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

2/21/2025

Mr. Trevor Cross
Champion X, LLC
2445 Technology Forest Blvd.
Building 4, Suite 1200
The Woodlands, TX 77381

Dear Mr. Cross:

We are writing in response to your submission on behalf of Champion X, LLC, located in The Woodlands, Texas, dated July 12, 2024, and subsequent correspondence dated August 30, 2024, October 15, 2024, and January 23, 2025, 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, Champion X has developed an aerial measurement system that utilizes an optical gas imaging (OGI) camera mounted on a helicopter which you refer to as aerial optical gas imaging (AOGI_. Similar to the use of OGI in Subpart OOOOb, Champion X utilizes trained technicians for identifying methane (and VOCs) emitted from equipment; however, the screening is conducted from an overhead position and this approach is capable of component-level resolution.

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:

- An executive summary document submitted July 12, 2024, through the public portal, that describes submission information, technical summary of the technology, and a summary of documents submitted. See §60.5398b(d)(2) and §60.5398b(d)(3)(i)-(ii).

- A description of technology document titled "Champion X Aerial Optical Gas Imaging Technology description, submitted July 12, 2024, through the public portal, supplemented with information from a series of documents claimed as CBI, received on August 30, 2024. These documents describe the AOGI technology, application, and detailed workflow. See §60.5398b(d)(3)(iii)-(v) and §60.5398b(d)(3)(vi)(B) & D.

- A third-party validation report for AOGI prepared for Champion X, dated June 27, 2024 and received on August 30, 2024, and supporting video files claimed as CBI, received on October 15, 2024. These reports serve as supporting evidence that Champion X's AOGI can appropriately detect methane at the 1 kg/hr threshold, as applied in the field. See §60.5398b(d)(3)(vi)(A).

- A sampling protocol titled "Champion X Aerial Gas Imaging." Champion X submitted this document initially on July 12, 2024 through the public portal, and submitted the final version in correspondence dated January 23, 2025, which EPA received on January 24, 2025 though the public portal, 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 the 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 15, 2024.

Based on a review of the provided material and a recognition that Champions X, LLC meets the criteria found in §60.5398b(d)(2), we have determined that your AOGI solution meets the 1 kg/hr threshold at the component-level resolution, using the protocol described above. Additionally, we are approving your solution for use by an owner or operator, on an affected facility, subject to the caveats included in the protocol, for the alternative periodic screening process as described in §60.5398b(b).

Furthermore, your AOGI solution 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 the requirements of §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-006** 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

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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,

STEFFAN JOHNSON

Digitally signed by STEFFAN JOHNSON
Date: 2025.02.21 07:24:13 -05'00'

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)

Champion X - Alternative Test Method (MATM-006).pdf

Memo to Docket - Acceptance Justification: Champion X Aerial OGI (Technology)

MEMORANDUM

TO: EPA-HQ-OAR-2025-TBD

FROM: Ned Shappley, EPA

DATE: February 21, 2025

Subject: **Acceptance Justification: Champion X Aerial OGI (Technology)**

This memorandum summarizes EPA's consideration of the technical basis of Champion X's approach for using an Optical Gas Imaging (OGI) camera from a helicopter, which they call aerial OGI or AOGI, documented in ALTTECH-12. Champion X (the company) initially submitted on July 11, 2024, as part of the Advanced Methane Detection Alternative Test Method program (40 CFR 60.5398b(d)). EPA's consideration of this technology under this program and its application to the Advanced Methane Detection Alternative Test Method program is further described in EPA's approval letter dated February 21, 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 the technology document , consistent with *§60.5398b(d)(3)(iii)*,the OGI cameras used are standard mid-wave infrared (MWIR) cameras. According to this document, a standard MWIR camera is a quantum semiconductor detector, meaning that for each photon that hits the sensor, an electron from the valence band is excited to a higher energy level. This excitement changes the sensor's current, which is then interpolated and processed in the image. However, in this spectral band, electrons at ambient temperature have enough thermal difference to overcome the bandgap between the valence and conduction bands. To counter this, the OGI camera detector must be cooled to cryogenic temperatures to ensure that any change in current at the detector is from a photon and not latent thermal energy. When methane gas is present in the camera's field of view, it absorbs infrared radiation at specific wavelengths that the camera is tuned to detect. This absorption occurs because methane molecules interact with the infrared light, absorbing energy at characteristic "fingerprint" wavelengths unique to methane. As a result, the camera detects a decrease in the intensity of the infrared light at these wavelengths, creating a contrast between the methane plume and the background environment. This contrast allows the camera to visualize the gas as a distinct plume or cloud, making it easily identifiable by a trained operator. EPA agrees that the use of OGI is an effective detection tool for leaks for many types of industry, and specifically for leaks of methane in the oil and gas sector.

