



OFFICE OF AIR QUALITY PLANNING AND STANDARDS
RESEARCH TRIANGLE PARK, NC 27711

4/16/2025

Mr. Brian Taylor
Project Canary, PBC.
1200 17th Street, Floor 23
Denver, Colorado USA 80202

Dear Mr. Taylor:

We are writing in response to your submission on behalf of Project Canary, PBC (Project Canary) located in Denver, Colorado, dated December 23, 2024 in which you request the approval of an “Alternative Test Method for Methane Detection Technology” under the New Source Performance Standards for Crude Oil and Natural Gas Facilities for which construction, modification or reconstruction commenced after December 6, 2022 (40 CFR Part 60, Subpart OOOOb). We are considering this request under 40 CFR [60.5398b\(d\)](#), based on the information you have submitted (as described below). The EPA’s Office of Air Quality Planning and Standards has been delegated certain authorities under this provision, including authority to consider and/or approve alternative test methods for methane detection technology.

As we understand, Project Canary has developed a measurement solution, Canary X Continuous Methane Monitoring System, which is a network of fixed devices on a site that measure gas concentration and environmental data and uses that data in physics-based models to convert that information into leak locations and quantities.

To support your submittal, you have provided the following documents associated with your submission, either submitted through [EPA’s publicly facing portal](#) or through EPA’s Confidential Business Information (CBI) Office when a CBI claim was made:

- Executive Summary document submitted December 23, 2024: this document is a publicly facing portal submission that describes submission information, technical summary of the technology, summary of documents submitted and additional contextualizing information. See [§60.5398b\(d\)\(2\)](#) and [§60.5398b\(d\)\(3\)\(i\)-\(ii\)](#).
- Description of Technology document submitted on December 23, 2024, and updated on April 3, 2025, which is a publicly facing document that describes the details of the

relevant measurement technology including measurement theory, instrumentation, application, and known limitations.

- Project Canary supplemented the publicly facing document with additional documentation claimed as CBI submitted on January 6, 2025 (and updated on April 14, 2025), which includes further information and data regarding how the technology works. See [§60.5398b\(d\)\(3\)\(iii\)](#).
- Publications and reports, listed below, were submitted through references in the Description of Technology document on December 23, 2024. Additional data and reports included in Project Canary's supplemental Description of Technology document, claimed as CBI, were also received on January 6, 2025. These materials, taken together, serve as supporting evidence that Project Canary can appropriately detect methane emissions at the 5, 10, and 15 kg/hr threshold and above. See [§60.5398b\(d\)\(3\)\(vi\)\(A\)](#).

- Cheptonui, F. et. al. 2024, Assessing the Performance of Emerging and Existing Continuous Monitoring Solutions under a Single-blind Controlled Testing Protocol. ChemRxiv 2024. <https://doi.org/10.26434/chemrxiv-2024-f1znb>

Note: Identified as "Solution F"

- Anemometer Spec Sheets: Young Meterological Instruments ResponseONE Model 91000 Ultrasonic Anemometer Operational Instructions. "Anemometer Spec Sheets.pdf"
- End User Data Samples: Raw Sensor Data Fields and Equipment-level Quantification Data Fields sent by API. "End User Data Extraction Examples.pdf"
- METEC Continuous Monitoring Final Report, Performer: Project Canary. July 11, 2024. "Project Canary 2024 ADED Results.pdf"
- Ball, D. "Single-Blind Testing of Continuous Monitoring System Realist Emission Timeseries." Internal Report, "Project Canary ADED 2 Results.pdf"
- Ball, D. et. al. 2024, Point Sensor Network Detects Short Releases Under Favorable Wind Conditions. ChemRxiv 2024. <https://doi.org/10.26434/chemrxiv-2024-18n19>
- A sampling protocol titled "Canary X Methane Monitoring System: 5, 10, 15 kg/hr Fugitive Methane Emission Monitoring" was submitted on December 23, 2024. EPA received the final version on April 3, 2025, which includes all the required procedures and applicable quality assurance and control requirements, consistent with your operation of the solution, and consistent with the requirements in [§60.5398b\(d\)\(3\)\(vi\)\(C\)](#).

EPA conducted an initial review of the submitted material. Based on this review and receipt of additional information and consistent with the requirements in [§60.5398b\(d\)\(1\)\(i\)](#), EPA determined your submission to be complete on February 3, 2025.

Based on a review of the provided material and a recognition that Project Canary, PCB meets the criteria found in [§60.5398b\(d\)\(2\)](#), we have determined that your Canary X Continuous Methane Monitoring System meets the periodic screening requirements for 5, 10, and 15 kg/hr detection thresholds. Additionally, we are approving your solution for use by an owner or operator of an affected facility, subject to the caveats included in the protocol, for the alternative periodic screening process as described in [§60.5398b\(b\)](#).

