci Controls, Inc. (“Loci”), I am writing to provide comments relating to the Proposed Amendments to the Low Carbon Fuel Standard (“LCFS”). Specifically, this comment recommends that the California Air Resources Board (“CARB”) establish a safe harbor crediting period for early adopters of enhanced landfill methane collection systems including automated monitoring and control technologies for landfills (“Advanced LFG Control Systems”). The establishment of this crediting period would be consistent with the language and intent of SB 1383, the short-lived climate pollutant (“SLCP”) statute that underpins the SLCP Strategy that CARB developed. Under the LCFS program at section 95488.9(f)(4), similar safe harbor crediting periods already exist for dairy and swine digester pathways and for voluntary organics diversion pathways. The establishment of this safe harbor for enhanced landfill methane collection systems would incentivize landfill owners and operators to install these systems prior to the effective date of any future more stringent landfill methane regulation.

If implemented, this proposal would expedite and expand the capture of methane, the largest component of landfill gas by volume, and reduce methane emissions. The accelerated and expanded capture of methane would be highly beneficial to California’s greenhouse gas (“GHG”) and carbon neutrality goals given that methane is a potent short-lived climate pollutant. As stated in the 2022 Final Scoping Plan,

Human sources of methane emissions are estimated to be responsible for up to 25 percent of current warming. Fortunately, methane’s short atmospheric lifetime of ~12 years means that emissions reductions will rapidly reduce concentrations in the atmosphere, slowing the pace of temperature rise in this decade. Further, a substantial portion of the targeted reductions can be achieved at low cost and will provide significant human health benefits. For example, the UN’s Global Methane Assessment (2021) found that over half of the available targeted measures have mitigation costs below \$21/MTCO_{2e},

and that each million metric tons of methane reduced would prevent 1,430 premature deaths annually due to ozone pollution caused by methane.¹

Loci' Technology

Loci is a world leader in the development and deployment of Advanced LFG Control Systems. Loci's patented cloud-connected real time data and automated gas collection control platform is comprised of four components: the Controllor, the Sentry, WellWatcher® control dashboard, and Liquid Level Management. Loci's Advanced LFG Control System provides landfill gas collection system operators with data to improve operations, increase methane capture, and reduce landfill gas emissions. In 2021, the American Carbon Registry ("ACR") affirmed the environmental value of Loci's Advanced LFG System with the approval of a methodology which enables landfills to go beyond existing regulations to prevent the release of methane and other gases into the atmosphere, thereby offering the potential for hundreds of millions of tons of additional emission reductions over the next decade.² Because Loci's technology goes beyond current regulatory requirements, its deployment offers additional, real-world, measureable reductions of LFG emissions.

Opportunities to Decrease Landfill Gas Methane Emissions

As stated in the Final 2022 Scoping Plan:

"Due to the multidecadal time frame required to break down landfilled organic material, the emissions reductions from diverting organic material in one year are realized over the course of several decades. For example, one year of waste diversion in 2030 is expected to avoid 8 MMTCO₂e of landfill emissions, cumulatively, over the lifetime of that waste's decomposition. Near-term diversion efforts are critical to avoid locking in future landfill methane emissions. (...)

While reducing organic waste disposal is the most effective means of achieving reductions in waste sector methane, strategies to reduce emissions from waste already in place in landfills also will play a role in achieving near-term reductions. As Figure 4-16 shows, the total degradable carbon (a measure of the amount of waste with potential to generate methane) that is accumulated from waste deposited in previous years is over 20 times greater than the amount added each year. This illustrates that even if we were able to entirely phase out landfilling of organic waste today, the existing waste in place at landfills would continue to generate methane for decades into the future.

¹ CARB, Final 2022 Scoping Plan (December 2022), at p. 225 (footnotes omitted), at <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>

² "Methodology for the Quantification Monitoring, Reporting and Verification of Greenhouse Gas Emissions Reductions and Removals from Landfill Gas Destruction and Beneficial Use Projects, version 2.0," available at https://americancarbonregistry.org/carbon-accounting/standards-methodologies/landfill-gas-destruction-and-beneficial-use-projects/lfg-methodology-v2-f_2021-05-05.pdf, press release with quote at <https://americancarbonregistry.org/news-events/program-announcements/acr-approves-new-methodology-to-reduce-methane-emissions-from-large-landfills>

Through a combination of improvements in operational practices, use of lower permeability covers, advanced landfill gas collection systems, and increased monitoring to detect and repair leaks, it is estimated that a direct emission reduction of 10 percent is achievable across the state’s landfills by 2030. Technologies to utilize landfill gas efficiently can contribute further emission reductions in the energy sector.³

Landfill Gas Reduction Potential in California

The largest landfills in California have been reporting gas collection operating performance annually for twenty years or more pursuant to measurement requirements and methodologies established by EPA Greenhouse Gas Reporting Program. This public data base provides a reliable benchmark for gas collection operations using industry standard manual wellfield tuning. An independent peer review of four landfills which utilized Loci’s Advanced LFG Control System found an increase in methane capture of 13-24% compared to the landfill’s previously documented LFG capture performance. Utilizing a representative estimate of average performance improvement of 15% for implementation of Loci’s Advanced LFG System would result in the following decreases in methane emissions from California landfills.

