

Emission Measurement Center
Oil and Natural Gas Advanced Methane Technology
Program

Guideline Document

For

Alternative Test Method Requests

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Oil and Natural Gas Advanced Methane Technology Program

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U.S. Environmental Protection Agency
Office of Clean Air Programs
Research Triangle Park, NC

Version 03: April 2026

Executive Summary of Guideline Document

This guideline document is a resource for applicants and end users of 40 CFR part 60 subparts [0000](#), [0000a](#), [0000b](#), and [0000c](#) *Advanced Methane Technology Alternative Test Method (Methane ATM)* program, and for federal, state, local, and tribal authorities to better understand the Methane ATM request and review process. This document describes the aims of the program, guides applicants through the Methane ATM request process, outlines what the Environmental Protection Agency (EPA) expects to see in a Methane ATM request and provides material to assist applicants in creating a Methane ATM application.

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1. Introduction to this Guideline Document

This guideline document addresses:

1. EPA's Methane ATM approval authority under [§60.5398b\(d\)](#).
2. EPA processes and procedures for requesting and responding to requests for Methane ATM approval.

EPA's Methane ATM approval authority under [§60.5398b\(d\)](#) is unique to methane detection technology for use for fugitive monitoring, inspection, and monitoring of covers and closed vent systems. This is separate from other Methane ATM authorities identified in the general provisions to parts 59, 60, 61, 63, and 65 of Title 40.

The fundamental purpose of a Methane ATM request is to explain how a technology works, and to demonstrate how that method will function under the range of physical and environmental conditions it will encounter in a real-world deployment.

This guideline document addresses how technology developers and facility owners and operators can seek approval for alternative Methane ATMs that demonstrate the accuracy and efficacy of new advanced methane detection technologies. Once approved, these advanced technologies can be used as defined in [§60.5398b\(b\)](#) of part 60 in lieu of, or in addition to, the required fugitive monitoring and inspection, and monitoring of covers and closed vent systems, under 40 CFR part 60 subparts OOOO, OOOOa, OOOOb and OOOOc to identify emissions. The statements in this guideline document are solely intended to aid applicants in complying with the published national regulation "Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector." (See [89 FR 16820 – March 8, 2024](#))

EPA may decide to revise this guideline document without public notice to reflect changes in EPA's approach to implementing the rule's requirements or to clarify the regulatory text. To determine whether EPA has revised this guideline document or to obtain copies, contact the EPA Methane ATM review team at MethaneATM@epa.gov.

The full text of the rule is available online at:

<https://www.federalregister.gov/documents/2024/03/08/2024-00366/standards-of-performance-for-new-reconstructed-and-modified-sources-and-emissions-guidelines-for>.

2. Abbreviations

Table 1. List of abbreviations used in this guideline document.

Abbreviation	
AI	Artificial Intelligence
AVO	Audible, Visual and Olfactory
BSER	Best Systems of Emission Reduction
CBI	Confidential Business Information
DQI	Data Quality Indicator
DQO	Data Quality Objective
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
FAQ	Frequently Asked Questions
IP	Intellectual Property
kg/hr	Kilogram per Hour
LDAR	Leak Detection and Repair
Methane ATM	Methane Alternative Test Method
m	Meter(s)
m/s	Meters per second
NSPS	New Source Performance Standards
OCAP	Office of Clean Air Programs
OGI	Optical Gas Imaging
PII	Personal Identifiable Information
POD	Probability of Detection
ppm-m	Parts per Million Meter
QA/QC	Quality Assurance/Quality Control
SIP	State Implementation Plan

3. Background

On December 6, 2023, EPA issued the final rule for “Standards of Performance for New Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review,” which can be accessed at <https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-operations/epas-final-rule-oil-and-natural-gas>. The rule established a streamlined pathway for EPA to consider and approve alternative options for compliance through proposed advanced methane detection technologies, like satellite monitoring and aerial surveys, and continuous monitors to find leaks in oil and natural gas operations. Owners and operators are allowed to use these new technologies as soon as they are approved by EPA, effectively allowing alternative methods of compliance in lieu of traditional ground-based methods such as Audible, Visual and Olfactory (AVO), Optical Gas Imaging (OGI) and EPA Method 21. This guideline document describes the Methane ATM submittal process and procedures for seeking approval under [§60.5398b\(d\)](#).

4. Methane ATM: Overview of Process, Timeline, and Requirements

4.1. Methane ATM Request Overview

A Methane ATM request has four primary components:

1. Document describing how the technology works, from first principles through final solution.¹ This is called the **description of technology**.
2. Set of supporting documents clearly demonstrating that the technology works as stated, along with clear applicability to methane detection. These are called **supplementary information**.
3. Document describing the alternative testing procedure(s) that addresses all key elements of the requested method(s). This is called the **Methane ATM (MATM)**.
4. Applicants can also submit an **optional executive summary**.

The request must be submitted as either a periodic screening method or a continuous monitoring method. The basic requirements for each method are outlined in Sections 4.4 and 4.5, respectively, of this guideline document.

4.2. Entry Qualifications

Any entity meeting the following requirements may submit a Methane ATM for consideration:

1. The entity must be an individual or organization located in, or that has representation in, the United States.
2. The entity must be considered an owner or operator of an affected or designated facility regulated under 40 CFR part 60 subparts OOOOa or OOOOb. An entity can also submit a Methane ATM if:
 - a. The entity directly represents the provider of the measurement system using advanced methane detection technology.
 - b. The measurement system has been applied to methane measurements or monitoring in the oil and gas sector either domestically or internationally.
3. The underlying technology or technologies submitted must be readily available for use, meaning that the measurement system using these technologies has either been:
 - a. Sold, leased, licensed, or offered for sale, lease, or license to the general public or;
 - b. Developed by an owner or operator for internal use or use by external partners.

¹ Solution refers to the ensemble package that describes the sensing technology, deployment methodology, and analytics.

4. The entity must be able to provide EPA with the information required in [§60.5398b\(d\)\(3\)](#), as described in Section 5.2 of this guideline document.

4.3. Timeline of Review Process

A Methane ATM request must be submitted to [EPA's Methane ATM portal](#) and will be reviewed by an EPA technical review team. EPA has a total of 270 days to determine if the requested alternative test method requirements outlined in [§60.5397b](#), and continuous inspection and monitoring of covers and closed vent systems in [§60.5416b](#). Within that 270 days, EPA has 90 days to perform a completeness check, as defined in the rule. This completeness check will include both public information and CBI. EPA will inform solution providers of the result of the completeness check, and if necessary, provide guidance on additional materials required to complete the application.

After the completeness check, EPA has the remainder of the 270 days to determine whether the full application is approved or declined. If EPA fails to provide this decision in writing, the solution is conditionally approved until EPA either accepts or rejects the application. An application will not be considered conditionally approved after 270 days if it does not meet the completeness check. See more at [§60.5398b\(d\)\(1\)\(iii\)](#).

Timing for EPA's review of a Methane ATM request depends on the complexity of the proposed approach. It is critical that any entity submitting a Methane ATM review the list of required documentation thoroughly before developing the proposal. Questions for the review team can be submitted through the communication window in the application portal or via email. EPA has designed this review process to be iterative between the applicant and the reviewers, and the review team may reach out with questions, requests for additional information, or requests to meet and discuss the application.

4.4. Overview of Methane ATM Technical Requirements: Periodic

If the applicant chooses to demonstrate compliance using periodic screenings (See [§60.5398b\(b\)](#)), they must comply with the requirements of [§60.5398b\(b\)\(1\)](#) through [\(5\)](#) and comply with the recordkeeping and reporting requirements in [§60.5424b](#). Many CO₂-emitting emissions sources are currently regulated through Best System of Emission Reductions (BSER), which are administered through quarterly Optical Gas Imaging (OGI) surveys. Approved periodic survey methane detection solutions, however, can be used instead of, and in partnership with, BSER. The frequency of deployment of the approved solution is based on the minimum detection threshold of the new technology, and whether the solution also incorporates OGI. The frequency of the surveys will be based on the deployed solution with the highest aggregate detection threshold, considering OGI when appropriate.

Table 1 of Subpart OOOOb of Part 60. Alternative Technology Periodic Screening Frequency at Well Sites, Centralized Production Facilities, and Compressor Stations Subject to AVO Inspections with Quarterly OGI or EPA Method 21 Monitoring.

Minimum Screening Frequency	Minimum Detection Threshold of Screening Technology
Quarterly	≤ 1 kg/hr ^a
Bimonthly	≤ 2 kg/hr
Bimonthly (+ use of OGI)	≤ 10 kg/hr
Monthly	≤ 5 kg/hr
Monthly (+ OGI use of OGI)	≤ 15 kg/hr

a. 3 kg/hr for a period of 2-years from effective date of the rule.

Table 2 of Subpart OOOOb of Part 60. Alternative Technology Periodic Screening Frequency at Well Sites and Centralized Production Facilities Subject to AVO Inspections and/or Semiannual OGI or EPA Method 21 Monitoring.

Minimum Screening Frequency	Minimum Detection Threshold of Screening Technology
Semiannual	≤ 1 kg/hr
Triannual	≤ 2 kg/hr
Triannual (+ use of OGI)	≤ 10 kg/hr
Quarterly	≤ 5 kg/hr
Quarterly (+ use of OGI)	≤ 15 kg/hr
Bimonthly	≤ 15 kg/hr

For a Methane ATM submission to be approved by EPA, fugitive methane emission events need to be captured at the 90% probability of detection (POD) limit, e.g., the proposed technology solution will successfully detect 90% of the events that occur above the minimum detection threshold of the screening technology. Any proposed method should detail how it determined the 90% POD. Finally, any approved periodic methane solutions must document the spatial resolution of the technology using the following requirements:

- a. **Facility-level spatial resolution:** ability of solution to confirm detection of fugitive emissions within the local boundaries of the site. See more at [§60.5398b\(b\)\(5\)\(ii\)](#).
- b. **Area-level spatial resolution:** ability of solution to confirm detection of fugitive emissions within a 4-m radius of the emission source, or 2-m radius if the confirmed detection occurred in the portion of a site that contains a storage vessel or a closed vent system. See more at [§60.5398b\(b\)\(5\)\(iii\)](#).
- c. **Component-level spatial resolution:** ability of solution to confirm detection of fugitive emissions within a 1-m radius of the emission source, or 0.5-m radius if the confirmed detection occurred in the portion of a site that contains a storage vessel or a closed vent system. See more at [§60.5398b\(b\)\(5\)\(iv\)](#).

4.5. Overview of Methane ATM Technical Requirements: Continuous

If the applicant chooses to demonstrate compliance using continuous monitoring (See [§60.5398b\(c\)](#)), they must comply with the requirements of [§60.5398b\(c\)\(1\)](#) through [\(9\)](#) and comply with the recordkeeping and reporting requirements in [§60.5424b](#). A continuous monitoring method is one that is constantly and consistently monitoring a given site at a facility-level resolution. To be considered 'continuous monitoring,' proposed advanced methane detection technology must operate with $\leq 10\%$ downtime (at least 90% uptime). This number is determined on a rolling basis, meaning at the end of each calendar month, the downtime is calculated for the previous 12 months.

Downtime means any of the following:

- a) A period where the system fails to record methane data at least once every 12-hr block period,
- b) A period between a failed quality assurance check and a passing quality assurance check, or until a replacement monitor is installed, or
- c) A period when a monitor is outside of its range.

