DOE NETL: Methane Emissions Quantification

GSI Project Awards: DE-29084 and DE-29085

DE-29084: Integrated Component-Specific Measurements to Develop Emission Factors for Compressors and Reduce Uncertainties in the Green House Gas Inventory (GHGI)

Problem Statement

The EPA has identified pneumatic controllers, blowdowns, and equipment leaks as potential major sources of methane emissions from pipelines and compressors within the gathering segment. Current methane emissions factors in EPA's Greenhouse Gas Inventory (GHGI) are out of date, lacking the equipment-specific disaggregation required to accurately characterize CH_4 emissions.

Project Objective

GSI has been awarded a 2-year project to collect defensible and repeatable data using multiple, highly accurate instruments to delineate leak rate and frequency by compressor type, pipeline type, seals and compressor vents.

Scope

- **Select proposed study areas** that provide the greatest diversity in compressor types, pipeline materials and surrounding infrastructure.
- Implement **field campaigns** during Spring and Fall to capture warm/cool weather conditions, assess seasonal variability and identify seasonally dependent operating parameters.
- Integrate a **novel data visualization package** that digitally overlays methane concentrations, emission rates, and meteorological data over time with three-dimensional smart maps of the site to create an animated time series of plume conditions (a "dancing" plume).
- **Develop methane emission factors** for gathering pipelines and compressors at boosting stations based on field campaigns to refine and improve the GHGI.

Centrifugal Natural Gas Compressor, *San Pedro Ranch, Eagle Ford Shale Play*

DE-29085: Long-Term Methane Emissions Rate Quantification and Alert System for Natural Gas Storage Wells and Fields

Problem Statement

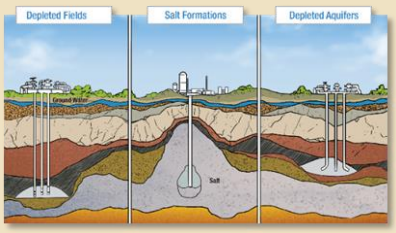
Knowledge of methane seepage from gas storage operations is currently limited and not fully represented in the GHGI. There is a need for a robust approach to detect and accurately quantify emissions over the full range of expected field conditions, including seasonal variability in climate and operations, to better understand the true impact of gas storage operations.

Project Objective

GSI has been awarded a 3-year project to employ a novel combination of technologies to detect and quantify average annual methane emissions from natural gas storage facilities, including from i) above-ground equipment leaks, and ii) seepage at the ground surface from underground leaks.

Scope

- **Measure** the rate and frequency of methane emissions from gas storage wells due to above-ground leakage, yielding summer vs. winter emissions.
- **Install and continuously monitor a network of in-ground sensors** at selected wells to provide high-resolution temporal data on the rates of methane emissions due to below-ground seepage near the well bore and related meteorological and soil conditions.
- **Calibrate/verify/validate the leak monitoring system** by collecting more intensive and extensive measurements of ground-based emissions.
- **Develop methane emission factors** for gas storage wells based on above-ground field investigations and continuous below-ground monitoring.



Types of Natural Gas Storage Wells and Fields

Research Teaming Partners: Utah State University, Colorado State University, Houston Advanced Research Center

A **Technical Advisory Steering Committee (TASC)** is being assembled under these DOE-funded studies to engage stakeholders such as industry, academia, regulatory agencies and non-governmental organizations throughout the duration of the project. The TASC plays an important role in providing recommendations and feedback on project activities, such as strategy development, field implementation, analysis and interpretation of data, and study conclusions.

GSI ENVIRONMENTAL

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