Year	% of California Landfill AGCCS Adoption (methane inventory basis)	Emissions Reduction Annually from Landfills with AGCCS - in metric tons/year CO _{2e}	% reduction of Estimated CA Landfill Emissions relative to 2019 estimated baseline
2024	3%	163,400	2%
2025	6%	245,100	3%
2026	9%	408,500	5%
2027	12%	571,900	7%
2028	15%	653,600	8%
2029	18%	817,000	10%
2030	21%	898,700	11%
2031	25%	1,143,800	14%
2032	30%	1,307,200	16%
2033	35%	1,552,300	19%
2034	40%	1,797,400	22%
2035	45%	2,042,500	25%

Status of Future California Landfill Methane Regulations

Approximately one year ago, on May 18, 2023, CARB held an informal workshop entitled Public Workshop on Potential Improvements to the Landfill Methane Regulation with stakeholders to inform the development of future landfill methane regulations.⁴ Since that time, there has not been another LMR workshop held or scheduled. It is anticipated that at some point in the future CARB may hold additional workshops and will subsequently proceed to develop the

³ California Air Resources Board, “2022 Scoping Plan for Achieving Carbon Neutrality,” (November 16, 2022), from Landfill Methane section at p. 233-234 (emphasis supplied, footnotes omitted), available at <https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp.pdf>

⁴ CARB, “Landfill Methane Regulation Meetings & Workshops,” at <https://ww2.arb.ca.gov/our-work/programs/landfill-methane-regulation/meetings>

proposed regulations, and to prepare the necessary analyses that are necessary to support the review and approval of any future landfill methane regulations. At this time, it is uncertain when the public workshop process will complete, when the formal rulemaking process will begin, and when the future LMR will come into effect. As established by SB 1383, Health and Safety Code section 39730.6(b) provides that except as otherwise provided by this section and Public Resources Code section 42652.5, CARB “shall not adopt, prior to January 1, 2025, requirements to control methane emissions associated with the disposal of organic waste in landfills other than through landfill methane emissions control regulations.” SB 1383 does not establish a date by which CARB must adopt more stringent LFG regulations. During this period of regulatory uncertainty, most landfill operators can reasonably be expected to defer investments in enhanced landfill methane collection systems until the program specifics are conclusively determined by CARB and approved by the Governing Board.

A Simple LCFS Program Amendment Will Speed Deployment of Enhanced Landfill Methane Collection Systems

In the interim period before more stringent regulations are established, the LCFS program does provide a market signal to incentivize the deployment of enhanced landfill methane collection systems even before the landfill methane regulations are proposed to the Governing Board, and likely years before future regulatory mandates will require large-scale deployment of Advanced LFG Control Systems. Unfortunately, due to the nature of LCFS program crediting, the possibility of future mandated installation of Advanced LFG Control Systems is likely to undercut that LCFS market signal. Specifically, the LCFS program structure provides incentives for reductions to the carbon intensity (“CI”) of transportation fuels based on a California regulatory baseline. In other words, while the use of RNG or electricity derived from non-mandatory methane capture would provide a recognizable CI reduction under the LCFS, the capture and use of the same RNG or electricity from mandated methane capture would not. Thus a landfill owner or operator that installs an enhanced landfill methane collection system in the near-term faces uncertainty regarding two critical investment decisions: 1) whether the Advanced LFG Control System or other system will meet the future LMR requirements that CARB has not yet established and 2) uncertainty regarding for how many years an early adopter facility will generate LCFS credits.

This hurdle could be overcome by the establishment of a safe-harbor LCFS crediting provisions for Enhanced Landfill Methane Collection Systems. This approach is consistent with the existing language of SB 1383 for the dairy and swine manure pathways and for qualified organics diversion. For these types of pathways, LCFS crediting is protected for a 10-year period by §95488.9(f)(3) even if CARB approves mandated methane control in the dairy sector or diversion of organic material from landfill disposal.⁵ To the extent that CARB seeks to extend comparable treatment for landfill gas, §95488.9(f) of the LCFS could be amended to establish a 10-year crediting period for projects that capture biomethane that would otherwise be released to

⁵ See LCFS Regulation entitled “Special Circumstances for Fuel Pathway Applications at §95488.9(f)(3) that provides for 10-year crediting periods for avoided methane emissions for dairy and swine manure pathways and for landfill-diversion pathways.



the atmosphere from the landfill and that commence prior to the establishment of any law, regulation, or legally binding mandate. Proposed regulatory changes to implement this proposal are included in attached Exhibit A.

