COLORADO
Department of Public Health & Environment

Alternative AIMM Guidance & Procedures

rev. October 31, 2019

Summary

In 2014 the Colorado Air Quality Control Commission (AQCC or Commission) adopted amendments to AQCC Regulation No. 7 to complement the partial adoption of the federal New Source Performance Standard, Subpart OOOO, Emissions Standards for New, Reconstructed and Modified Sources in the Oil and Natural Gas Sector (NSPS OOOO). These amendments included use of Approved Instrument Monitoring Methods (AIMM), as defined in AQCC Regulation No. 7, §XVII, to identify and reduce hydrocarbon emissions from certain oil and gas operations. The amendments also provide the ability for the Air Pollution Control Division ("Division") to approve additional AIMM beyond those specified in the regulation. As a result, the Division developed criteria and a process for review and approval of such AIMM, which are referred to as "Alternative AIMM".

In 2017 the AQCC adopted amendments to AQCC Regulation No. 7, which included formalizing the criteria and process for review and approval of Alternative AIMM in §XII.L.8. as part of Colorado's State Implementation Plan (SIP) to achieve compliance with the National Ambient Air Quality Standards (NAAQS) for ozone.

The review criteria adopted by the AQCC largely conform to those originally developed and applied by the Division after the 2014 rulemaking, but with some notable additions. Therefore, this update to the Alternative AIMM Guidance & Procedures aligns the review of proposed Alternative AIMM with the requirements of §XII.L.8. Proposed Alternative AIMM may not be subject to all review requirements of §XII.L.8., specifically public notice/comment and EPA review, if the Alternative AIMM will be used exclusively outside of Colorado's ozone nonattainment area.

Purpose:

This document provides an overview and guidance of the key elements considered for review of a proposed Alternative AIMM for approval by the Division.

Definition of AIMM:

As stated in AQCC Regulation No. 7, AIMM means an infrared (IR) camera (defined as an optical gas imaging instrument designed for and capable of detecting hydrocarbons), EPA Reference Method 21 ("Method 21"), or other Division approved instrument based monitoring method or program ("Alternative AIMM"). The Division may approve the use of Alternative AIMM that may be used in lieu of, or in combination with, an IR camera, Method 21, or other approved Alternative AIMM. A proposed Alternative AIMM must be able to demonstrate it is capable of achieving emission reductions that are at least as effective as the emissions reductions achieved using an IR camera or Method 21 (AQCC Regulation No. 7, §XII.L.8.a(ii)(I)). An approved Alternative AIMM may be utilized for monitoring storage tanks and components at well production facilities and natural gas compressor stations statewide, and pneumatic controllers in the 8-hour Ozone Control Area.

Criteria for Alternative AIMM Approval

In accordance with Regulation No. 7, §XII.L.8, and as allowed under §XVII.B, the Division will review the following criteria for applications for Alternative AIMM approval:

<table>
<tr><th colspan="3">Alternative AIMM Review Criteria</th></tr>
<tr><td colspan="3">Manufacturer Information</td></tr>
<tr><td>Detection Method</td><td>Quantitative</td><td>Non-Quantitative</td></tr>
<tr><td rowspan="2">What is the Technology? -Capabilities, Reliability & Limitations</td><td colspan="2">1) Commercial availability of proposed AIMM?
2) Other approved applications or uses (e.g. pipeline monitoring)
3) Reliability (ability to detect emissions at what threshold and frequency, as well as identify or determine specific emission leak locations)
4) Capable of achieving emission reductions that are at least as effective as the emissions reductions achieved using an IR camera or Method 21 demonstrated through field test data and modeling
5) Limitations/Restrictions (detection limits, weather/temperature/moisture, maximum/minimum operating parameters, other)
6) Data quality indicators for precision and bias
7) Quality control and quality assurance procedures for proper operation
8) How does it work?</td></tr>
<tr><td>9) Method to quantify emissions</td><td>N/A</td></tr>
<tr><td>How Will It Be Used + Maintained / Calibrated?</td><td colspan="2">1) Description of where, when and how the AIMM will be used
2) User guide
3) Manufacturer-recommended maintenance/calibration
4) Calibration process
5) Field test may be requested</td></tr>
<tr><td>Process for Recordkeeping</td><td colspan="2">1) Frequency of data measurements
2) Data logging capabilities</td></tr>
<tr><td>Training Required for Use</td><td colspan="2">Training documentation or program, including any ongoing support provided.</td></tr>
<tr><td>Field Testing and Modeling</td><td colspan="2">Has testing and/or modeling of the proposed Alternative AIMM been completed with associated documentation to demonstrate emission reductions at least as effective as those achieved using an IR camera or EPA Method 21?</td></tr>
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Minimum Elements & Guidelines for Alternative AIMM Application and Review

