



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

05/13/2025

Mr. David Conley
Clean Connect AI Inc.
7352 Greenridge Rd, A9,
Windsor , Colorado 80550, US

Dear Mr. Conley:

We are writing in response to your submission on behalf of Clean Connect AI Inc. (Clean Connect), located in Windsor, Colorado, dated July 27, 2024, and subsequent correspondence dated April 17, 2025. In that request, you seek approval of an “Alternative Test Method for Methane Detection Technology” under the 40 CFR part 60, Subpart OOOOb - Performance Standards for Crude Oil and Natural Gas Facilities for Which Construction, Modification or Reconstruction Commenced after December 6, 2022 (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, Clean Connect, has developed a measurement solution, the LeakFinder System (LeakFinder), which is built into Clean Connect’s Minerva Sensor-Fusion(™) Platform (Minerva). The LeakFinder incorporates an optical gas imaging (OGI) camera and “Intelligent Edge” Data Center (Edge Computer). The Leakfinders are permanently mounted at an elevated position within an oil and gas facility to maximize the “line of sight” of the equipment to be monitored. To further maximize the line of sight, the mounting apparatus is equipped with a gimbal to allow the system to pan the site and the OGI mount includes additional pan and tilt capabilities. When in active operation, the Minerva containing the LeakFinder scans the site, autonomously detects any methane and/or VOCs emission events imaged by the OGI through proprietary computer vision models, as they occur, and uploads these events to Clean Connect’s cloud-based platform (dashboard). Additionally, LeakFinder collects environmental data that could impact the detection sensitivity, including wind speed and direction, to ensure the validity of any screening.

We also understand that Clean Connect’s practice includes collaboration with the operators of

oil and gas sites in determining the number of LeakFinders needed for any given site and provides a certification for the individual users of the system through a series of training and competency evaluations associated with the interpretation data provided to the platform.

To support your submittal, you have provided the following documents associated with your submission. This information was submitted through [EPA's publicly facing portal](#).

- “Executive Summary” documents, submitted July 27, 2024, which describe submission information and provides information about Clean Connect. Also, included was a high-level summary of the technology, summary of documents submitted and additional contextualizing information, and a document that requests approval under the periodic screening approach at 5 kg/hr. See [§60.5398b\(d\)\(2\)](#) and [§60.5398b\(d\)\(3\)\(i\)-\(ii\)](#).
- “Description of Technology” document submitted on July 27, 2024, which provides detailed information on the measurement technology, including the sensors used to collect the measurement, the practices for treating this data, and quality control measures to determine the accuracy of the reported data from the technology. See [§60.5398b\(d\)\(3\)\(iii\)](#) and [§60.5398b\(d\)\(3\)\(iv\)](#).
- “A Visual Workflow document” submitted on July 27, 2024, detailing how data is collected, processed, maintained, and provided to the user. See [§60.5398b\(d\)\(3\)\(v\)](#).
- A third-party report of a “controlled release study” conducted for Clean Connect by Highwood Emission Management. The study was conducted in October of 2022 and EPA received the report on July 27, 2024. You supplement this report with additional release studies with supporting video files. These studies were conducted in April of 2022 and received by EPA on July 27, 2024. These reports serve as supporting evidence that the Leakfinder System can appropriately detect methane at the 5 kg/hr threshold, as applied in the field and aid in developing the operational envelope of operation. See [§60.5398b\(d\)\(3\)\(vi\)\(A\)](#).
- A sampling protocol (*i.e.*, alternative test method) titled “CleanConnect LeakFinder System Periodic Screening Methane Alternative Test Method”, initially submitted on July 27, 2024. EPA received the final version on April 17, 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 October 25, 2024.

Based on a review of the provided material and recognizing that Clean Connect AI Inc. meets the criteria found in [§60.5398b\(d\)\(2\)](#) to submit an alternative test method for consideration, we have determined that your LeakFinder System meets the periodic screening requirements for

the 5 kg/hr detection threshold. Additionally, we are approving your solution for use by an owner or operator, at an affected facility, for the alternative periodic screening process as described in [§60.5398b\(b\)](#), subject to the caveats below:

- *As detailed in the approved alternative test method, the LeakFinder System is considered a technology with component-level spatial resolution, as defined in [§60.5398b\(d\)\(3\)\(vii\)\(C\)](#), when there is a direct line of sight from the sensor to the equipment.*
- *As detailed in the approved alternative test method, the LeakFinder System is considered a technology with area-level spatial resolution, as defined in [§60.5398b\(d\)\(3\)\(vii\)\(B\)](#), when there is not a direct line of sight from the sensor to the equipment and that equipment is within 2 meters of the nearest clean line of sight.*

Furthermore, the alternative test method may be used as an alternative to fugitive emissions monitoring under 40 CFR part 60, Subpart OOOOa - 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 (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](#).

EPA has created a docket EPA-HQ-OAR-2024-0619 and is making the relevant documents mentioned in this letter publicly available there. Additional material developed by EPA to justify these decisions is also attached to this letter.