Prior to implementing a continuous monitoring solution, the site must first calculate its baseline methane emissions when it is operating as expected, e.g. with no leaks. This baseline is calculated using a 30-day rolling average of site emissions, removing all maintenance events or interruptions. Once the system has completed the 30-day baseline determination, any fugitive events are calculated as emissions above that number. Fugitive events are determined using a 7-day and 90-day rolling average. When the site exceeds the 7-day rolling average, an investigation must be completed within 5 days of the exceedance. When the site exceeds the 90-day average, the investigation must be completed within 30 days of the exceedance. Continuous monitoring solutions must be able to determine a minimum leak threshold of 0.40 kg/hr over the baseline. The minimum leak threshold quantification is not a one-time lab or field calculation; it is an ongoing determination. The minimum threshold calculation is the key factor when assessing whether a continuous method meets acceptable standards.

5. Methane ATM Application

5.1. Methane ATM Request Process

The Federal Register lays out the Methane ATM request requirements at [§60.5398b\(d\)](#). Applicants should read the language of §60.5398b(d) and **refer to Appendix A of this guideline document** to follow the step-by-step procedures to:

- a) Create a Login.gov account.
- b) Submit and review your Methane ATM request at the Methane ATM portal.

- c) Browse Methane ATM requests at the Methane ATM portal.
- d) Navigate the Methane ATM portal.

Before submitting a Methane ATM request, applicants must follow the submission process set forth in [§60.5398b\(d\)](#). Sections 5.2-5.9 of this guideline document provide context and guidance on those requirements.

5.2. Overview of Required Content

A Methane ATM request typically consists of four primary components (although one is optional):

1. *Optional executive summary* document (Section 5.2.1)
2. **Description of technology** document (Section 5.2.2)
3. **Supplementary information** (Section 5.2.3)
4. **Methane ATM** (Section 5.2.4)

Methane ATM requests will need to cover the operation and method of a proposed solution in highly technical detail, including information that would not normally be publicly distributed. To protect an applicant's Intellectual Property (IP), proprietary materials can be submitted to the review team through EPA's Confidential Business Information (CBI) system. All information submitted through the Methane ATM portal is available to the public. Applicants should not use the Methane ATM portal to submit any information believed to be CBI. See Section 5.3 of this guideline document for instructions on submitting CBI.

5.2.1. Executive Summary (Optional)

Applicants are encouraged to submit an executive summary, which will help expedite the Methane ATM review process. An executive summary provides a brief overview of the proposed advanced methane detection solution, along with a list of the submitted documents and a short (1-2 sentence) description of each file. Any documentation submitted to the CBI system should also be included, along with an indication that it was submitted into that system. There is no formatting template for the executive summary, but the following template may be a useful example:

SAMPLE TEMPLATE

[Company Name] Methane Alternative Test Method Request – Executive Summary

Request Number – ALTTECH-###

Submission Date –

Company Name	
Submission Point of contact Name	
Product Name	
Technology Type	
Target Applicability	
Target Emission Leak Rate Threshold	
Request Numbers of any connected submitted requests	

A. Technical Summary of Technology:

A high-level summary of the solution, technique, and applicability.

B. Notes for the Review Team:

Helpful notes contextualizing the application for the review team. For example, if an applicant is submitting multiple applications for a solution with multiple thresholds, applicants can note those related applications.

C. Updates to the Application:

A description of any documents that were added, changed, or updated, with explanation as to why. Include the date (YYYY-MM-DD) when the additions and edits in this document were performed. Add any files to the summary of documents submitted and mark them in some way – Adding a table with “added on Date” or coloring the text, for example.

D. Summary of Documents Submitted:

A list of all documents submitted, separated by type of document, with a 1-2 sentence summary for each document.

Description Document Submission Category:

Document Name(s) with extension	Document Description
Company Name LDAR Measurement Document.pdf	The Measurement technology summary document.
Company_Name_Visual_Workflow.pptx	A visual workflow for Company Name Methane ATM submission

Supporting Documents:

Document Name(s) with extension	Document Description
Product_Brochure.pdf	Informational brochure used in sales pitches
Siteing_guidelines.pdf	Site set up guidelines that are used by the installation crew
Technical_summary_presentation.pptx	Executive summary slides for outside shareholders

Methane Alternative Test Method (MATM):

Document Name(s) with extension	Document Description
Company Name Alt Test Method.pdf	Formatted Alternative Tested Method

CBI Submitted Documents:

Document Name(s) with extension	Document Description
CM_SOP.docx	The SOP for the method that is turned over to end users
QA_Baseline_values.csv	Minimum quality assurance values

5.2.2. Description of Technology

Applicants must submit a description of technology containing the elements described in [§60.5398b\(d\)\(3\)\(iii\)](#), [\(iv\)](#), and [\(v\)](#). In summary, the description of technology document should contain: (1) a description of the measurement technology, including the physical components, the scientific theory, and its known limitation; (2) description of how the measurement technology is converted to a methane emission rate (i.e., kg/hr of methane) or equivalent; and (3) description of how all data collected and generated by the measurement system are handled and stored. This document should be written for a technical audience, i.e., do not use marketing language.

5.2.2.1. Format of Description of Technology

There is no required format for the description of technology. EPA is also not prescriptive about how information within this document is split between the publicly facing portal and the CBI system. Applicants are encouraged to use strategies that help the EPA review team track where information is submitted. Examples are:

- a. Submitting redacted version of the technology document on the publicly facing portal.
- b. Submitting a summary document to the CBI portal that outlines what is on the CBI system.
- c. Making a reference in the public-facing document to specific documents and document sections that can be found in the CBI system.

5.2.2.2. Visual Workflow (Optional)

Applicants are encouraged to submit a visual workflow document as a complimentary section within the description of technology. A workflow is intended to help the reviewers track how data moves through the proposed advanced methane technology solution and document processing. There is no required format for the visual workflow, however the workflow should include the following:

- a. How data moves through the system
- b. Data sources, transformation, and calculation steps
- c. Artificial Intelligence (AI) technology applications
- d. Quality control steps
- e. Storage and retrieval processes

EPA also requests that automated versus manually operated steps are clearly indicated within the workflow. Unless it's critical for understanding the data flow, it is not necessary to include the internal software architecture of processing and storage systems. EPA understands that it may be necessary for applicants to separate parts of their workflow depending on the

complexity of the proposed advanced methane detection solution. If an applicant takes this approach, it is necessary to explain how subsidiary workflows work together. The workflows may be included in either the public-facing portal or in the CBI system, or as a separate document within the description of technology.

5.2.3. Supporting Documentation

Applicants must submit supporting documentation containing the elements described in [§60.5398b\(d\)\(3\)\(vi\)](#) and [\(vii\)](#). In addition to the required information/documentation, EPA encourages applicants to provide available public-facing documentation that explains the technology (e.g., white papers, technical slide decks, and informational brochures), and datasets and validation information that demonstrates the applicability and performance of the method. All supporting documentation, similar to other application documents, can be split between the public-facing portal and the CBI portal.

5.2.4. Methane ATM

The Methane ATM document is in reference to [§60.5398b\(d\)\(3\)\(vi\)\(C\)](#), and describes the proposed method protocol that will be officially approved by EPA. This is the most important part of the application. An applicant's Methane ATM is a public-facing document and should not include CBI. Approved Methane ATMs are featured on the [EPA website](#) and are publicly accessible for regulators, stakeholders, industry, and the general public to use with the objective to understand how a technology is deployed in the field. ***Refer to Appendix B of this guideline document for the style and formatting guide to writing the Methane ATM.***

5.3. Confidential Business Information

Many applications will contain CBI. Applicants should submit any CBI materials to EPA's CBI office. Applicants should clearly mark any information with CBI, as any other information may be authorized for public release without prior notice. Information marked as CBI will not be disclosed except in accordance with procedures set forth in [40 CFR part 2](#). All CBI claims must be asserted at the time of submission. Anything submitted using the portal cannot later be claimed CBI.

EPA prefers to receive CBI electronically using email attachments, a File Transfer Protocol (FTP), or other online file sharing services. Electronic submissions must be transmitted directly to the CBI office at: oaqps_cbi@epa.gov. These submissions should include clear CBI markings and be flagged to the attention of: Measurement Technology Branch (MTB) Team. For large electronic files that exceed the file size limit for email attachments, email oaqps_cbi@epa.gov to request a file transfer link. When communicating with the CBI office via email, applicants should not include any additional EPA personnel in those communications. In situations where a file cannot be transmitted electronically, applicants can send hard copy CBI information to:

U.S. EPA
Attn: OCAP Document Control Officer and MTB Team
Mail Drop: C404-02, 109 T.W. Alexander Drive, P.O. Box 12055,
RTP, North Carolina 27711.

Hard copy CBI material should be double wrapped and clearly marked. Any CBI markings should not show through the outer envelope.

5.4. Artificial Intelligence Methods

EPA is currently requiring applicants to identify any advanced methane detection technology methods that would fall under the umbrella of AI, including, but not limited to, machine learning, neural nets, and deep learning techniques. Additionally, application materials should discuss how the technology development process addresses any potential security concerns and potential bias in the training and application of these techniques within the proposed methane solution. Materials should also discuss ongoing measures for evaluating potential security threats or bias concerns. As EPA develops more formal governance and directives, the agency will provide sufficient time for solution providers using AI to come into compliance with the new requirements.

5.5. Additional Information

EPA reviewers may require additional documents as part of the Methane ATM review process. Documents cannot be edited or deleted from a submitted request, including documents added at the request of the review team. If the additional requested information is considered CBI, applicants must inform reviewers.

If the applicant included the optional executive summary in their Methane ATM request, EPA encourages applicants to add an updated executive summary when new documents are added to the portal or through the CBI system. The updated portion of the executive summary should be clearly highlighted, and detail what documents have been added (document name and extension), where they were submitted (publicly facing portal or CBI system), and a 1-2 sentence summary of the document contents.

5.6. Withdrawing a Methane ATM Request

Applicants can withdraw a Methane ATM request before the review process is completed. This most often occurs when an applicant needs to provide additional documents or information, and review is likely to exceed the 270-day window, which would trigger a disapproval letter. When an application is withdrawn, application materials remain saved on the submission portal but will no longer be public facing. Once reviewers have reached a final decision on an application, however, it can no longer be withdrawn.

5.7. Submissions with Multiple Emission Detection Thresholds

Some proposed periodic screening Methane ATM's can be applied to different detection thresholds. In those circumstances, applicants are required to submit separate applications for each detection threshold. If the applicant submits multiple similar Methane ATM requests, each executive summary should detail the differences between the related requests, and where those details are recorded within the application. It is not necessary to submit different materials in each application if the technology is the same.

5.8. Revisions to Approved Methane ATM Requests

Any changes to an approved Methane ATM and/or the underlying advanced methane detection technology require EPA's review and approval. Applicants should reach out to the EPA review team. The EPA review team may determine that a formal review and approval process is required a method change is significant. In such a case, the applicant will be asked to revise and resubmit the approved Methane ATM request. To expediate the review process of the proposed revisions, the applicant should inform EPA of any previously submitted requests, include an updated executive summary outlining a description of the changes and why the changes were made, and identify all location of all new information in the submitted text and documents.

The revised Methane ATM will be approved as a separate method with a separate Request ID. The original approved method will remain as a standalone advanced methane detection technology. If the applicant wants to sunset a previously approved technology, they must reach out directly to the EPA review team. See Section 6.3 of this guideline document for more information.

5.9. Personal Identifiable Information

To stay in compliance with federal rules, all Personal Identifiable Information (PII) must be eliminated from an application. [PII is defined as:](#) "Any information about an individual maintained by an agency that can be used to distinguish, trace, or identify an individual's identity including personal information which is linked or linkable to an individual."

For a Methane ATM request, PII includes contact name, address, phone number, and email address. This information will be collected as part of the Methane ATM request header information but will be redacted off the public-facing Methane ATM request. Applicants should ensure that this information is not included in an executive summary or any technology documents. No other documents will be reviewed for PII and will be considered voluntarily submitted.