Consistent with the Alternative AIMM Application Form, the following elements must be provided in order for the Division to consider the application complete and ready for evaluation to determine approval:

1) Alternative AIMM Manufacturer Information

   This information should be for the entity that produces the Alternative AIMM, which may not be the same entity that sells the Alternative AIMM or is seeking to obtain its approval.

   If the Alternative AIMM is a program that relies on or uses more than one technology, then information on each technology's manufacturer needs to be provided. Similarly, if the Alternative AIMM is an individual system that utilizes a technology for emissions detections in the system that is produced by another manufacturer, then information on that manufacturer needs to be provided as well.

2) Detection Method designated as Quantitative or Non-Quantitative

   Regulation No. 7 §§XII.L.4.c. and XVII.F.6.d. specify that for Alternative AIMM, leak identification requiring repair will be established as set forth in the approval for the Alternative AIMM. Therefore, a proposed Alternative AIMM will be classified and evaluated by the Division as being either quantitative or non-quantitative in nature regarding emissions detection as follows:

   - Quantitative – Has the ability to measure or quantify emissions (for example, concentration in parts per million, flow rate, etc.). A proposed Alternative AIMM that is quantitative will require that emissions detected using the AIMM must be addressed and the source of the emissions repaired at a defined or specified emissions threshold.
   - Non-Quantitative – Can detect emissions but is unable to measure or quantify actual emission rates. A proposed Alternative AIMM that is non-quantitative will require that any emissions detected using the AIMM must be addressed and the source of the emissions repaired.

3) Commercial Availability

   The Division will not consider a proposed Alternative AIMM until it is ready for deployment in the field and has repeatable, proven or demonstrated success for emissions detection. Applications for Alternative AIMM in development, testing or the prototype phase will not be evaluated.

4) Alternative AIMM approval by other regulatory authorities and for what purpose or application (for example, pipeline monitoring, emissions detected or simple presence of emissions)

It is important to understand the specific application(s) for which a proposed Alternative AIMM may have already been approved as that may inform the evaluation of the Alternative AIMM by the Division.

5) The leak detection capabilities, reliability, and limitations of the proposed Alternative AIMM, including, but not limited to, the ability to identify specific leaks or locations, detection limits, and any restrictions on use, as well as supporting data

This information should include details on how the Alternative AIMM actually identifies or detects emissions and what is necessary or required for it to do so, including capability and reliability in performing that function under various conditions. This information should be available or provided in easy to understand terms or language. Examples include the following:

- What are the proposed Alternative AIMM's emission detection limitations or requirements and how are those impacted by any number of potential field conditions? For example, how effective is the Alternative AIMM under different types of weather, wind speed, temperature, topography, facility-type or set-up, etc.?
- What is the proven minimum detection limit (MDL) of the Alternative AIMM and under what conditions or requirements?
- What is the maximum monitoring distance of the Alternative AIMM and how does distance affect emissions detectability and/or quantification abilities? Is there a manufacturer-recommended distance or range for using the Alternative AIMM?
- Is the proposed Alternative AIMM capable of identifying specific emission locations (e.g., leaking component, tank thief hatch, pneumatic controller) or can it only indicate if emissions are detected at a site, facility or within a general area? If this varies, please explain, including factors that impact ability to identify specific emission locations.
- A field demonstration(s) may be requested to confirm the Alternative AIMM's capabilities

6) The frequency of measurements and data logging capabilities of the proposed Alternative AIMM

Considerations include how monitoring and emissions detection and quantification (if applicable) is performed, tracked and recorded using the proposed Alternative AIMM. Examples include the following:

- Is monitoring and emissions detection done manually, automatically/autonomously, or both and how is that confirmed?
- Is the monitoring completed on a periodic or continuous basis?
- If the proposed Alternative AIMM quantifies emissions, does that occur continuously as emissions are detected or does the Alternative AIMM provide a "snapshot" or summary value from the detection?
- Must be able to satisfy the recordkeeping and reporting requirements in Regulation No. 7 §§XII.L.6 and 7, XVII.C.3, XVII.F.8 and 9, and XVIII.E, as applicable.