The instrument itself mirrors the same instrument used in the standard leak detection program in the oil and gas sector. The key difference is in the application to aerial monitoring, to support this application, the company developed a propriety gimble for controlling and stabilizing the OGI camera used in surveys and a prescriptive protocol for the survey of fugitive components, covers, and closed vent systems. The company provided EPA with technical information regarding the design and operation of the combined OGI and gimble through technical documents, claimed as Confidential Business Information (CBI). The company also provided EPA with their standard operation procedures including but not limited to flight preparation, flight coordination, flight operations, and camera operation, which were also claimed as CBI. These documents, in detail, provide sufficient evidence to the EPA of how the data are collected and how the leaks are detected, consistent with the requirements in *§60.5398b(d)(3)(iv) & (v)*.

To support the use of AOGI, and consistent with the requirements in *§60.5398b(d)(3)(vi),* the company provided EPA a third-party validation report, claimed as CBI, prepared by Southwest Research Institute (SWRI). The company commissioned SWRI to conduct a blind audit at two active upstream oil and gas production facilities in Texas. These blinded studies were performed to assess the ability of the company's AOGI approach to detect leaks from variable locations and rates using control releases which were designed to determine the lower threshold of AOGI's technology and to develop a probability of detection. EPA conducted a thorough review of the study, including but not limited to the supporting evidence in the release report, the associated video files of the AOGI survey to verify the AOGI detections, and the determination of probability of detection based on how the AOGI was operated during this study. Additionally, EPA reviewed the associated video files to confirm the company's claim of component-level spatial resolution and EPA was able to match the company's determination on locality of the releases (within 0.5 meter), even when the release was hidden from direct view in the video files provided to the EPA.

The final method developed by the company, based on comments from the EPA, reasonably matches how data was collected during the third-party validation report, is sufficient for use for compliance in the oil and gas sector, and includes all the information as required in §60.5398b(d). The method defines obligations for the pilot of the helicopter, the operator/technician of the OGI camera, and secondary data reviewer, in terms of training, recordkeeping, and operation that will yield consistent implementation. The method identifies any potential weather conditions that are either unsafe to operate or would be outside the envelope of operation which could affect the technology's probability of detection. The method also includes performance-based language regarding the

equipment and supplies needed to perform the method, this language was written consistent with the equipment identified in the company's standard operating procedures. 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 Champion X's processes.

The company requested their AOGI be approved broadly across all basins in the continental United States. The justification for the broadly applicable request is based on the use of OGI in the standards for fugitive, covers, and closed vent systems in the oil and gas sector rule *(see § 60.5397b and §60.5416)* and that AOGI is currently applied in multiple basins to supplement standard OGI monitoring. EPA agrees with company's justification that AOGI can be used broadly without caveat because this approach is reliant on a detection principle that is not as dependent on the topography or the background. Likewise, the application of the method and the required training of the user provides sufficient checks to when surveys may be conducted and for determining the presence or the absence of leaks.

Meeting Summary between EPA Measurement Technology Group and Champion X

Date	Venue	Participants	Topics
2024-05-09	Teams Call	Shankar Annamalai Johanna Eidmann, David Yoeman, John Tang Khalid Soofi, Ned Shappley, Hannah Halliday, Walter Lin, Mike Stovern	Introductory Call, General review of Champion X, also included discussion on continuous emission technology (*i.e.,* SOOFIE sensor application
2024-06-23	Teams Call	Trevor Cross, Johanna Eidmann, Khalid Soofi, Ned Shappley	Walk through the supporting data and initial round of questions. EPA request for associated video files from the release study for further examination.
2024-10-01	Teams Call	Trevor Cross, Shankar, Carlos Valle Diaz, Ned Shappley	Provide initial feedback of the complete application and conversation regarding potential revisions.
2024-12-20	Teams Call	Trevor Cross, Carlos Valle Diaz, Ned Shappley	Conversation regarding potential revision to method and request for additional information
2025-1-21	Teams Call	Trevor Cross, Carlos Valle Diaz, Ned Shappley	Working meeting discussing revisions to method.