5.10. Basic Checklist for Methane ATM Request

EPA encourages the applicant to use the following checklist (Table 3) to ensure the Methane ATM request is ready to be submitted for review.

Table 3. Basic checklist for applicants when submitting a Methane ATM request.

Check Box	Description
	Optional: Executive summary of the proposed advanced methane detection technology using the suggested format described in Section 5.2.1 of this guideline document
	Description of Technology document containing the elements indicated in Section 5.2.2 of this guideline document.
	Supporting Documentation containing the elements indicated in Section 5.2.3 of this guideline document
	Methane ATM document written using the style and formatting indicated in Appendix B of this guideline document.
	Header information on the Methane ATM request is accurate, particularly the detection threshold, the applicability, and the technology type. See Section 2.2.2 of Appendix A of this guideline document.
	Materials submitted between the public-facing portal and the CBI system. The executive summary and description of technology documentation exclude PII or CBI.

5.11. Frequently asked questions (FAQs)

Applicants should refer to the [FAQs located in the Methane ATM website](#) (See Section 2.9 of Appendix A) before reaching out the review team for questions. There are FAQs answer questions about the Methane ATM regulatory program, application scope, application process, and application materials.

6. The Methane ATM Review Approval Process

6.1. Post-Submission Methane ATM Review Process

1. Applicant submits a Methane ATM request with a stated emission rate threshold.
 - a. Any non-CBI information submitted through the portal will become publicly viewable within 7 days.
2. Review team evaluates the application for completeness.
3. Review team schedules meetings between applicant and the review team. This ensures that applicant can address initial agency feedback and questions. Ultimately, the review team decides if the application meets the completeness check requirements.
4. If the application proceeds further in the review process, the review team will provide additional feedback to the Methane ATM until it is finalized.
5. Final version of the Methane ATM, if approved, will be checked that it meets 508 compliance requirements.
6. Review team writes a decision letter and acquires the signature from the delegated EPA authority.
7. Applicant receives decision notice via email including a copy of the 508-compliant Methane ATM, if approved.

6.2. Request Approval or Disapproval

EPA will issue either an approval or disapproval in writing to the applicant. Approvals will either be on a site-specific basis or will be deemed as broadly applicable. Broadly applicable Methane ATMs and approval letters will be posted at <https://www.epa.gov/emc/oil-and-gas-approved-alternative-test-methods-approvals>.

If EPA finds any deficiencies in the request and disapproves the request in writing, the owner or operator may choose to revise the information and submit a new request for an alternative test method.

If EPA fails to provide a decision on approval or disapproval within 270 days after the completeness check is confirmed, the Methane ATM will be given conditional approval status and publicly posted on the EPA webpage.

If a methane detection solution is approved, the request status will be changed to “Approved” in the submission portal. The application will also be searchable under the “Approved Methane ATM Requests” section of the program website. Information and documents submitted as a part of this request will remain public facing. The approved Methane ATM outlining the protocol will continue to be referred to by its ALTECH—XXX identification number.

The applicant can make a major revision to the approved request at a later date. Applicants cannot, however, withdraw from an approved request. Under some unique circumstances, an approved request may eventually be sunset by the applicant.

If a Methane ATM Request is declined by the review team, the request status will be changed to “Declined” in the submission portal. Information and documents submitted as a part of this request will no longer be public facing.

If subsequent testing of an approved solution produces evidence that the approved solution does not work, EPA has the authority to revoke the approval. Upon receipt of such evidence, EPA will review all relevant data and meet with the applicant prior to making a final determination. Any monitoring performed with the alternative technology solution prior to the revocation date will be considered valid. After the revocation date of a solution, owners or operators using that technology must find another monitoring technology or choose to use OGI and must revise their monitoring plan accordingly.

6.3. Sunsetting Approved Technologies

Major revisions (See Section 5.8 of this guideline document) are made by submitting a new Methane ATM request, separate from the already approved method. In circumstances when there are numerous nearly identical approved methods in tandem, EPA will allow an applicant to sunset an approved solution that has been replaced with a new, updated version. This sunsetting occurs on a case-by-case basis. If an applicant is interested in sunsetting an approved advanced methane detection technology, they must contact the EPA review team to begin the process.

6.4. Solution Provider or Solution Name Change

If the applicant or technology name changes due to a company buy-out, merger or rebranding, an applicant updates the Methane ATM request to reflect the updated name or company. Applicants must contact the EPA review team to initiate the process. This will be handled on a case-by-case basis.

Appendix A – Creating a Login.gov Account and Submitting a Methane ATM Request

1. Creating a Login.gov Account

1.1. The first step in submitting a Methane ATM request to EPA is to create a login.gov account. Applicants should visit www.login.gov for information on creating an account. EPA provides a “Login” link located in the top navigation menu of the Methane ATM Homepage or the Login.gov link located in the middle of the page, as shown in Figure A1.

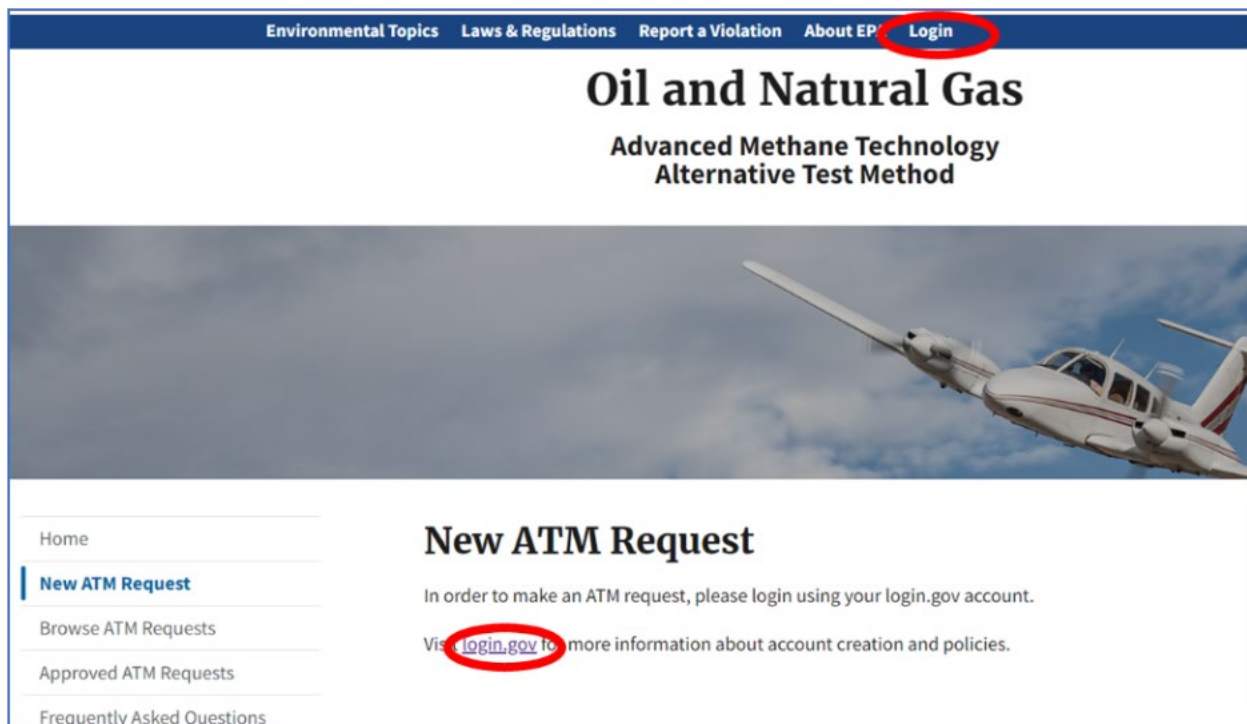


Figure A1. Portal – Login.gov Account.

1.2. From www.login.gov, click the “Create an account” link located in the top navigation menu, as shown in Figure A2.

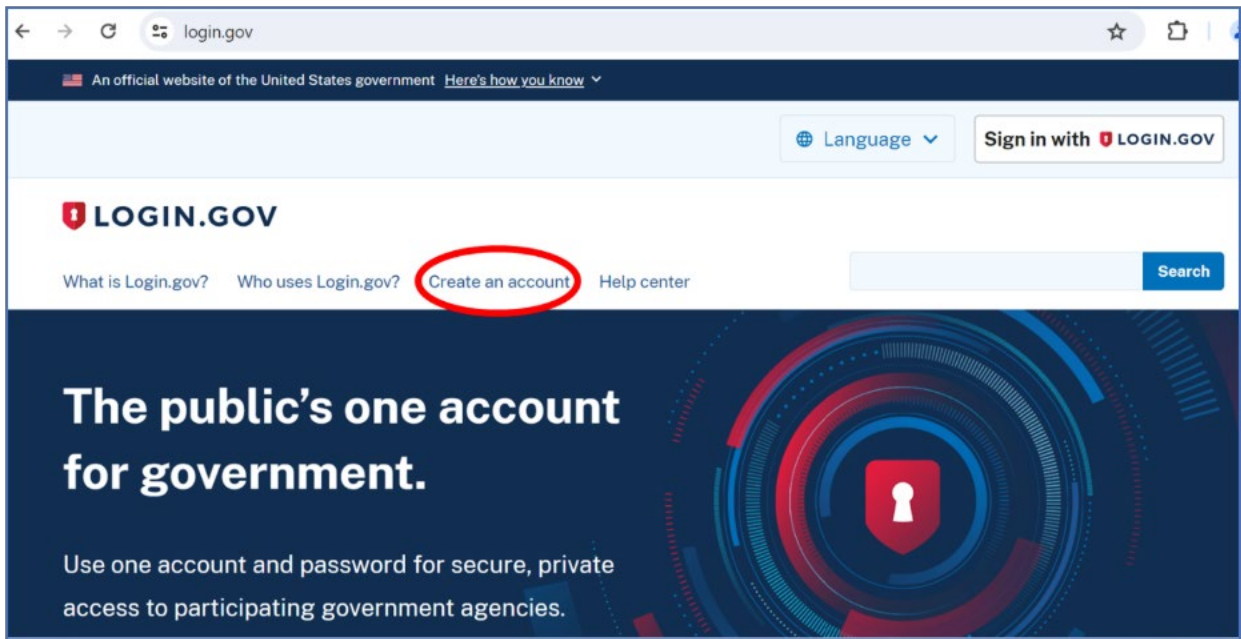


Figure A2. Portal – Login.gov Create Account.

1.3. Once the applicant has an account, navigate back to the Methane ATM home page and click the “Login.gov” link. This will route to the EPA Gateway page. From there, click the “Login” button to log in with Login.gov credentials as shown in Figure A3.