Because the alternative method may be used by owners and operators of affected facilities subject to the monitoring of fugitive emissions components, and inspection and monitoring of covers and closed vent systems subject to Subparts OOOOa and OOOOb, we will post this letter as **MATM-011** on the EPA website at <https://www.epa.gov/emc/oil-and-gas-alternative-test-methods> for use by interested parties.

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

Sincerely,

for 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)

Clean Connect Alternative Test Method (MATM-011).pdf

Acceptance Justification: Clean Connect AI Minerva Sensor-Fusion(™) Platform

MEMORANDUM

TO: EPA-HQ-OAR-2024-0619

FROM: Ned Shappley, EPA

DATE: May 12, 2025

Subject: **Acceptance Justification: Clean Connect AI LeakFinder System installed in the Minerva Sensor-Fusion™ Platform**

This memorandum summarizes EPA's consideration of the technical basis to approve Clean Connect AI Inc.'s (Clean Connect) periodic measurement solution, called the LeakFinder System, which is installed in the Minerva Sensor-Fusion™ Platform, documented in ALTTECH-44, . Clean Connect initially submitted on July 27, 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 May 12, 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.

Background Information

Based on Clean Connect's submittal to EPA's Advanced Methane Technology Alternative Test Method Portal¹, they are company based in Windsor, Colorado, which builds and supports products designed to automate health, safety, and environmental operations, including the LeakFinder System. According to Clean Connect's Executive Summary, the LeakFinder System has been deployed across several oil and gas production basins, including in the Denver-Julesburg Basin in Colorado where this technology has been approved by state regulators for conducting fugitive measurement at sources at sources subject to Colorado's Regulation 7 through their ALT-AIMM program. For purposes of their submission to EPA, Clean Connect requested their technology be broadly applicable across the sector in the periodic screening program at a sensitivity of the 5 kg/hour. Based on the information provided in their submittal to EPA, referenced above, they were eligible to apply as required under §60.5398b(d)(2). Additionally, the submittal was clear as to the applicability of the request and provided the EPA the information included in §60.5398b(d)(3)(i-ii).

¹ <https://methane.app.cloud.gov/review/44>

Technology Description

Consistent with the requirements in §60.5398b(d)(3)(iii-iv), Section 2.0 of Clean Connect's Description of Technology Document details their measurement technology. This document describes Clean Connect's LeakFinder System, which is used to screen for leaks at oil and gas sites that may require leak detection and repair (LDAR). Optical gas imaging (OGI) video footage is collected using a permanently installed, autonomous OGI camera. The OGI footage is then passed through a detection algorithm consisting of a proprietary, gas leak detection model, and a-priori auxiliary models. The detection algorithm and all supporting models leverage deep learning / neural networks to "see" emissions in the autonomous OGI camera's footage and isolate these emissions from potential false positives. The autonomous OGI cameras used in this system are held to the same standards as used in the standard leak detection approach in 40 CFR 60.5397b(c). The processing of the OGI images is performed within the Edge computing system located in the platform containing the LeakFinder system. Information from this system is uploaded to Clean Connect's cloud-based platform where the owner or operator can access the processed video/images. The primary limitations are obstructions (e.g., infrastructure) that would limit the line of sight; these obstructions are minimized through strategic placement of the platform, including the installation of multiple platforms, if necessary. Additionally, OGI cameras are impacted by cloud cover, sunlight glint, and other environmental factors which could result in erroneous readings. These factors are typically mitigated through models or through trained human flagging of erroneous data. Clean Connect also submitted a detailed workflow associated with their description of technology document which visualizes the data flow and process conducted by either Clean Connect personnel, an owner or operator, or automated through their models. This document, along with the description of technology document, is also consistent with the regulatory requirements in §60.5398b(d)(3)(vi)(A) and §60.5398b(d)(3)(v).

Method Sensitivity and Spatial Resolution

Clean Connect claimed a solution sensitivity of 5 kg/hour for the LeakFinder System and to support this claim they provide supporting evidence in Section 8.4.2 of their Description of Technology Document and associated reports in documents titled "Controlled Release Testing 1 Full Results", "Controlled Release Testing 2 Full Results" and "Controlled Release Testing 3 Full Results". EPA's evaluation of the Leak Finder System, focused on Controlled Release Testing 2 & 3, as they represent the

current configuration of the LeakFinder System. The controlled release testing were conducted with the assistance of Highwood Emission Management who also provided independent review of the data.

Controlled Release Testing 2 as described in Section 8.2 of the description of technology document was a blinded study performed at two separate production facilities in Weld County, Colorado on April 22, 2022. The releases were performed by the operators of the facility and conducted at a leak rate approximately 10 - 1950 scf (0.2 – 40 kg/hr) from distances of approximately 30 – 100 yards (9 – 90 meters). The releases were conducted in relatively calm winds of approximately 0 - 7 mph (0 – 3 m/s) from a fuel gas line at these facilities. Based on the data provided in the summary spreadsheet, that included links to the processed video files, all releases of approximately 3 kg/hr were detected with the lowest detection of 0.2 kg/hr detected from approximately 30 yards.

