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February 10, 2023
VIA Electronic Filing

Chair Liane Randolph
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Potential Improvements to the Landfill Methane Regulation

Dear Chair Randolph,

Project Canary appreciates the opportunity to provide public comments regarding the May 18, 2023 California Air Resources Board (CARB) Public Workshop to discuss Potential Improvements to the Landfill Methane Regulation (LMR). Project Canary supports California's continued efforts to address methane and short-lived pollutants. Project Canary provides these comments in support of the state's efforts to improve landfill methane emissions mitigation using the best-available technologies.

Project Canary applauds CARB for its actions and continued drive to improve LMR, which has elevated the standard by which methane emissions from solid waste are managed. We believe CARB can go further to encourage the adoption of commercially viable methane monitoring technologies to improve our collective understanding of and, thus, management of landfill methane emissions.

In support of this, Project Canary provides comments on two primary areas:

1. Encouraging adoption of new monitoring technologies that allow for safer and more frequent surface emissions monitoring.
2. Encouraging use of new monitoring technologies and approaches that minimize system downtime and time to detect abnormal emissions events.

About Project Canary

Project Canary, based in Denver, Colorado, is a mission-driven B Corporation accountable to a triple bottom line of people, planet, and profit. Our goal is to mitigate climate change by enabling the energy

production sector to operate on a cleaner, more efficient, more sustainable basis. Our proven technologies provide real-time emissions monitoring with demonstrated success in oil and gas production and broader applicability in other industries with emissions-intensive industries, such as solid waste management and agriculture. Project Canary solutions help companies collect, manage, operationalize, and benefit from real-time environmental data so that they can mitigate impacts now.

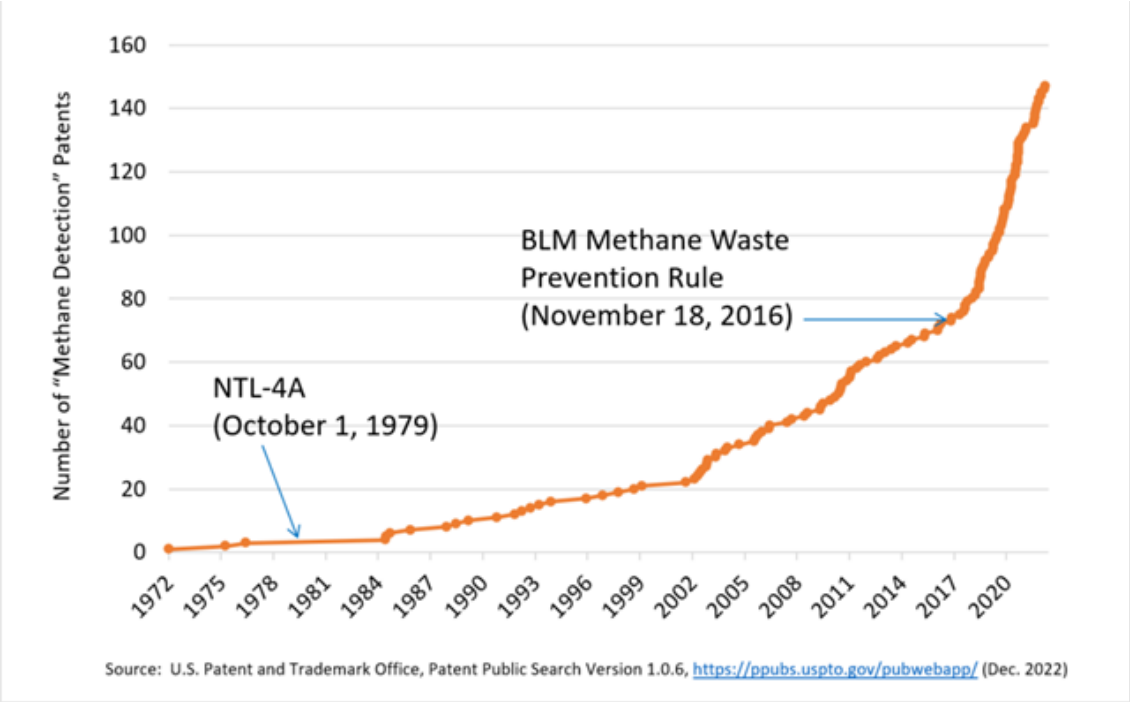
Project Canary is a technology and data company that offers a suite of services designed to help lower the environmental impact of natural gas production, transportation, and distribution, including the rigorous, independent emissions monitoring and environmental risk assessment. Our thesis is that methane leaks in upstream energy facilities are preventable, and we can stop the leaks. The foundation of Project Canary's solutions is continuous monitoring technologies. When combined with an integrated, real-time dashboard, our technology provides companies with rapid detection and notifications related to unintentional releases from energy production locations, significantly reducing the duration of leaks and thereby reducing losses of a valuable product and short-lived pollutant. The monitoring technology we provide has been in use since 2019 on facilities across the United States in every major producing basin. Our technology alerts companies as soon as a leak threshold is reached. Companies then determine the cause of the leak and take further action as appropriate. The use of continuous real-time monitoring in this manner significantly reduces emissions from energy production when compared with traditional intermittent Optical Gas Imaging (OGI) camera inspection programs. We believe this technology has applications beyond the oil and gas sector, and lessons learned in methane mitigation in energy can be used in the assessment and mitigation of methane in landfill operations.