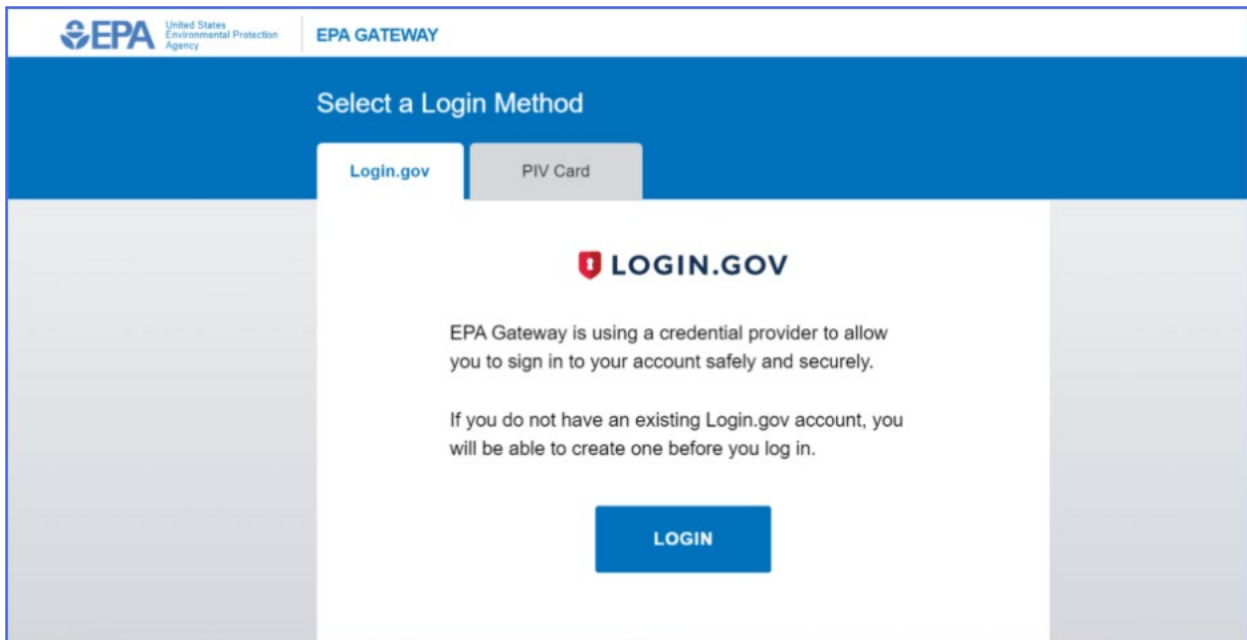
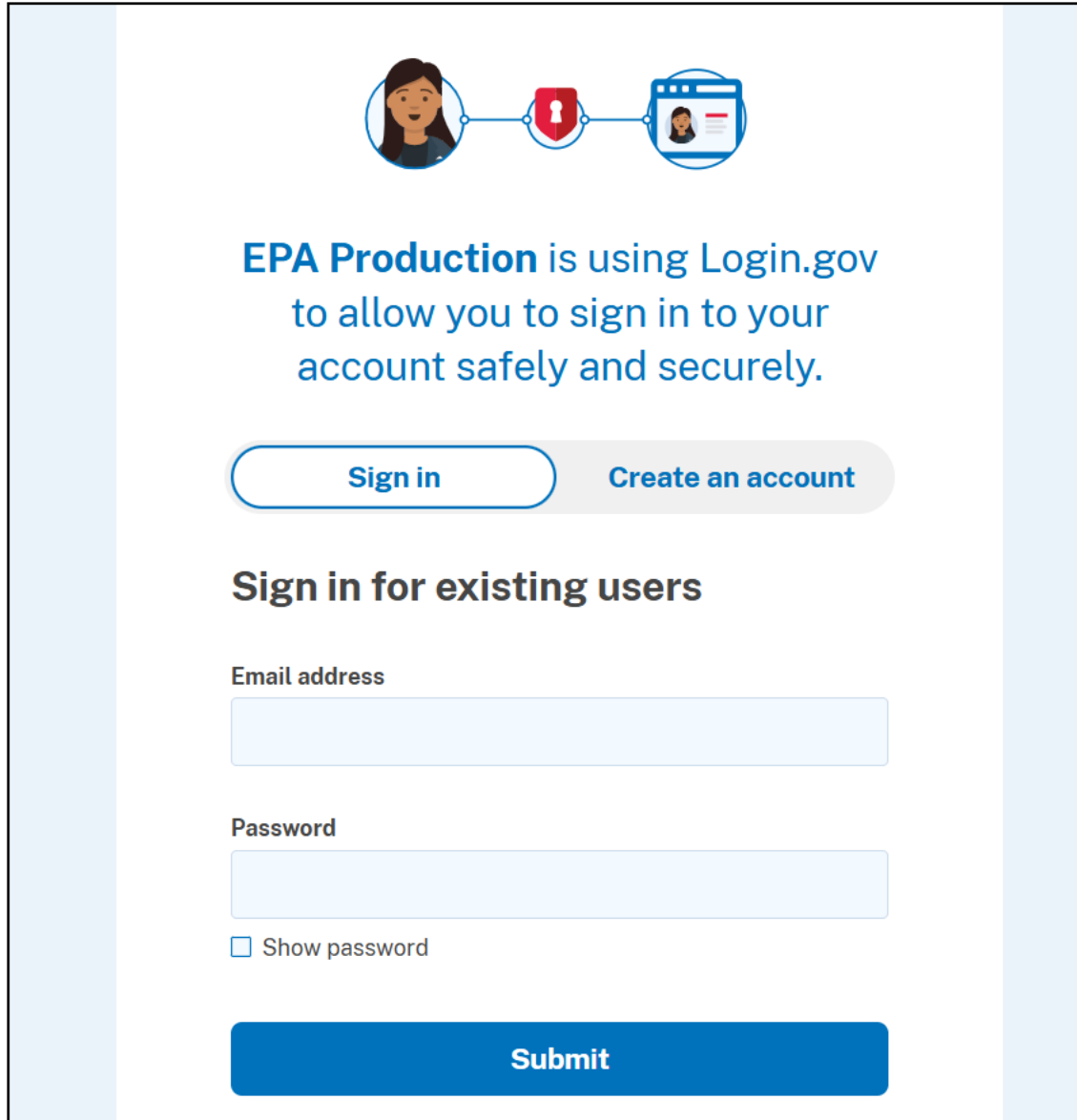


Figure A3. Portal – EPA Gateway.

1.4. Click the “Login” button, and the Login.gov sign in page will appear. Select the “Sign in” option and enter the email address and password used to create the Login.gov account in the input boxes located in the middle of the page. Click the “Submit” button, as shown in Figure A4.



EPA Production is using Login.gov
to allow you to sign in to your
account safely and securely.

[Sign in](#) [Create an account](#)

Sign in for existing users

Email address

Password

Show password

Submit

Figure A4. Portal – Login.gov Sign-In.

1.5. Once logged in, applicants will be prompted to enter a one-time code to access the system, as shown in Figure A5. Note that the one-time code expires after 10 minutes. If the system isn’t accessed within 10 minutes, it will prompt you to repeat the login procedures.

Enter your one-time code

We sent a text (SMS) with a one-time code to (***) ***-5668.
This code will expire in 10 minutes.

One-time code
Example: 123456

Remember this browser

Submit

[Send another code](#)

Figure A5. Portal – Login.gov One-Time Code.

2. New Methane ATM Request

2.1. Home Page

A Methane ATM request, along with the required supporting information, must be submitted to EPA through the Alternative Methane Detection Technology Portal, accessible at <https://methane.app.cloud.gov/> (See Figure A6). All information submitted through the Methane ATM portal is available to the public. If an applicant wishes to submit CBI, they must submit the portion of the information claimed as CBI to the CBI office (see Section 5.3 of the guideline document). Once an applicant has logged into the portal using their login.gov account, they must register for further access. Instructions are available at <https://www.epa.gov/emc/oil-and-gas-alternative-test-methods>, or you can access it directly in the following PDF link: https://www.epa.gov/system/files/documents/2024-05/menthane-atm-register-with-epa.instructions.-pdf_0.pdf

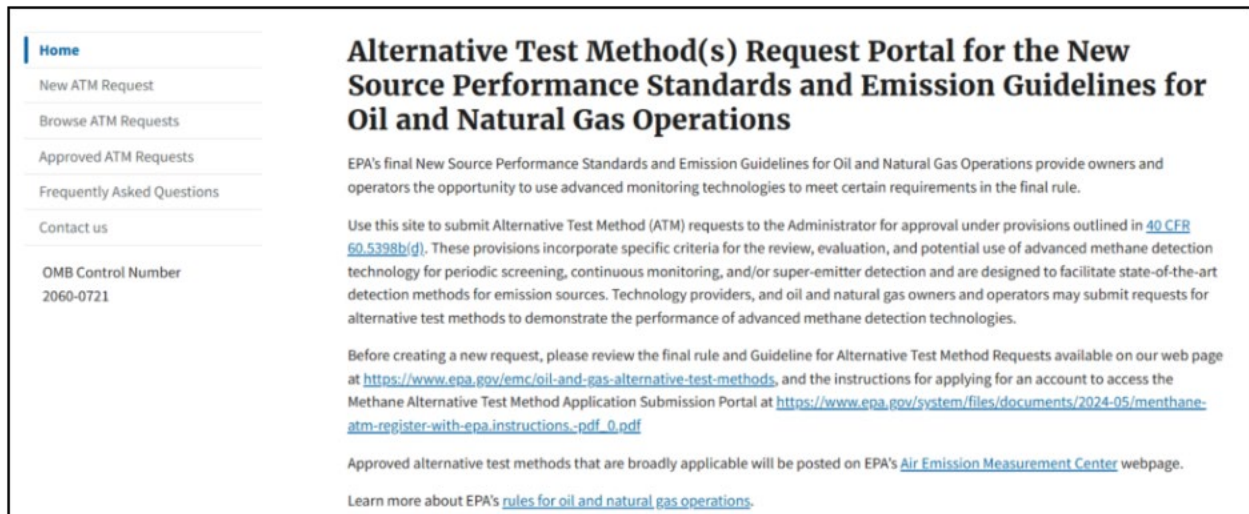


Figure A6. Portal – Methane ATM Home Page.

2.2. Important Methane ATM Request Website Features

There are several important features in the Methane ATM portal. It is important for applicants to familiarize themselves with these features before submitting an application.

2.2.1. Get Help Button (Communication Window)

2.2.1.1. The portal contains a “Get Help” button (see Figure A7), which allows direct communication between submitter and EPA reviewer and is available as soon as an application is saved to the system. This is a useful tool for applicants to communicate with EPA before their application has been assigned to an EPA review team. Applicants must click the “Get Help” button to access the Communication Window. While the Communication Window does not allow real time communication, the correspondence will be saved with the records of the review. After the initial meeting between applicant and EPA review team, however, communication may occur directly over email.

Home

New ATM Request

Review ATM Requests

Approved ATM Requests

Frequently Asked Questions

Contact us

Note About CBI

Do not submit information you claim as confidential business information (CBI) to EPA via this website. All information submitted through this website will be made available to the public without further notice to you.

Please visit [Handling CBI](#) to learn more about CBI and the

Please fill out the form below. You can save your progress at any time and return to it later. When you are finished, you can submit it for review. Your application will become publicly visible 7 days after you submit it (or sooner if it's approved.)

If you have questions, get help from the message portal. [Get Help](#)

Request ID
Not saved yet

Communication Window

Avoid personal information
Contact information will be hidden from the public, but you are encouraged to provide business (non-personal) email and phone.

1. Point of Contact

Full Name: Jane Doe
Email: jane@abcsolutions.com
Phone: 555-555-5555

Header Information

Figure A7. New Methane ATM Request Input Form

2.2.2. Header (Background) Information

All project background information must be entered into the header section of the Methane ATM portal (See Figures A7 and A8). This information must be complete before any submission is accepted by EPA. The header information provides context for the Methane ATM request and will be pinned in EPA’s public-facing web portal, giving end users the ability to search and sort technological solutions. The required information is described in Section 2.3.3.2 of this appendix.

2. Company and Product

Company Name: ABC Solutions Inc.
Company Website: http://abcsolutions.com

Product Name: My Detection Product
Desired Applicability: Site-specific

Leak Detection Resolution: 1 kg/hr
Technology Type: Satellite

Continuous solution

Additional Information (optional)

Header Information

Figure A8. New Methane ATM Request Input Form – Company/Product Information.

2.2.3. Submission “Buckets” for Methane ATM Request Materials

§60.5398b(d) outlines certain required pieces of information for any Methane ATM request. In the Methane ATM portal, the information will be submitted into various “buckets” (See Figures A9 and A10).