Conclusion

We would welcome the opportunity to provide any further information that would be value to CARB on this subject.

Respectfully,

Graham Noyes
Representing Loci Controls, Inc.

Exhibit A

Section 95488.9(f) as proposed in rulemaking, proposed new language in black underline, proposed new Loci language in red underline/~~strike-out~~:

(f) *Carbon Intensities that Reflect Avoided Methane Emissions from Dairy and Swine Manure, ~~or Organic Waste Diverted from Landfill Disposal~~, or Enhanced Landfill Methane Collection Systems.*

- (1) A fuel pathway that utilizes biomethane from dairy cattle or swine manure digestion may be certified with a CI that reflects the reduction of greenhouse gas emissions achieved by the voluntary capture of methane, provided that:
 - (A) A biogas control system, or digester, is used to capture biomethane from manure management on dairy cattle and swine farms that would otherwise be vented to the atmosphere as a result of livestock operations from those farms.
 - (B) The baseline quantity of avoided methane reflected in the CI calculation is additional to any legal requirement for the capture and destruction of biomethane.
- (2) A fuel pathway that utilizes an organic material may be certified with a CI that reflects the reduction of greenhouse gas emissions achieved by the voluntary diversion from decomposition in a landfill and the associated fugitive methane emissions, provided that:
 - (A) The organic material that is used as a feedstock would otherwise have been disposed of by landfilling, and the diversion is additional to any legal requirement for the diversion of organics from landfill disposal.
 - (B) Any degradable carbon that is not converted to fuel is subsequently treated in an aerobic system or otherwise is prevented from release as fugitive methane. Upon request, the applicant must demonstrate that emissions are not significant beyond the system boundary of the fuel pathway.
 - (C) The baseline quantity of avoided methane reflected in the CI calculation is additional to any legal requirement for the avoidance or capture and destruction of biomethane.
- (3) A fuel pathway that utilizes enhanced landfill methane collection systems may be certified with a CI that reflects the reduction of greenhouse gas emissions achieved by the voluntary capture of methane provided that:
 - (A) The enhanced landfill methane collection system is additional to any legal requirement for the capture of methane from landfills.
 - (B) Any degradable carbon that is not converted to fuel is prevented from release as fugitive methane. Upon request, the applicant must demonstrate that emissions are not significant beyond the system boundary of the fuel pathway.

(C) The baseline quantity of avoided methane reflected in the CI calculation is additional to any legal requirement for the avoidance or capture and destruction of biomethane.

(4) Carbon intensities that reflect avoided methane emissions from dairy and swine manure or organic waste projects are subject to the following requirements for credit generation:

(A) *Crediting Periods.* Avoided methane crediting for dairy and swine manure pathways as described in (f)(1) above, for landfill- diversion pathways as described in (f)(2) above, and for enhanced landfill methane collection as described in (f)(3) above is limited to three consecutive 10 years crediting periods, counting from the quarter following Executive Officer approval of the application. The pathway holder must formally request each subsequent crediting period for the project through the LRT-CBTS. The Executive Officer may renew crediting periods for fuel pathways certified before January 1, 2030, for up to three consecutive 10-year crediting periods. For pathways for bio-CNG, bio-LNG, and bio-L-CNG used in CNG vehicles associated with projects that break ground after December 31, 2029, the Executive Officer may only approve avoided methane crediting through December 31, 2040. For pathways for biomethane used to produce hydrogen that break ground after December 31, 2029, the Executive Officer may only approve avoided methane crediting through December 31, 2045.

(B) Notwithstanding (A) above, in the event that any law, regulation, or legally binding mandate requiring either greenhouse gas emission reductions from manure methane emissions from livestock and dairy projects, ~~or~~ diversion of organic material from landfill disposal, or enhanced landfill methane collection comes into effect in California during a project's crediting period, then the project is only eligible to continue to receive LCFS credits for those greenhouse gas emission reductions for the remainder of the project's current crediting period. The project may not request any subsequent crediting periods.

(C) Notwithstanding (A) above, projects that have generated CARB Compliance Offset Credits under the market-based compliance mechanism set forth in title 17, California Code of Regulations Chapter 1, Subchapter 10, article 5 (commencing with section 95800) may apply to receive credits under the LCFS. However, the LCFS crediting period for such projects is aligned with the crediting period for Compliance Offset Credits, and does not reset when the project is certified under the LCFS.