The Case for Adoption of Next Generation Emissions Monitoring Technology

Advancements in technology have substantially expanded the capabilities and availability of site-level measurement and continuous monitoring services. The chart below illustrates that the number of "methane detection" patents has doubled since the proposed 2016 Waste Prevention Rule ("the 2016 Rule") and has increased fifty-fold since the publication of NTL-4A in 1979. Indeed, last year, the U.S. House Committee on Science, Space, and Technology acknowledged that "[r]ecent technological advances" have allowed scientists "to use newly sophisticated methane detection and quantification technologies to actually measure methane emissions."[1] Project Canary alone has installed over one thousand five hundred continuous monitoring units (with hundreds more under contract) across the United States, Canada, and the United Kingdom at over five dozen major oil and gas and midstream companies and multiple landfills. Adoption of next generation emissions monitoring technology by oil and gas companies offers an example of how solid waste management can similarly embrace technology to more accurately inventory and mitigate methane emissions.

[1] House of Representatives Committee on Science, Space, & Technology, *Seeing CH4 Clearly: Science Based Approaches to Methane Monitoring in the Oil and Gas Sector*, at 13-14 (June 2022).

Moreover, the gas sensing technology in systems like Project Canary's has rapidly developed, providing increased accuracy while reducing form factor and cost for site-level monitoring.[2]



Encouraging the adoption of new monitoring technologies and approaches for surface emissions measurement

Project Canary commends CARB's openness to evaluating the use of new technologies to supplement surface emissions monitoring. Project Canary believes that the adoption of new monitoring technologies for surface emissions monitoring would ensure consistent data collection and reporting, allow for

[2] University field testing of Project Canary's onsite continuous monitoring units demonstrated that the devices detect methane leaks with nearly perfect accuracy and can measure the volume of those leaks with minimal quantification error (6%). *See* METEC Testing Results August 2021; Project Canary, A Quantitative Overview to Continuous Monitoring of Methane Emissions (2021); Shan Lin et al., *Improvement of the Detection Sensitivity for Tunable Diode Laser Absorption Spectroscopy: A Review*, Frontiers in Physics (Mar. 1, 2022), https://www.frontiersin.org/articles/10.3389/fphy.2022.853966/full.

increased frequency of data collection and, should new monitoring technologies ultimately replace Method 21, improve workplace safety.

Though Method 21 prescribes the required process for collecting surface emissions monitoring data, its execution is error-prone due to the challenges of manually surveying the entire landfill. Technologies like continuous monitoring and intermittent mobile gas detection, such as unmanned aerial vehicles (UAVs) equipped with gas analyzers, can improve the consistency and accuracy of data collection and reporting. Further, technology offers operational leverage that lowers the marginal cost of additional data collection. New technologies allow for more frequent sampling without placing an unreasonable burden on operators, who would otherwise have to manually collect this data. Enabling more frequent measurement will shed light on diurnal variability in landfill methane emissions; this variability is not well understood due to Method 21 data collection being limited to daytime.Finally, landfills present hazardous conditions, especially for those tasked with walking the entire landfill to collect surface emissions measurements. Technology can limit unnecessary exposure to these hazardous conditions, creating a safer workplace.

OTM51 represents a positive step towards enabling adoption of best-available technologies for surface emissions monitoring, but it falls short of its promise by requiring ground-level sample collection identical to Method 21. As a result, adoption has been limited and its scalability remains to be seen. CARB could incentivize further innovation by creating pathways to acceptance through equivalency analyses that consider dispersion and can model surface emission localization detected remotely.

Technology Improves Operational Performance by Reducing Time to Detect Abnormal Emissions Events

Project Canary believes that measurement using best-available technologies has a role to play in reducing gas collection system downtime and identifying other abnormal emissions events more frequently. Additionally, best-available technologies have the potential to improve efficiency and reduce errors associated with sizing collection systems based on standard modeling methods. Programs such as Colorado's Alt-AIMM and the EPA Supplemental Rulemaking allow for adoption of alternative technologies to more rapidly detect and repair leaks in the oil and gas industry; Project Canary recommends similar policies for landfills to reduce total emissions by reducing the time to detect and repair collection system failures. In addition, more comprehensive datasets will help operators better understand patterns, empowering them to make data-driven capital allocation decisions that improve operations and reduce emissions.

Conclusion

CARB can encourage the adoption of best available technologies that will improve operations management and reduce emissions for landfill facilities in the state of California. Allowing for this adoption will enable safer and more reliable data collection leading to a heightened understanding of—

and reduction in—emissions from landfills. Operators can also greatly benefit from using new technologies as they limit their employees' exposure to hazardous conditions and can streamline data collection and reporting, reducing administrative burden. We encourage CARB to consider the proposed concept that recognize advancing, available technology and allow those tools for surface emissions monitoring and more rapid detection of abnormal emissions events.

Project Canary appreciates the opportunity to provide these comments and looks forward to further participation in this process. Should you have questions about any of the material or concepts included herein, please feel free to contact me directly (michelle.applegate@projectcanary.com).

Sincerely,

Michelle Moorman Applegate
Project Canary
Sr. Director of Public Policy