- a. **Bucket 1:** Executive Summary (optional)
- b. **Bucket 2:** Description of Technology (required)
 - a. Visual workflow (optional)
- c. **Bucket 3:** Supporting Documentation (required)
- d. **Bucket 4:** Methane ATM – formal alternative test method (required)

3. Documentation CBI also submitted **CBI Checkbox**

Please upload files for each document category or mark the relevant checkboxes to acknowledge their absence and explain in the accompanying field.

Executive Summary (This document will expedite the application process)

This information is provided in another file or not relevant **Information Elsewhere**

To add one or more files, click the field to open a selection window. To change or delete the file before Save, click the field again. Save the form to make your changes permanent.

Upload file Drag files here or [choose from folder](#) **Bucket 1**

Description of Technology (Description including theory and known limitations)

This information is provided in another file or not relevant

To add one or more files, click the field to open a selection window. To change or delete the file before Save, click the field again. Save the form to make your changes permanent.

Upload file Drag files here or [choose from folder](#) **Bucket 2**

Figure A9. New Methane ATM Request Input Form – Documentation.

Supporting Documentation (Verification of spatial resolution, detection threshold etc.)

This information is provided in another file or not relevant

To add one or more files, click the field to open a selection window. To change or delete the file before Save, click the field again. Save the form to make your changes permanent.

Drag files here or [choose from folder](#)

Bucket 3

Formal Alternative Test Method (Description of the alternative testing procedures)

This information is provided in another file or not relevant

To add one or more files, click the field to open a selection window. To change or delete the file before Save, click the field again. Save the form to make your changes permanent.

Drag files here or [choose from folder](#)

Bucket 4

Pressing Save will reload the page and return focus to the top of the page.

Save → ← **Submit**

Figure A10. New Methane ATM Request Input Form – Supporting Documentation.

2.2.4. Uploading Files

Files can be attached to any written content in each “bucket.” To upload a new file, click the “Choose file” button. Applicants can upload multiple files into each “bucket” by clicking the “+” button located across from the “Choose File” button.

2.2.5. Information Elsewhere Checkbox

Often information in a submission applies to multiple “buckets.” An applicant can click the information elsewhere checkbox to indicate that a document or written content has already been included in another section. Once the applicant clicks the checkbox, a text box pops up with a prompt to explain where else to find the information in the application.

Example: EPA requests standard operating procedures be submitted in the supporting information “bucket.” This information may also be submitted in the CBI portal. If the information was already submitted in the CBI portal, check the ‘information elsewhere’ box and provide details.

2.2.6. CBI Checkbox

Clicking the CBI checkbox tells reviewers if there were additional documents submitted in the CBI system. If documents are submitted through the CBI system and the checkbox is not checked, the review process will likely be delayed. Additional details can be found in Section 5.3 of this guideline document.

2.2.7. Save Button

Methane ATM requests must be manually saved within the portal, which can happen at any time throughout the application process. *There is no autosaving feature in the portal.* Once a Methane ATM request has been saved, applicants can close out and come back to their work by logging into Login.gov. The Methane ATM portal will generate a draft “Request ID” which applicants can use to return to the input form. The “Request ID” is an auto-generated identification number that will be associated with the request after the submitter first saves the form. The Request ID will be in the form ALTTECH-01, ALTTECH-02, ALTTECH-03, etc.

2.3. Submitting a New Methane ATM Request

2.3.1. Once an applicant is logged into the system, click the “New Methane ATM Request” link located in the page’s left side menu as shown in Figure A11.

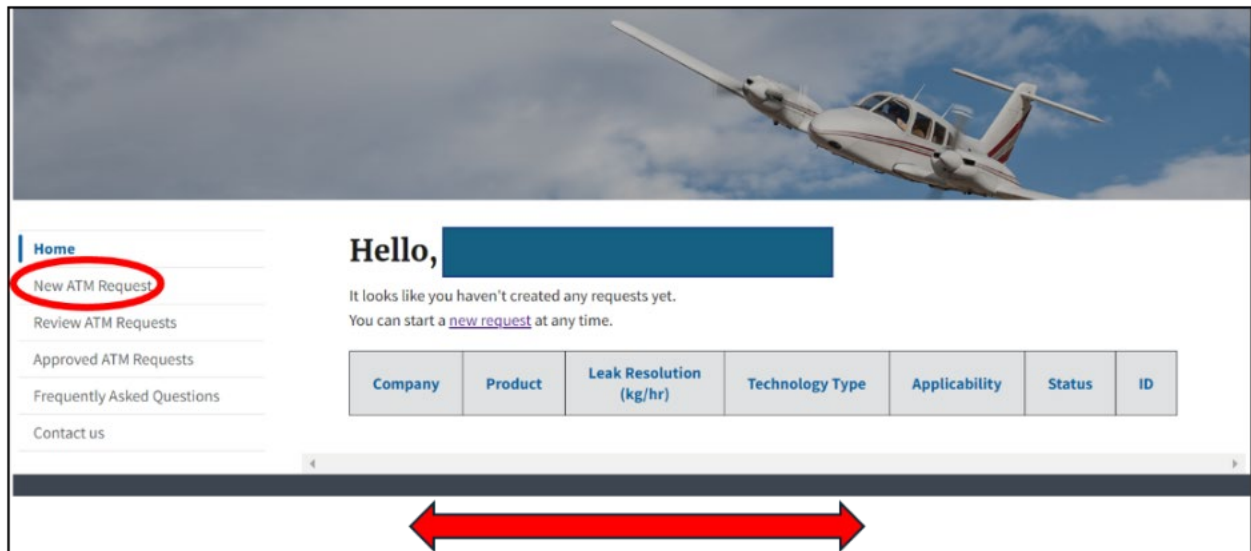


Figure A11. Portal – New Methane ATM Request.

2.3.2. The New Methane ATM Request input form will be displayed as shown in Figures A7-A10. Figure A8 has input fields for providing company and product information, and Figures A9 and A10 include input fields for providing the necessary documentation and supporting documents

to complete the Methane ATM request. Applicants must complete the New Methane ATM Request input form as described below:

2.3.3. Input Form

2.3.3.1. Section 1. Point of Contact for Application

- a) **Full Name:** Enter first name, followed by last name, e.g., Jane Doe (Required Field).
- b) **Email:** Enter a valid email address for point of contact, e.g., jane@abcsolutions.com (Required Field).
- c) **Phone:** Enter phone number for point of contact, with area code, in the following format: 555-555-5555 (Required Field).

2.3.3.2. Section 2. Company and Product

- a) **Company Name:** Enter the name of the company represented by this submission (Required Field).
- b) **Company Website:** Enter a valid URL for the company represented by this submission (Required Field).
- c) **Product Name:** Enter the product name of the advanced detection technology seeking approval (Required Field).
- d) **Desired Applicability:** Click on the down arrow to unhide menu and select one of the following dropdown list options: (Required Selection).
 - a. Site-specific
 - b. Basin-specific
 - c. Broadly applicable across the sector
 - d. Other
- e) **Leak Detection Resolution:** Enter the leak detection resolution rate in kg/hr of the advanced methane detection technology seeking approval (Required Field).
- f) **Technology Type:** Click on the down arrow to unhide menu and select one of the following dropdown list options: (Required Selection).
 - a. Satellite
 - b. Stationary in-situ sensor
 - c. Stationary remote sensor
 - d. Ground based mobile in-situ sensor
 - e. Ground based mobile remote sensor
 - f. Airborne mobile in-situ sensor (aircraft or drone)
 - g. Airborne mobile remote sensor
 - h. Other
- g) **Additional information:** Enter any additional information, as needed (Optional Field).

Note: In-situ technologies are measurements of the ambient matrix at the point of interest, by contact with the medium. In the case of methane, this would be any chemical monitoring that directly samples air into the measurement instrument. Remote technologies are systems that measure from a distance (e.g., LiDAR systems, video monitoring, and other non-interactive monitoring systems).

2.3.3.3. Section 3. Documentation

To learn more about what EPA is recommending for each type of documentation listed below, hover over the “?” icon to learn more. To attach a document, click “drag files here” or “choose from folder” and select the file to attach. Applicants can attach multiple files or delete files, as needed. Refer to sections 5.2.1-5.2.4 of the guideline document for the optional and required documentation in a Methane ATM request.

Note: if the information requested in this section is provided in another file or does not apply, click the checkbox for “This information is provided in another file or not relevant” (the system will then bypass this otherwise required field). If CBI is associated with the advanced methane technology request, check the box for “CBI also submitted.”

2.3.4. Submit Button

Once all required fields are complete and appropriate supporting documents have been uploaded, click the blue “Submit” button located at the bottom, right-hand corner of the page to finalize and formally submit a request. The EPA review team will be notified of new submissions on a weekly basis. After submission, files will be public-facing and applicants will no longer be able to edit or delete submitted documents. Applicants, however, can still log into their account and add additional documents per the review team’s request (see Section 5.5 of this guideline document). The submitter will have the ability to withdraw the Methane ATM request throughout the review process (see Section 5.6 of the guideline document) and can resubmit at any time.

2.3.5. Once clicked, a confirmation pop-up window will open to confirm the submission. Users can close the window by clicking on the “Close” button located on the bottom right-hand corner or by clicking on the “X” located on the top, right-hand corner of the window.

2.4. Adding Additional Documents to a Submitted Methane ATM Request

2.4.1. After a Methane ATM Request has been saved and submitted, applicants can add additional documents to their request at any time. Once logged in, applicants can navigate to the home page and click the name of the existing request. Applicants also have the option to withdraw the request before it is approved, as shown in Figure A12. Once an applicant has withdrawn a Methane ATM Request, it can no longer be modified unless it is resubmitted.

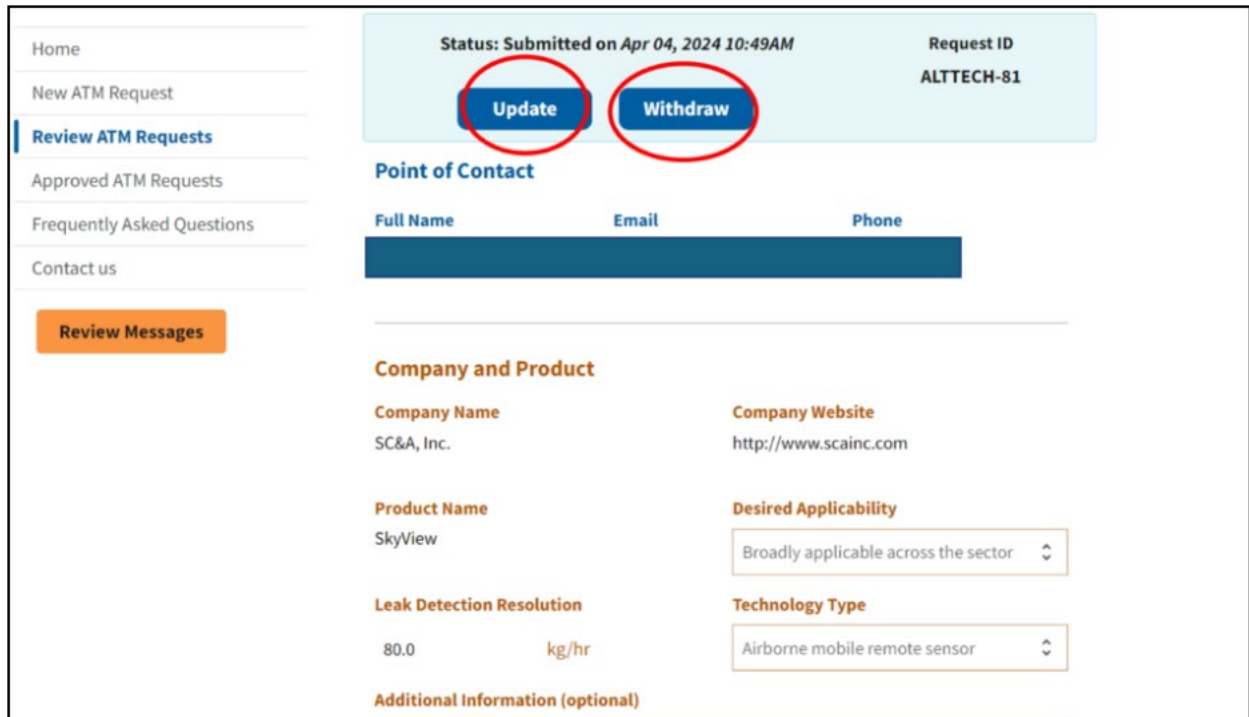


Figure A12. Portal – New Methane ATM Request Update/Withdraw Methane ATM Request.