7) Data quality indicators for precision and bias of the proposed Alternative AIMM

- These should be specific to helping confirm the detection and/or measurement performance of the proposed Alternative AIMM.
- These indicators may be technology/program specific.

8) Quality control and quality assurance procedures necessary to ensure proper operation of the proposed Alternative AIMM

- What are the calibration and/or maintenance requirements or procedures (manufacturer-recommended) for the Alternative AIMM and how often must they be performed?
- What is the training and/or certification required to understand and properly operate the Alternative AIMM? Does the manufacturer offer training? Is it standardized?

9) A description of where, when, and how the proposed Alternative AIMM will be used

- "Where" may include facility type(s), facility location(s), geography, topography, or any other relevant physical attributes.
- "When" may include operating limitations, restrictions and capabilities. See numbers 5) and 6) above.

- "How" may include whether use of the proposed Alternative AIMM is conducted on a mobile (foot, vehicle, air or satellite) or stationary platform and the specific monitoring process.

10) Documentation (e.g., field or test data, modeling) adequate to demonstrate the proposed Alternative AIMM is capable of achieving emission reductions that are at least as effective as the emission reductions achieved by the leak detection and repair provisions in §XII.L

As noted in this document, a proposed Alternative AIMM must be able to demonstrate it is capable of achieving emission reductions that are at least as effective as the emissions reductions achieved using an IR camera or Method 21 ("AIMM"). AQCC Regulation No. 7 assumes a certain level of emission reductions are achieved using these AIMM on a periodic basis with increasing emission reductions under greater monitoring frequencies.[1]

- Testing under lab and field conditions is a primary way to demonstrate a proposed Alternative AIMM's emission reduction capabilities. The Division recognizes that field testing may be a challenge in terms of obtaining permissions or finding a willing partner. However, as an example, sites such as the Methane Emissions Technology Evaluation Center (METEC) at Colorado State University may be used to conduct field testing.
- Modeling may also be used to help demonstrate a proposed Alternative AIMM's emission reduction capabilities, but should not be relied on exclusively for this demonstration (i.e., testing must be completed). An example is the Fugitive Emissions Abatement Simulation Toolkit (FEAST), which is an open-source model/tool originally created by researchers at Stanford University that models the effectiveness and cost-efficiency of various leak detection technologies and regimes.

Alternative AIMM Continuous Monitoring and Streamlined Inspection and Reporting

Under the AIMM definition in Regulation No. 7, §XVII.A.2, the Division may approve a streamlined inspection and reporting program for applicable Regulation No. 7 requirements for an approved AIMM that utilizes continuous emission monitoring. If a proposed Alternative AIMM utilizes continuous emission monitoring, then a proposed streamlined inspection and reporting program for applicable Regulation No. 7 requirements may also be submitted or included with the Alternative AIMM application for consideration, though it is not a required criteria for approval of the Alternative AIMM.

Users of a Division-approved Alternative AIMM that has continuous emission monitoring may also submit a proposed streamlined inspection and reporting program for applicable Regulation No. 7 requirements to the Division.

[1] Monthly/quarterly/semi-annual IR camera or Method 21 inspections = 80/60/40% emission reductions

Process for Alternative AIMM Approval including Public Notice and EPA Review

The Division will review proposed Alternative AIMM applications on a quarterly basis.

1) Submit complete Alternative AIMM application and supporting documentation to cdphe_aimm@state.co.us

   If any application material is considered Confidential Business Information (CBI), please submit an original application and a separate, redacted application for public notice purposes only.

2) AIMM Team reviews application for completeness at next quarterly meeting. A complete application must address each criteria outlined in §XII.L.8.

   a. The Division is responsible for providing a complete application and any additional materials, including public comments, to the U.S. Environmental Protection Agency (EPA), per Regulation No. 7, §XII.L.8.a.(iii), unless the proposed Alternative AIMM will be exclusively used outside of the ozone nonattainment area.
   b. Applications for Alternative AIMM that will be exclusively used outside of the ozone nonattainment area must still address each of the minimum elements in order to be considered and evaluated.

