

**Advancing Development of Emissions Detection (ADED)  
DE-FE0031873**

There are four objectives for Advancing the Development of Emissions Detection (ADED) project: (1) Develop and test protocols for controlled testing that reliably assess the performance of leak detection and quantification solutions under a range of representative field conditions at a controlled test facility (Methane Emissions Technology Evaluation Center; METEC); (2) Develop protocols for field trials and conduct a comprehensive, multi-solution, field trial including a range of facility types across different oil and gas basins; (3) Advance the state of solution testing to be scientifically rigorous, affordable, repeatable, and adaptable to field conditions, and make this knowledge available to all stakeholders; and (4) Propose test standards from the previous objectives that can be adopted and adapted by state and federal regulatory agencies for regulatory approval of leak detection and quantification solutions.

The CSU team developed a consensus protocol that incorporated wide stakeholder engagement before being adopted and tested. The protocol had three primary objectives: (1) Test the sensitivity of the solution as deployed, not the sensitivity of the instrument alone; (2) Design the protocol in such a way that many unique solutions can test under the protocol, enabling comparable results that are broadly understood by the stakeholders; and (3) Use a reproducible experimental methodology that allows for comparison of newly tested solutions with previously tested solutions. CSU engaged 75+ stakeholders to form the protocol development committee that included 75+ members across 60+ different organizations. Protocols for evaluating continuous methane emission monitoring systems and survey solutions were developed. The protocol for assessing continuous methane emission monitoring systems underwent two rounds of revisions and 409 comments. The survey protocol underwent a single round of revision after 92 comments. The protocols were implemented to test continuous methane emissions monitoring systems and survey leak detection solutions.

To date, 16 different continuous monitoring systems and 12 survey solutions have been evaluated to the protocol and some systems have tested multiple times. Three major rounds of 12-14 weeks of continuous methane emission monitoring tests across three years have been conducted and have resulted in a single publication thus far with several more being prepared. Results from the survey testing and a quantitative optical gas imaging solution are also being prepared for publication. Additional testing for is underway to evaluate more systems using the consensus protocol before a final version is drafted and circulated for comment. Drafting the final version of the protocol will include a collaboration with Total Energies in the EU to engage a wider stakeholder group and establish international consensus on testing protocols and test centers.

A large portion of the ADED program was to conduct onsite field trial challenges on operational oil and natural gas facilities. So far, 11 field sites were visited (7 production and 4 midstream compression) across 3 basins (Upper Green, Marcellus, and Permian) and 13 different technologies were evaluated across all of these deployments. The effectiveness of leak detection and quantification solutions was evaluated by running metered controlled releases from onsite gas to determine if the solutions could identify a fugitive emission against the background of an operational site and locate a leak. The results of these field trials were disseminated to the operators who participated in the campaigns and the results are being aggregated into a manuscript for publication.