2.5. CBI Material

CBI cannot be included in the submission because it will be made publicly available. Any CBI must be submitted through EPA’s secure CBI system. When submitting CBI, it is paramount that applicants include a Request ID (ALTTECH-xxx) in the title, as well as the body of the email. Not including a Request ID when submitting CBI will likely cause delays in the review process.

2.6. Browsing Methane ATM Requests

2.6.1. To view an existing Methane ATM request currently in the system, click the “Browse Methane ATM Requests” link from the main menu. A list of active requests will be displayed as shown in Figure A13. This can show all interested parties any submitted or approved Methane ATM request.

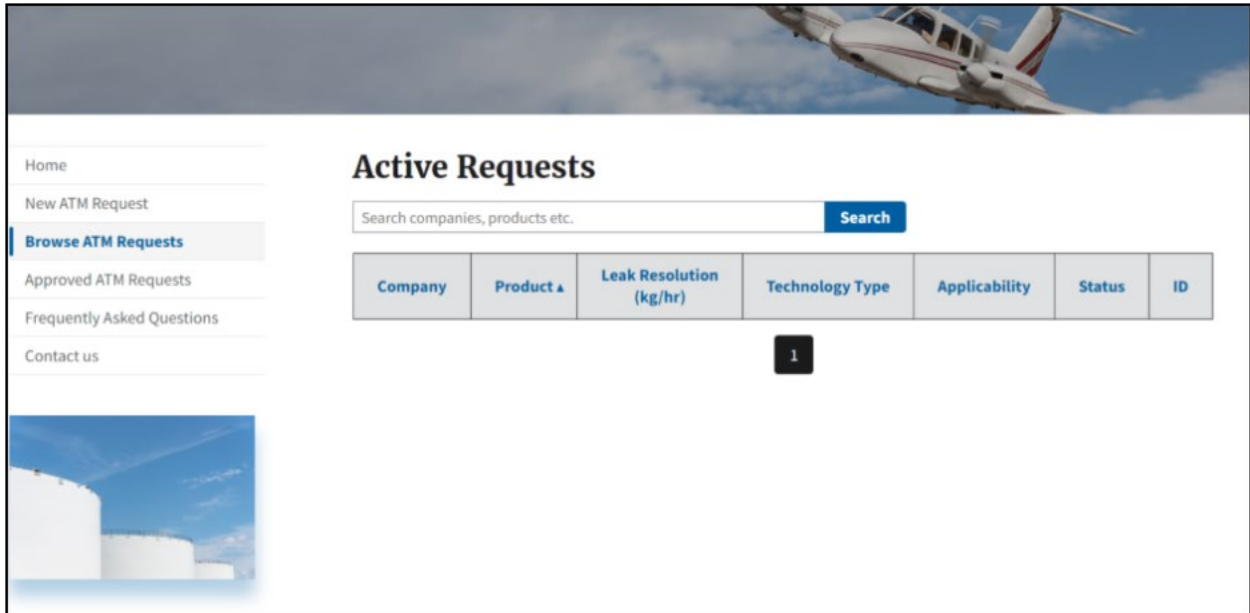


Figure A13. Portal – Browse Methane ATM Requests List.

2.6.2. Click any data item on the table of active requests for more information. A new page displaying information related to the request will be displayed with personal information redacted, as shown in Figure A14.

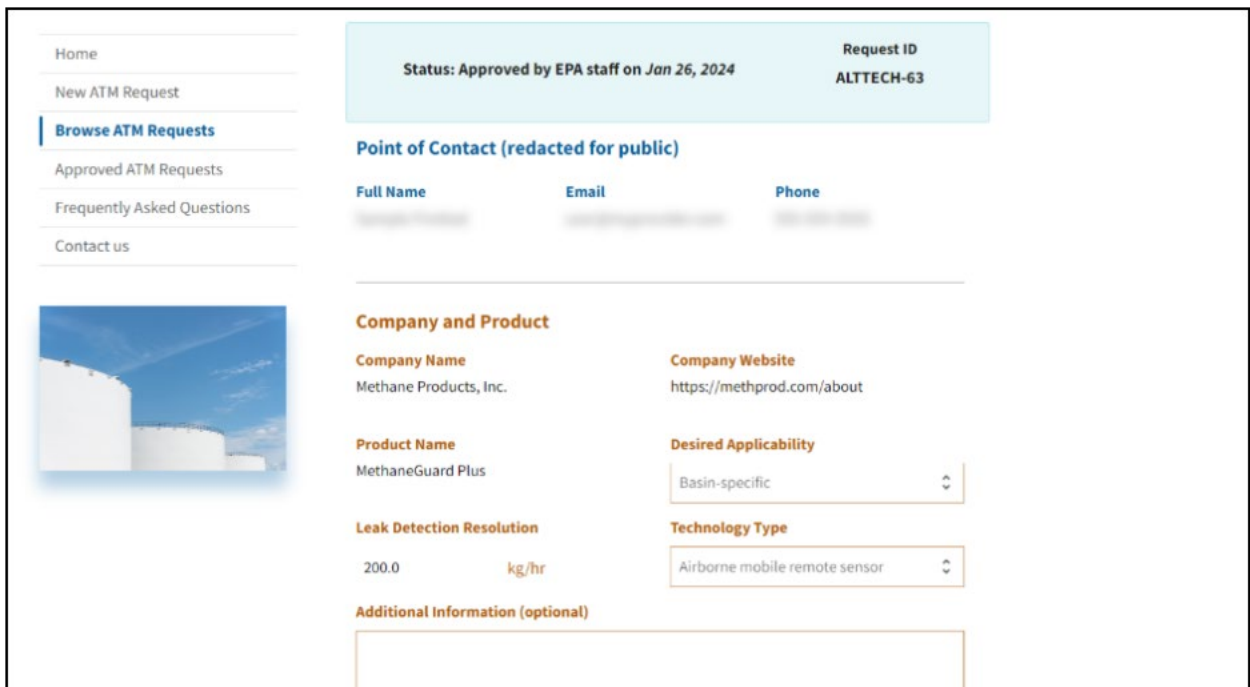


Figure A14. Portal – Browse Methane ATM Requests Details.

2.6.3. Individual documents associated with a request can be viewed by clicking the document name. It is also possible to download all documents associated with a request by clicking the “Download all” link, as shown in Figure A15.

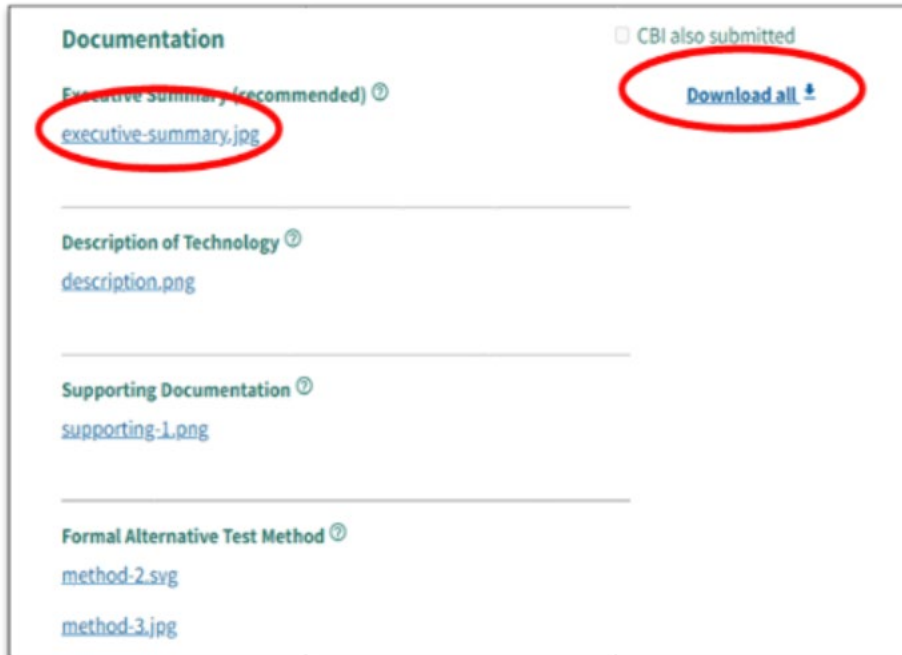


Figure A15. Portal – Browse Methane ATM Requests Details View Documentation.

2.7. Approved Methane ATM Requests

To view approved Methane ATM requests, click the “Approved ATM Requests” link from the main menu. A list of approved requests will be displayed as shown in Figure A16.

2.8. Modifying an Approved ATM Request

Previously approved Methane ATM requests can re-apply to EPA with major revisions to their technology. In this situation, applicants should open their original Methane ATM request and click the “Create Revision” button. This will create a new Methane ATM Request with a unique Request ID but maintain a reference to the original Request ID.

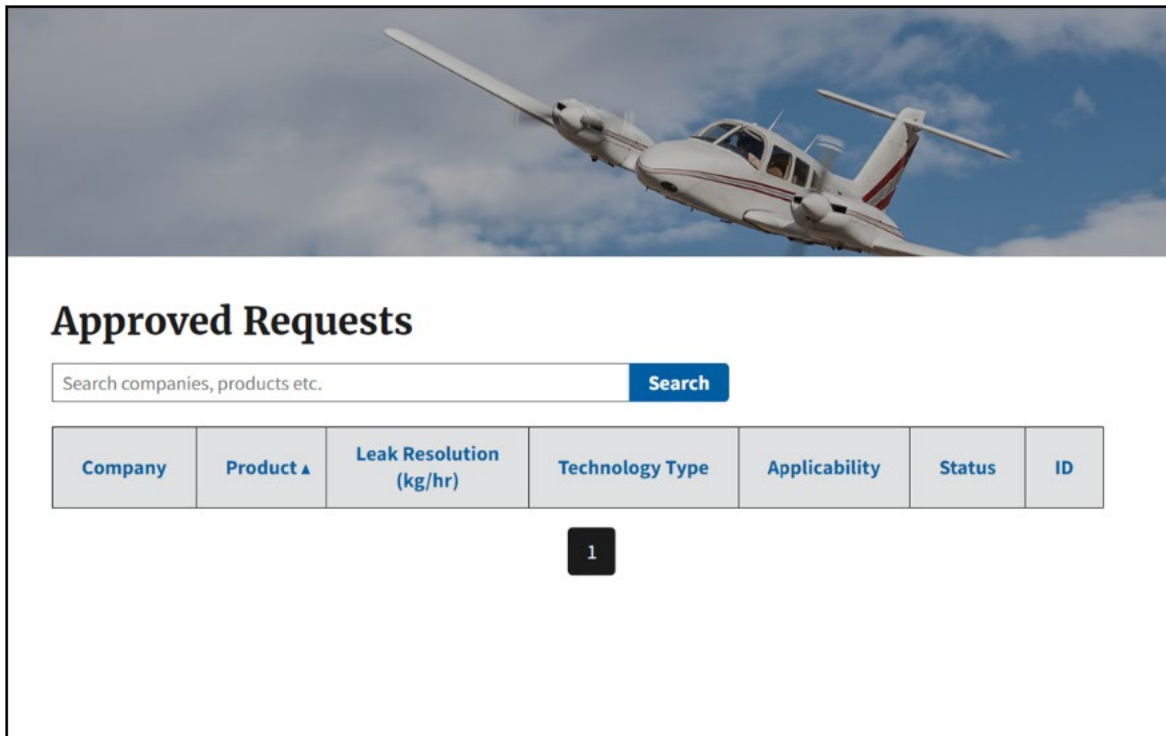


Figure A16. Portal – Approved Methane ATM Requests.

