Northeast GAS ASSOCIATION
NYSEARCH

Technology Brief

Technology Evaluation and Test Program For Quantifying Methane Emissions related to Non-Hazardous Leaks

Description: **A technology test program based on competitive solicitation and selection of technologies that convert methane concentration to flow rates or relative emission flow rates**

Status: **First round of controlled tests completed. Second round of controlled testing to be completed before selection of most promising technologies for live field testing.**

BENEFITS

If successful in finding and validating a technology or combination of technologies that can apply to practically and reliably quantify methane emissions flow rates, gas companies can factor in the emission contribution of individual leaks as systems are assessed by segment. Once fully evaluated, each technology can be applied based on its "fit-for-purpose". Prioritization of non-hazardous leaks based on their methane emissions can expand the understanding of the costs and benefits associated with addressing non-hazardous leaks in the overall rehabilitation of aging infrastructure. Methane emissions information supports the goals of achieving the highest standard in safety while practically addressing rehabilitation of aging infrastructure in a manner that also considers greenhouse gas emissions.

BACKGROUND

Practical measurement of methane emissions has emerged as a priority because of public and regulatory attention to the natural gas industry; the industry's growing global market presence and the need to balance capital expenditures on expansion with rehabilitation of aging infrastructure particularly in urban areas. In an effort to reduce methane emissions, the natural gas industry is investigating how to factor in methane emissions rates and quantification of those emissions, specific to its infrastructure in gas operating decisions.

While no leak is desirable, by definition, a non-hazardous leak takes less of a safety priority than a hazardous leak but yet collectively, non-hazardous or "Type 3" leaks contribute to the greenhouse gas /carbon footprint. As such, any leak repair program that targets repair of non-hazardous leaks can serve to reduce methane emissions by also considering emission rates when prioritizing segments needing repair.

TECHNICAL APPROACH

Following a literature search and interview process, NYSEARCH issued a Request for Proposal (RFP) to a large number of potential technology providers. From numerous proposal

Figure 1: Scene from first controlled test site at PSE&G

responses, three teams who are developing algorithms and methodologies for estimating

methane emissions flow rates were selected by the NYSEARCH funders to participate in the test program.

During the controlled tests that were designed by NYSEARCH and its funders, using gas company training facilities, methane releases were provided in a known and controlled manner through trays near ground level to be sure of the exact flow rates. In addition, the test conditions were monitored and set to minimize variability during data collection sessions. During the controlled tests, each service provider was expected to show how their technology is able to quantify emission rates or how it would provide a relative size of the emission rate as small, medium or large.

Data collection includes information on measured methane emissions flow rates, wind speeds and directions. Prior to selecting one or more technologies to proceed to the more challenging situation of live field tests, the gas company funders examined the controlled tests findings and the results of an independent statistical analysis.

PROGRAM STATUS

The NYSEARCH technical manager issued a comprehensive test plan for the first round of controlled tests that the funders and the (3) technology service providers agreed to. Following tests in three separate weeks at PSE&G, the data was collected and reviewed by the NYSEARCH project managers and the independent statistician. Agencies associated with a Con Edison collaborative working group also reviewed the data.

Following the analysis of the first round of data where there was a wide variability in the accuracy and precision of the actual versus measured rates for all the technologies tested, it was decided that more data under controlled conditions was needed to separate the emissions flow rates into bins of very low flow, low flow, medium and high flow rates.

Using very similar conditions to the controlled site at PSE&G, SoCal Gas is hosting the second round of tests in their service territory as shown in Figure 2.

Figure 2: Scene from 2nd Round of Controlled Testing

Following review of the same (3) technology providers' data that comes from the second round of controlled testing, the statistician will issue a report that will help the funders to determine the next steps and the viability of taking one or more of these technologies into live field conditions. [Field conditions bring more variables such as change in weather, wind, and other factors that impact performance such as presence of above-ground barriers, dissipation of methane flows from underground sources and other variables.]

In parallel to this testing and with cofunding from DOT/PHMSA, NYSEARCH is also working on a separate effort with its member operators to identify methods for validating methane emissions measurements in everyday gas operational situations. This work will build on the controlled and field tests results as well as the practices and constraints envisioned by gas work process owners and advisors. This collaborative effort is likely to advance the implementation process as well as define additional activities needed to ascertain the best fit for various emissions quantification technologies.

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