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Tasks 4 & 6: System Demonstration, Testing, Data Processing and Algorithms Development

Work during this third quarter focused on inter-related Tasks 4 & 6, System Demonstration, Testing, Data Processing and Algorithms Development. As described in previous reports, one of the two Advanced Mobile units has been deployed for several months conducting leak survey missions in conjunction with routine surveying. The Advanced Mobile unit is accompanied by a second vehicle equipped with the traditional leak detection tools. Data from both vehicles are acquired and processed in real-time. All data from the Advanced Mobile sensors have been recorded and stored. Some of these data have been subjected to detailed analysis to understand sensor performance and improve the leak detection algorithms.

While quantitative statistics have not yet been compiled, qualitative observations of the data indicate that the Advanced Mobile sensors, specifically the two side-scanning roof-mounted RMLDs and the extractive point sensor with Herriot optics, combined with their proprietary leak detection algorithms, successfully detect leaks at least as well as traditional tools. Nevertheless, a goal for this project is to not only detect, but also to quantify leaks. During this quarter, we have been analyzing data from the point sensors in both vehicles, as well as gathering more data on a laboratory benchtop. The purpose is to understand a slow drift in sensor measurement that establishes the lower limit of quantitative accuracy. The magnitude of the drift, typically corresponding to a few ppm varying over periods of minutes to hours, is generally slow and small compared to changes due to driving through a leak but larger than sensor noise. It is unclear from the municipal survey data whether the slow drift is due to real local changes in ambient methane, or instrumental artifacts. Benchtop tests suggest a combination of both, the instrumental artifact resulting from a drift in an offset parameter. At the time of this report, we are developing a novel procedure for real-time correction of the drift.

Task 7: Peer Review #1 was presented on May 4, 2016, completing T&D Payable Milestone No. 14.

Task 8: This Quarterly Report completes T&D Payable Milestone No. 12.