2.9. Frequently Asked Questions (FAQ)

2.9.1. To review FAQs relating to the Methane ATM request procedure, click the “Frequently Asked Questions” link from the main menu. A new page will be displayed that will provide a link to the FAQs document. This document can also be accessed at <https://www.epa.gov/emc/oil-and-gas-alternative-test-methods> as shown in Figure A17.

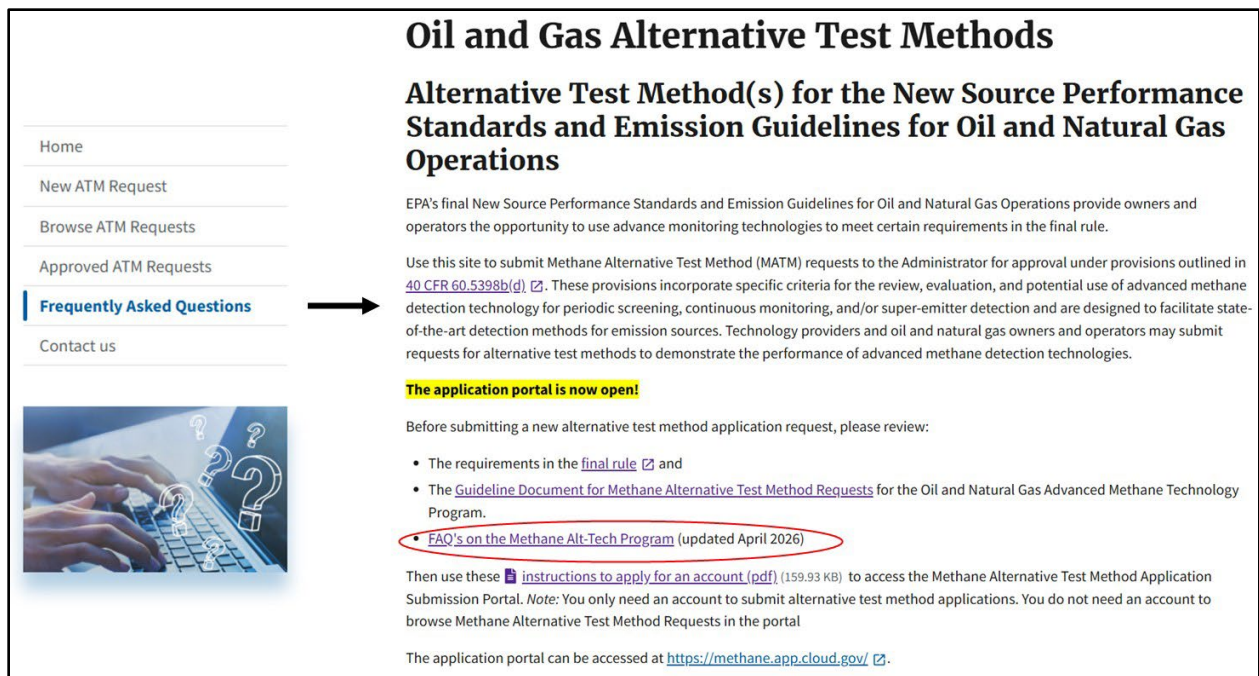


Figure A17. Frequently Asked Questions document accessed at the portal (left) or the program website (right).

2.10. Contact Us

To contact an EPA staff member for additional assistance in the Methane ATM Program, click the “Contact Us” link from the main menu. A new page will be displayed as shown in Figure A18.



Figure A18. Portal – Contact Us.

Appendix B – Required Format for Drafting a Methane ATM (Periodic Screening)

Before drafting a Methane ATM (herein referred to as MATM), applicants should use the styling and formatting guide of this appendix to ensure the final document meets EPA standards and best practices. These standards and best practices are a modified version of a guideline document titled [“Environmental Monitoring Management Council \(EMMC\) Methods Format.”](#)

Style Guide for Writing the MATM

- a) Write the MATM as a performable method, focusing on Quality Assurance/Quality Control (QA/QC) metrics rather than a narrative technology description. Avoid the use of marketing language. The method must be written in technical and prescriptive terms for a state auditor to assess compliance.
- b) Do not provide a title page, list of regulations, or a table of contents.
- c) Each paragraph must begin with a section number (e.g., 1.4.1, and 2.6). The only exception is if there is a single paragraph after a main section heading. There needs to be at least two objects to create a subsection. Use subsections or if a specific list, like (a) - (z), to indicate references to a specific element instead of bullets or other numbering systems.
- d) Do not include copyrighted material. EPA cannot publish copyrighted material.
- e) Do not cite or refer to documentation that will not be provided to reviewers.
- f) Avoid the use of ‘etc.’ and add all relevant information in this document.
- g) Avoid the use of ‘and/or’ on procedural steps.
- h) Avoid using words like 'usually', 'typically', 'should', 'could', or other similar terms that deviate from the prescriptive expectation of writing a compliance method. The procedures laid out in a method must be specific and not left to subjective interpretation.
- i) Use EPA’s [Grammar, Style and Usage](#) as a resource.
- j) The final draft of the MATM must be Section 508 compliant. Use the resources below to learn how to make a Microsoft Word document accessible within Section 508 standards.
Note: The EPA now uses Calibri font due to accessibility requirements.
 - i) [Create Accessible Documents | Section508.gov](#). **Note:** All figures and equations must contain detailed alt-text for visually impaired readers. The review team will provide guidance on writing alt-text for 508 compliance.
 - ii) [WebAIM Contrast Checker](#)
 1. This resource is to verify if the contrast ratio of the colors used in the foreground and backgrounds of figures meets 508 compliance.
 2. When presenting data using plots, use different shapes to differentiate data sets instead of color gradients.

Structure of the MATM for Periodic Screening

Methane Alternative Test Method - *[Insert Technology Name Here]* for Fugitive Methane Emission Monitoring

1. Scope and Application

1.1. Scope

Indicate the applicability of the method for demonstrating compliance with the procedures in §60.5398b and specifically for demonstrating compliance through periodic screening according to §60.5398b(b). Use the following language as an example to write this section. Edit accordingly relative to your application.

“This method is applicable for demonstrating compliance with the procedures in 40 CFR §60.5398b for fugitive emissions components in affected facilities and compliance with periodic inspection and monitoring requirements for covers and closed vent systems, specifically demonstrating compliance through periodic screening in 40 CFR 60.5398b(b), as approved, per 40 CFR §60.5398b(d). Affected facilities could include, but are not limited to, single wellhead only sites, small well sites, multi-wellhead sites, well sites with major production and processing equipment, centralized production facilities, and compressor stations.”

1.2. Application

This section should generally cover where this method can be applied, and what it can be applied to. At a minimum, it should cover the following information:

- Technology type (e.g., stationary in-situ, stationary remote, ground-based mobile in-situ)
- Spatial resolution (facility-level, area-level, component-level)
- The applicability (broadly across the sector, basin-specific, site-specific, other) of the method for methane emissions from oil and gas facilities and its applicable sites (e.g., well sites, compressor stations).
- **Note:** Indicate methane’s Chemical Abstract Service (CAS) registry number (CAS #: 74-82-8) when writing this section. Do not place this information as a separate subsection in Section 1.

Use the following language as an example to write this section. Edit accordingly relative to your application.

1.2.1. The application of this technology is per the Environmental Protection Agency’s 40 CFR part 60 New Source Performance Standards (NSPS): Subparts OOOO, OOOOa, and OOOOb, and Emissions Guidelines (EG): OOOOc, for the Oil and Natural Gas Source Category.

1.2.2. *The test method is applicable to methane (CH₄, CAS No. 74-82-8) emissions from oil and gas facilities. This method can be used, as approved by the Administrator, in lieu of the applicable fugitive monitoring requirements in either §60.5397a or §60.5397b and inspection and monitoring of covers and closed vent systems in either §60.5416a or §60.5416b. This test method may be used for fugitive monitoring requirements in §60.5397c and monitoring of covers and closed vent systems under §60.5416c when a state, local, or tribal authority incorporates the model rule (i.e., OOOOc) for the emission guidelines as part of their State Implementation Plan (SIP) or elsewhere approved as applicable.*

1.2.3. *The test method is a performance-based method to determine whether [insert spatial resolution(s); i.e., individual component-level, area-level, or facility level] emissions remain below prescribed thresholds.*

1.3. Method's Probability of Detection

Provide a general description of the method's 90% probability of detection (POD) threshold in kilograms per hour (kg/hr). For methods where the detection and alerting rely on quantification, include the definition of the method's precision and accuracy of the quantification. The method's detection threshold should be validated by field testing data (Section 13 of the MATM) within the defined envelope of operation (Section 4 of the MATM).

1.4. Data Quality Objectives

Data Quality Objectives (DQOs) are quantitative and qualitative criteria that clarify study objectives, define appropriate types of data to collect, and specify the tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions. The performance or acceptance criteria defined in the DQOs are used to develop appropriate Data Quality Indicators (DQIs) as part of the sampling and analysis design. DQIs are technology specific QA/QC measures to ensure data validity and accuracy, i.e., precision, accuracy (bias), representativeness, completeness, comparability, and sensitivity (pages 11-12 of [CIO 2105-S-02.1](#)) provides definitions of each DQI listed. However, depending on the advanced methane detection technology and method, other DQIs may be more appropriate.

For the MATM, indicate the study objectives in this section, along with the performance metrics that satisfy the DQOs in Section 2.3 and the DQIs in Section 9. Use the following language as an example to write the study objectives in this section. Edit this language relative to your application.

“Adherence to the requirements of this method will enhance the quality of the data supporting the advanced methane detection technology’s objective to screen for fugitive emissions from an oil and gas/well-pad/compressor station/etc... on the [X] frequency that exceed [X] kg/hr and provide an alert to an operator that triggers a leak detection and survey response.”

Note: Refer to [Table 1](#) and [Table 2](#) from Subpart OOOOb of Part 60 when indicating the screening frequency of your method.

2. Summary of Method

Write a succinct overview of the technology and the method to aid in understanding the method by providing a brief description of the solution’s principle of operation and detection (Section 2.1), data collection and reporting (Section 2.2), and performance metrics that satisfy the DQOs (Section 2.3).

3. Definitions and Abbreviations

3.1. Definitions

Include the definitions of all method-specific terms in alphabetical order. Only include a glossary if the number of defined terms is extensive. **Note:** Technology-specific definition of detection and alerting must be discussed in Section 12 of the MATM.

3.2. Abbreviations

Include a list of all method-specific abbreviations used throughout the MATM in alphabetical order. Do not include those that are mentioned once, unless they are specifically relevant to the method.

4. Interferences and Envelope of Operation

Outline the method’s validated envelope of operation, covering the environmental and operational condition ranges that must be met for valid data. The envelope of operation must include method interferences that are considered during deployment. Examples include: windspeed, chemical interferences, temperature and humidity ranges, surface roughness, adverse weather events, topography, time of day, and industrial background noise. The envelope of operation defined in the method should be supported by existing validation data.