Furthermore, the Project Canary emissions monitoring system may be used as an alternative to fugitive emissions monitoring under the New Source Performance Standards for Crude Oil and Natural Gas Facilities for which construction, modification or reconstruction commenced after September 18, 2015, and on or before December 6, 2022 (40 CFR Part 60, Subpart OOOOa) provided the owner or operator using the solution complies with [§60.5398b](#), including the notification, recordkeeping, and reporting requirements outlined in [§60.5424b](#).

Because the alternative method may be used by owners and operators subject to the monitoring of fugitive emissions components affected facilities, and inspection and monitoring of covers and closed vent systems subject to 40 CFR part 60, Subparts OOOOa and OOOOb, we will post this letter as **MATM-010** on the EPA website at <https://www.epa.gov/emc/oil-and-gas-alternative-test-methods> for use by interested parties.

This approval letter is not an implied or express endorsement by EPA of any specific companies or products, as EPA does not promote the products, services, or enterprises of non-federal entities. This letter may be freely distributed and used for non-commercial, scientific and educational purposes. The use of the official EPA Seal and Logo is intended for US Government purposes only and may only be reproduced and used with the express, written permission of EPA's Office of Public Affairs. Further, the EPA Seal or Logo may not be used in a way that implies an EPA endorsement.

If you should have any questions or require further information regarding this approval, please contact my staff at MethaneATM@epa.gov.

Sincerely,

Steffan M. Johnson, Group Leader
Measurement Technology Group

cc:

Greg Fried, OECA/AED
Elizabeth Leturgey, OECA/OC
Ned Shappley, OAQPS/AQAD
Karen Wesson, OAQPS/AQAD
Regional Testing Contacts

Attachments (2)

Project Canary Alternative Test Method (MATM-010).pdf

Memo to Docket - Acceptance Justification: Canary X Continuous Methane Monitoring System

MEMORANDUM

TO: EPA-HQ-OAR-2024-0619

FROM: Hannah Halliday, EPA

DATE: April 16, 2025

Subject: **Acceptance Justification: Canary X Continuous Methane Monitoring System (Technology)**

This memorandum summarizes EPA's consideration of the technical basis to approve Project Canary's periodic measurement solution, called the Canary X Continuous Methane Monitoring System, documented in ALTTECH-75, 76, and 77. Project Canary initially submitted their application on December 23, 2024, as part of the Advanced Methane Detection Alternative Test Method program (40 CFR 60.5398b(d)). EPA's consideration of this technology as a periodic measurement solution under this program and its application to the Advanced Methane Detection Alternative Test Method program is further described in EPA's approval letter dated April 16, 2025. This Memorandum also includes a summary of meetings between the company and EPA staff related to the company's request for approval of this technology.

According to the company's Description of Technology document, the Canary X Continuous Methane Monitoring System is a network of fixed devices on a client site designed to detect, locate, and quantify methane emissions in 15-min time increments. The system includes (i) an autonomous Internet of Things (IoT) device, which houses a laser absorbance methane sensor and support components, (ii) an independent on-site ultrasonic anemometer for quantifying wind speed, direction, and stability, (iii) a cloud-based data management and analysis platform, which uses a physical model coupled with Bayesian state estimation to determine leak locations and leak magnitudes, and (iv) a web-based dashboard which aggregates the methane system results and provides actionable information for client owner/operators. The detailed description of the components included in this document meet the requirements included in §60.5398b(d)(3)(iii).

The Project Canary IoT measurement device houses a Tunable Diode Laser Absorption Spectroscopy (TDLAS) methane sensor to measure the ambient methane mixing ratio, along with additional environmental sensors (i.e., relative humidity and temperature). These IoT devices are

designed to be autonomous once deployed, and the TDLAS measurement is a robust, stable measurement that is well suited to in-situ deployment. Project Canary clearly defined all known interferences and supported their measurement system performance with field deployment data and long-term validation information, all claimed as Confidential Business Information (CBI). Additionally, Project Canary has developed a set of quality assurance and quality control (QA/QC) checks for all physically placed components to monitor performance and behavior, in addition to checks within the localization and quantification processing system to ensure accuracy and reasonableness of the instrument/modeling system. EPA reviewed the sensor calibration data, the proprietary siting tool, and the solution's QA/QC processes, and concludes that they are sufficient to meet the requirement in §60.5398b(d)(3)(vi)(B). EPA also finds Project Canary's approach for handling data, quantification, and QA/QC effective for meeting the goals of the program.