Controlled Release Testing 3 as described in Section 8.3 of the description of technology and the Controlled Release Testing documents was a blinded study performed at an operating facility in Colorado on October 20 and 21, 2022. The releases were performed by the operators of the facility and conducted at a static leak rate approximately 2 kg/hr at from distances of approximately 20 – 120 meters. The releases were conducted in relatively calm winds of approximately 0 – 5 m/s from a fuel gas line at these facilities. Based on this data set provided in the summary report, all releases at all distances we identified.

From these data points, reviewed by Highwood Emission Management, a calculated Probability of Detection (POD) curve was developed, demonstrating of 90% POD of < 5 kg/hr. Consistent with the requirements in §60.5398b(d)(3)(vi)(A), Clean Connect's data has provided sufficient evidence to support their requested LeakFinder System's detection threshold.

Clean Connect requested a component-level spatial resolution for their LeakFinder system. These claims are supported in Section 9.0 of their description of technology and through controlled testing documentation. Specifically Clean Connect provided the EPA with processed still OGI imaging and processed OGI videos associated with their controlled release. These media indicated the LeakFinder Systems could identify the approximate source of emissions within 0.5 meters of a release point, satisfied the component-level spatial resolution requirements in §60.5398b(d)(3)(vii). Additionally, Clean Connect requested area-level spatial resolution in those instances when there is not a direct line of sight of the LeakFinder System from the emission point. In EPA's judgement we agree with Clean Connect's claim of the Leak-Finders area-level resolution in those instances when those components are within 2.0 meters of the line-of-sight. This consideration is based on the likelihood of a plume of 5 kg/hr in

magnitude would be detected from a source within 2 meters of a line of sight measurements sometime during the 7-day sampling period utilized by Clean Connect as part of their alternative test method.

Testing Protocol

The alternative test method, developed by Clean Connect and refined based on feedback from the EPA, reasonably matches EPA's understanding how data will be collected, and the application of the LeakFinder System in their method is consistent with the operation of the system in the validation report. The alternative test method includes all the information as required in *§40 CFR 60.5398b(d)(3)(vi)(B) and (C)* and appears to be adequate for use for in the alternative monitoring standards identified in *§40 CFR 60.5398b(b)*. The method, includes a defined siting protocol in Appendix B of the method designed to maximize the number of visible equipment and the detailed training for the owner or operator to ensure the system is operating as designed; identifies any potential interferences (*e.g.*, weather conditions) that would be outside the envelope of operation which could affect the technology's probability of detection and has developed sufficient QA/QC around these limitations to ensure when valid data is being collected and potential corrective actions are needed; details the amount of valid data needed to verify either the presence or the absence of an emission, and; is written to include sufficient recordkeeping of their procedures that would allow a third-party (*e.g.*, state regulatory authority) to audit the Clean Connect's processes, such as the availability of the processed OGI images and the recordkeeping of operator's interpretations.

Applicability

Finally, CleanConnect requested the LeakFinder System be approved broadly across all basins in the continental United States based on successful deployment in several basins. Consistent with previous approvals in this program, EPA agrees with the broad approval request since the primary technology, OGI, is the accepted measurement approach for fugitive, covers, and closed vent systems in *§ 60.5397b* and *§60.5416*. Also, the detection principle of OGI is not as dependent on the topography or the background as other approaches.

Meeting Summary between EPA Measurement Technology Group and Clean Connect

Date	Venue	Participants	Topics
2024-09-12	Teams Call	Ned Shappley, Mike Stovern, David Conley, Mark Smith, Brendan Moorhouse	Introductory Call, General review of Clean Connect
2024-11-26	Teams Call	Ned Shappley, Mike Stovern, David Conley, Mark Smith, Brendan Moorhouse	Provide Initial Feedback and Additional Data Request
2025-01-10	Teams Call	Ned Shappley, Mike Stovern, David Conley, Mark Smith, Brendan Moorhouse	Discuss Siting Process and Method Revisions
2025-02-26	Teams Call	Ned Shappley, Mike Stovern, David Conley, Mark Smith, Brendan Moorhouse	Training Discussion and Recordkeeping in Method
2025-03-10	Teams Call	Ned Shappley, Mike Stovern, David Conley, Mark Smith,	Continued method feedback
2025-03-26	Teams Call	Ned Shappley, Mike Stovern, David Conley, Mark Smith, Brendan Moorhouse	Check-in call, continued method feedback and iteration
2025-04-04	Teams Call	Ned Shappley, Mike Stovern, David Conley, Mark Smith,	Check-in call, continued method feedback and iteration
2025-04-23	Teams Call	Ned Shappley, Mike Stovern, David Conley, Mark Smith,	Close-out call and next steps