Summarize the method interferences and envelope of operation in a table. Table B1 shows an example approach that includes the operational condition, a condition summary, and the mitigation plan.

Table B1. Example of table summarizing the method interferences and envelope of operation.

Condition	Summary	Mitigation
Solar illumination	Method requires sunlight for robust detection	Schedule flights to meet sun-angle constraints (typically 1000-1500 local time)
Clouds	Dense clouds can reduce surface radiance and/or obscure earth's surface, impacting detection and/or quantification	Schedule flights for conditions with better than broken sky cover; use cloud gaps and repeat overflights to image priority facilities; QC flag for cloud contamination and low signal-to-noise ratio (SNR).
High wind speed	Wind speeds above 20 m/s dilute CH ₄ concentration, complicating detection	Schedule flights to avoid high wind conditions. QC flag in analysis workflow for high winds reported in reanalysis product.

5. Safety

This section must discuss only those safety issues and considerations specific to the method (e.g., trip hazards, compressed gas, weight limits, proper lifting techniques). Indicate personnel qualifications and responsibilities, if applicable. This section must also address target analytes or reagents that pose specific toxicity or safety issues. Include a statement about the intrinsic safety (Class/Div classification) of the equipment that will be used on-site in the case that the technology is not a completely remote solution. For methods that perform aerial surveys (i.e., flight patterns and drones), describe in this section the pre-flight equipment checks, crew safety briefings, and safety protocols during flight. Partition the information into subsections.

6. Equipment and Supplies

This section must include a complete description of equipment and supplies needed for the implementation of this technology as described within the method. Include performance requirements for each applicable equipment using ranges (e.g., sonic anemometers are designed to work at temperatures between -35 °C and 70 °C) when possible. Use figures and tables when necessary and avoid superfluous language.

7. Regents and Standards

Provide sufficient details on the concentration and preparation of reagents and standards to allow the work to be duplicated. Avoid lengthy discussions of common procedures. If the method does not require these, write “[Reserved]” on this section.

This section must cover any standard gases used (with accuracy included, e.g., $\pm 0.1\%$), as well as sourcing and specifics on non-consumptive standards used for sensor calibration (if applicable). Reviewers will verify reagents and standards are acceptable.

8. Data Collection and Processing

This section should contain a description of all data, models, and a-priori methods used. At a minimum this description must contain the information in paragraphs [\(d\)\(3\)\(iv\)\(B\)](#), [\(C\)](#), and [\(E\)](#) of [§60.5398b\(d\)\(3\)\(iv\)](#). Present your inputs in table form, with additional narrative when needed to outline data collection methods. An example is presented in Table B2, showing columns for instrument/source, variables, and use in the method.

Table B2. Example of table summarizing data collected.

Instrument/Source	Variables	Use
Spectrometer	Calibrated Radiance Data, Short-wave infrared (SWIR) bands (wavelength range)	Radiance data processed to generate the SMF masks used to Identify and analyze methane plumes
Spectrometer	Calibrated Radiance Data, visible bands (RGB) (2100-2480 nm)	Visible images used analysts to look for activity or new development not visible in basemap imagery.
Aircraft Inertial Measurement Unit (IMU)	Altitude (m), latitude, Longitude, velocity (m/s), wind direction SD	Orthorectification of calibrated radiance data on a per-pixel bases
US National Weather Service HRRR 3 km 60 m Forecast	Wind Speed (m/s), Wind direction (degrees)	Preliminary meteorological data. Forecast data used for flight planning and initial data work up for emission rates and plume characterizations

Ground-based applications (e.g., point sensors): Provide a general description of the siting information used to deploy the technology. The siting tool needs to account for time to detection and the method’s 90% POD. A detailed framework should be included as supplementary information in the MATM (see Appendix I of this rubric).

For methods that perform aerial surveys (i.e., flight patterns and drones): Describe in this section the procedure for setting up the sampling survey. It must cover pre-flight procedures (e.g., survey planning and relevant pre-survey steps), in-flight procedures (e.g., survey protocols and routing considerations), and post-flight procedures (e.g., data transmission and processing). Partition the information into subsections.

9. Quality Assurance and Control

Summarize the method’s QA/QC operations in a table. An example format is presented in Table B3. This table should cover any operational conditions covered in Section 4 of the MATM, as well as any metrics that would be necessary for an outside auditor to assess whether the appropriate data was collected during a survey.

Table B3. Example of table summarizing QA/QC operations.

Instrument	QC Procedure	Acceptance Criteria	Frequency of QC Procedure	Corrective Action
Anemometer	Wind Speed Accuracy	± 10% at 5 m/s	Once by manufacturer	Do not deploy
Gimbal	Movement Check	Movement detected	Every measurement (> 10x an hour)	Software or field service required
TDLAS Sensor	Calibration	Concentration measured is within 10% of the actual for 20 ppm-m, 200 ppm-m, and 1000 ppm-m	Annually by [company] employees	Sensor repair

10. Calibration and Standardization

In this section, applicants should discuss initial, follow-up, and periodic calibration procedures. Indicate the frequency of such calibrations, refer to performance specifications (as applicable), and indicate corrective actions that must be taken when performance specifications are not met. This section must include procedures for calibration verification or continuing calibration. If the operator is the primary user of the technology, include a detailed description of the training requirements.

Clearly detail the metrics used to determine when as-needed calibrations are required, if there is not a set cadence. Otherwise, the solution provider must include data that suggests

their calibration cadence is appropriate. This data/evidence must be submitted as a separate supplemental document and not included in this MATM. **Note:** The reviewers will provide direction on the information used to indicate the types of procedures for calibration verification or continuing calibration as it is dependent on the method and sensor(s) used.

Methods that do not require calibration must provide a procedure (e.g., bump test) either in Section 10 or as a separate appendix in the MATM. Field procedures are required as a form of a sanity check to verify the instrument's capability of measuring methane concentration at the site. Write the steps as if writing a Standard Operating Procedure (SOP) to allow the state auditor, facility operator, or tester to follow each step accordingly and assess compliance of the method. Use the following outline to write the calibration procedure: (1) Device Conditioning; (2) Calibration Gas Requirements; (3) Equipment and Materials; (4) Procedure; (5) Validation and Comparison; (6) Safety and Compliance; (7) Documentation (i.e., what should be recorded in the test log).

11. Analytical Procedure

For solutions that collect physical samples, provide a general description of the material sample processing and instrumental analysis steps. Discuss those steps that are essential to the process and avoid unnecessarily restrictive instructions. If the technology does not require the physical collection of samples, write "[Reserved]" on this section.

12. Detection and Alerting

The data collection procedures described in Section 8 and QA/QC measures described in Section 9 are related to the method's definition of detection and alerting to be described in Section 12 of the MATM. This section should explain how the validated data collected in Sections 8 and 9 of the MATM are used to determine whether fugitive methane emissions are detected (Section 12.1) and whether those detections trigger alerts (Section 12.2) requiring follow up as defined in the rule.

A couple of notes to consider when writing this subsection:

- Any detection(s) resulting in an alert using a method approved at facility-level resolution would require a follow-up inspection of the entire site, as defined in the rule.
- Methods approved at area-level or component-level resolution may narrow follow-up to specific segments of the facility, as defined in the rule.
- The method cannot rely on end user (owner/operator) to interpret the data used to define detection and alerting.
- This section should discuss how ambient methane concentrations are handled.

12.1. Detection

For the purposes of this MATM, detection is defined as any observation(s) that indicates an emission of fugitive methane. This section should clearly explain how the validated data, described in Sections 8 and 9 of the MATM, are used to determine if there is a fugitive methane emission event above the detection threshold. The definition of detection should account for both DQIs and 90% POD of the method.

12.2. Alerting

For the purposes of a MATM, an alert is defined as any single detection or set of detections that require action by the owner/operator. This section should describe how the detections identified in Section 12.1 are classified as alerts. If all detections trigger alerts, state that. If detections are filtered, quantified, or processed in any way to determine if an alert is triggered, describe that process. DQIs or considerations that are used to determine which detections are classified as alerts should be clearly defined. All alerts require follow up action from the owner/operator as defined for periodic screening. The follow up actions to be conducted should be defined in the Site Monitoring Plan – [§60.5398b\(b\)\(2\)](#) (see Appendix II of this rubric).

13. Method Performance

Use the submitted supporting information [[§60.5398b\(d\)\(3\)\(vi\)](#)] and the following recommended outline to write this section.

- a) Summary of the studies performed where the results will be discussed in this section. Include length of study, location, emission rates, temperature/wind speed range, and any other relevant information.
- b) Discuss the method's DQI of representativeness where the method demonstrates to achieve a 90% POD below the detection threshold. Include a plot of POD as a function of the release rate showcasing the 90% POD. The true positive and false positives values used in the plot must be constrained to the defined envelope of operation.
- c) Discuss the method's spatial resolution. Include table(s) or figure(s) to support the discussion.
- d) If the method's detection and alerting rely on quantification, discuss the method's quantification precision and accuracy. Include table(s) or figure(s) to support the discussion.
- e) If applicable, discuss the method's DQI of comparability. If the technology was tested relative to a reference method (i.e., EPA Method 21 and OGI), provide a comparison of performance versus the reference method specifications.
- f) If applicable, include a discussion with supporting table(s) or figure(s) of any relevant QA/QC metrics indicated in Section 9 of the MATM to evaluate the method's performance (e.g., leak-start/leak-end times, time to detection, precision, bias, false negatives).

14. Pollution Prevention

Describe aspects of this method that minimize or prevent pollution that may be attributable to the reference method, i.e., EPA Method 21 and OGI surveys. If the method does not generate pollution or the pollution generated is comparable to the reference method, write “[Reserved]” on this section.

15. Data Management and Recordkeeping

Describe how all data collected and generated by the measurement system are handled and stored. At a minimum this description must contain the information in paragraphs (d)(3)(v)(A) through (C) of §60.5398b(d)(3)(v). Consider using a workflow diagram to present how these data streams are processed and manipulated, including how the resultant data processing is documented. Refer to §60.5420b and §60.5424b for the notification, reporting, and recordkeeping requirements.

16. References

While EPA does not have a set reference style for promulgated test methods, the reviewers encourage applicants to cite source documents and publications using the Chicago Manual of Style (CMOS) 14.71 format (see example below). Nevertheless, flexibility will be provided with citation formatting. Be consistent on how references are cited throughout the MATM (e.g., superscript numbers, author and year). Do not include references that are not cited throughout the MATM nor application materials that are not public facing.

1. Zavala-Araiza, D., Alvarez, R., Lyon, D, et al. 2017. “Super-emitters in natural gas infrastructure are caused by abnormal process conditions.” Nat Commun 8, 14012 (2017). <https://www.nature.com/articles/ncomms14012.p>

17. Tables, Diagrams, and Flow Charts

Additional information relevant to the method may be presented in this section as long as they are referred to elsewhere in the text. Do not include validation data in this section.

Appendices

I. Siting Information

If applicable, this section should provide detailed information on the initial siting procedure and the metrics used to ensure the site is fully covered. This would generally be a one-time set up procedure. This may include:

- a) Parameters used (e.g., site boundaries, site equipment, potential leak sources, meteorological data, on-site equipment effect on wind flow patterns) to identify the optimal location of the sensor(s).
- b) Protocol to determine if the placement of sensor(s) is optimal after deployment. Include in the discussion the criteria used to establish confidence in the siting of the sensor and determining when or if it is necessary to re-site.
- c) If the method requires installation of equipment at the site, provide the planning and installation procedures.

II. **Site Monitoring Plan**

Include a Site Monitoring Plan as a supplemental document to the MATM. The monitoring plan must contain the information specified in paragraphs (i) through (ix) of [§60.5398b\(b\)\(2\)](#).

