Quarterly Report

Date of Report: July 1st, 2019
Contract Number: PHMSA-RA-DTPH56-17-RA-00002
Prepared for: Pipeline and Hazardous Materials Safety Administration (PHMSA)
Project Title: Tools for Predicting Gas Migration and Mitigating its Occurrence/Consequence
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For quarterly period ending: June 30th, 2019

Results and Conclusions:
During this quarter, we performed the following tasks to achieve the proposed work in this project:
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METEC pipeline test bed experiments and Numerical modeling: A series of field experiments conducted at the Methane Emissions Technology Evaluation Center (METEC) in Fort Collins, Colorado to improve the experimental design. Natural gas leak was simulated at different rates at a specified underground location over a period of time. Above-ground methane concentrations and wind conditions were measured to establish understanding of above-ground concentrations associated with underground natural gas leaks.
Develop & deploy leak detection survey tool: We finalized and deployed a leak response survey to collect data at leakage sites. The leak survey was distributed to industry partners and data is being collected/analyzed.

Plans for Future Activity:
Future experiments will focus on developing a quantitative method to predict leakage rates based on above-ground gas concentrations and wind conditions. These experiments will evaluate (1) the extent of subsurface gas migration over a range of realistic natural gas leakage rates, and (2) the effect of wind conditions on above-ground gas concentrations that arise from underground leaks. Results from these studies will be used to calibrate numerical models to predict gas above-ground and below-ground migration behavior for a wider range of potential field conditions. Future modeling work will be extended to different obstruction conditions, vegetation, soil layering, and other environmental parameters.

We are currently analyzing data collected from the leak response survey and designing field-scale experiments. Future experiments will focus on developing a quantitative method to predict leakage rates based on above-ground gas concentrations and wind conditions.