Consistent with the requirements in §60.5398b(d)(3)(vi), Project Canary provided EPA with third-party validation reports to demonstrate their system could achieve their target sensitivity levels of 5 kg/hr, 10 kg/hr, and 15 kg/hr. The first report is titled "Assessing the Performance of Emerging and Existing Continuous Monitoring Solutions under a Single-Blind Controlled Testing Protocol", and was developed by Colorado State's Methane Emissions Technology Evaluation Center (METEC). This study was performed between February and April 2024. The METEC facility was designed to mimic and simulate a wide range of emission scenarios associated with upstream and midstream natural gas operations. The facility was built using surface equipment donated from oil and gas operators. A controlled release system allowed metering and control of gas releases at realistic sources such as vents, flanges, fittings, valves, and pressure relief devices found throughout equipment. The result of this program indicated a 90% Probability of Detection (POD) when compared to emission rate of 0.5 kg/hr. Another report by Ball et al. (2024) titled "Point Sensor Network Detects Short Releases Under Favorable Wind Conditions" was included, which evaluated the effect of wind direction on their detection of short emission events (~30 minute-controlled releases) from the a separate METEC Advancing Development of Emissions Detection (ADED) experiment run in 2023. Additional data was also included as CBI, where Project Canary supplied case studies and client reports from confidential client sites. EPA thoroughly reviewed these reports and datasets and find them sufficient verification of the sensitivity of their technology as required in §60.5398b(d)(3)(vi)(A). MATM-010 can be used for any of the following detection thresholds: 5 kg/hr, 10 kg/hr, or 15 kg/hr.

Project Canary's alternative test method, developed by the company and refined based on comments from the EPA, is sufficient for use in compliance in the oil and gas sector, and includes all the information as required in *§40 CFR 60.5398b(d)(3)(vi)(C)*. The method includes critical practices such as the siting of the individual sensor nodes, installations, registration, and confirmation steps. The method includes sufficient information to allow a user to understand the data collection through data reporting phase. The method also includes sufficient QA/QC of the sensors to ensure when valid data is being collected and potential corrective actions are needed. Additionally, there are checks within the data processing phase that allow trained Project Canary personnel to continually evaluate the system and make any necessary changes to the modeling or physical equipment on a site. Finally, the method is written to include sufficient recordkeeping of their procedures that would allow a third-party (e.g., state regulatory authority) to audit Project Canary's processes.

Finally, Project Canary requested their solution be approved broadly across all basins in the continental United States. The justification for the broadly applicable request is based on a CBI analysis of the operational conditions across five basins in the continental United States, as well as a set of operator case studies. Project Canary demonstrated their system's ability to quantify leak rates and sizes from different types of equipment failures, leaks, and on-site processes. Project Canary's case studies are sufficient evidence that their measurement system has performed effectively in different geographical and environmental conditions. EPA agrees with Project Canary's assertions that the alternative should be approved broadly and has not included any basin restriction in the alternative test method letter.

Meeting Summary between EPA Measurement Technology Group and Project Canary

Date	Venue	Participants	Topics
2023-10-24	Teams Call	Ned Shappley, Brian Taylor, Paul Van Rooy, Hannah Halliday	Discussion of point sensor data formatting
2023-11-16	Teams Call	Ned Shappley, Brian Taylor, Paul Van Rooy, Hannah Halliday	Follow up discussion on point sensor solution data
2024-01-23	In-Person Discussion	Ned Shappley, Hannah Halliday, Walter Lin, Dave Nash, Paul Van Rooy, Brian Taylor, Gerri Garwood, Annie Walbridge, Nathan Eichenlaub	Discussion of the Alt-Tech program, application requirements, and solution details.
2024-05-01	Teams Call	Ned Shappley, Hannah Halliday, Brian Taylor, Dave Nash, Paul Van Rooy, Walter Lin, Annie Walbridge, Michael Stovern	Discussion of continuous application requirements and general review process for the Alt-Tech program.
2024-06-25	In-Person Discussion	Ned Shappley, Hannah Halliday, Brian Taylor, Dave Nash, Paul Van Rooy, Walter Lin, Annie Walbridge, Michael Stovern	Discussion about Project Canary Technology, capabilities, and preparing for program application.
20214-10-15	In-Person discussion at the CH4 Connection Conference	Hannah Halliday, Brian Taylor, Ned Shappley	Application Status and review process
2025-02-27	Teams Call	Carlos Valle Díaz, Hannah Halliday, Brian Taylor, David Ball, Nathan Eichenlaub, Annie Walbridge	Application Review and editing feedback
2025-03-17	Teams Call	Carlos Valle Díaz, Hannah Halliday, Brian Taylor, David Ball, Nathan Eichenlaub, Annie Walbridge	Call to finalize edits and feedback for application