3) AIMM team completes evaluation of the proposed Alternative AIMM and drafts approval for public notice.

   a. Prior to public notice, the draft approval letter will be sent to the applicant for review that will outline the conditions or requirements for use of the Alternative AIMM.
   b. Public notice will not be required if the Alternative AIMM will be exclusively used outside of the ozone nonattainment area, which will be clearly stated in the approval letter. If this is the case, please skip to step 8 below.

4) AIMM team posts documents for Public Notice to the AIMM public notice web page. Documents to be posted will include:

   a. The draft approval letter and the Division's evaluation of the application.
   b. The application and all supporting materials excluding CBI [redacted application].

5) Public Comments will be accepted for 30 days. Please see AIMM Public Notice web page for comment guidance and how to submit comments for an Alternative AIMM.

6) The Division will review and respond to public comments.

7) Following the completion of the public comment period and Division's response, the EPA will be provided with the proposed Alternative AIMM application materials, the Division's draft approval letter, and public comments with Division's responses.

   a. Following the public notice process, the EPA has up to 6 months to approve or disapprove the proposal. If the EPA fails to approve or disapprove the proposal within six (6) months of receipt of these materials, EPA will be deemed to have approved the proposal.

   b. EPA review will not be required if the Alternative AIMM will be exclusively used outside of the ozone nonattainment area, which will be clearly stated in the approval letter.

8) The Division posts the Alternative AIMM approval letter on the Division's AIMM web page.

   a. Once an approval letter is issued, the Alternative AIMM may be used by anyone to meet Regulation No. 7 requirements provided the approval conditions are met.

Questions for Companies and Sources Considering Applying for an Alternative AIMM

1) Can a manufacturer of a proposed Alternative AIMM request Division approval of the Alternative AIMM or must it be done by an oil & gas company, consultant or service company interested in using or purchasing the Alternative AIMM?

   - Any party may apply so long as the above-noted application criteria are met.

2) If a proposed Alternative AIMM uses infrared (IR) technology, is it already approved to meet requirements under Regulation No. 7?

   If the proposed Alternative AIMM uses technology that meets the definition of an infrared camera in Regulation No. 7 §§XII.B.15. and XVII.A.9., it may be an acceptable AIMM under the current definition of the rule if the requirements below are met.

   - Consistent with the adoption of the Control Technique Guidelines (CTG) in the 2017 amendments to Regulation No. 7, the Division will require the development and implementation of a monitoring plan for a non-handheld IR camera used in a mobile monitoring platform or deployment method (for example, vehicle- mounted or aerial/drones) to instruct the use of the technology.

- The monitoring plan does not need to be provided to or approved by the Division prior to use of the IR camera-based mobile monitoring system but must be made available upon request.
- The monitoring plan may be developed by the manufacturer or operator of the IR camera-based mobile monitoring system and should include, at a minimum, the following:

    - A summary of how the monitoring system is operated and used.
    - A typical "observation path" that is focused on the field of view of the IR camera being used by the system. The observation path description may be a simple schematic diagram or aerial photograph of the facility/site(s) being monitored, which should clearly identify the locations of components and equipment subject to monitoring, along with the maximum distance between the IR camera and the equipment monitored (i.e. "observation path") to ensure all subject components and equipment are monitored.
    - The maximum viewing distance of the IR camera being used by the system.
    - Typical rate of travel of the monitoring platform while conducting IR observations.
    - Limitations affecting the ability of the system to monitor or detect emissions, such as adverse weather conditions, wind speed, etc. (see also #5 above under "Minimum Elements & Guidelines for Alternative AIMM Application and Review" for additional information).
    - Training and experience required to use the system.
    - Calibration and maintenance procedures for the system, including those recommended by the manufacturer.

Alternative AIMM Application Form

Applicants can contact the Division for an Alternative AIMM application form, which is also available on the Division's AIMM website. Applicants should ensure the application is complete before submittal. The Division will not review incomplete applications.

For More Information:

Please send questions, comments or concerns to the AIMM email at cdphe_aimm@state.co.us