RD&D
COMPLETED PROJECTS

APRIL 2023

SUMMARIES FOR ALL PROJECTS COMPLETED IN THE LAST QUARTER

Identification and Development of an Analyzer for Siloxane Measurement (M2018-010) Phase II

Program: Gas Operations
Sub-Program: System Design & Materials

Benefits
Reduced Greenhouse Gas Emissions, Improved Air Quality

Start Date
January 1, 2021

End Date
January 1, 2023

Total Project Cost
$256,203

Total SoCalGas Cost
$28,940

Total Co-Funding
$227,263 by NYSEARCH Members

The overall goal of this project was to find a robust measurement method that could detect siloxanes in renewable natural gas (RNG). Siloxanes are man-made organic compounds that contain silicon, oxygen, and methyl groups, commonly found in personal hygiene, health care, and industrial products leading to the formation of siloxane in biomethane produced from the anaerobic digestion of waste from landfills and wastewater treatment plants. Phase I completed selection of several analyzers from a set criteria and market availability. Phase II objective was to identify a suitable portable technology that can measure low levels of siloxane concentrations (~0.1 mg Si/m3) and to test the instrument in a wide range of applications. Combustion of RNG containing siloxanes produces a silica deposit on downstream surfaces that could impact the safety and reliability of appliances and the efficiency of industrial equipment. Although five analyzers were selected, it was concluded that none of the analyzers met the project's criteria. The project was terminated as advancements with testing siloxanes from a portable analyzer, test site availability, and testing for American Society for Testing and Materials (ASTM) D8230-19 is being performed by other research consortia. Once approved, SoCalGas will use the ASTM standard to validate the Rule 30 trigger level for siloxanes. This research helped bridge the technology gap for monitoring siloxane concentration levels at RNG sites.

SoCalGas™

MAOP and Materials Verification - Phase I (4.17.d)

Program: Gas Operations
Sub-Program: System Design & Materials

Benefits
Reduced Greenhouse Gas Emissions, Improved Air Quality

Start Date
September 8, 2017

End Date
February 28, 2023

Total Project Cost
$116,000

Total SoCalGas Cost
$11,364

Total Co-Funding
$104,636 by OTD Members

The project objective was to provide software tools to assist operators in complying with the Maximum Allowable Operating Pressure (MAOP) and materials verification requirements proposal of the Integrity Verification Process (IVP). The proposed guideline allows using Engineering Critical Assessments (ECA) instead of hydrotesting, derating, or pipe replacement. The pending rule also allows pipe surface-based non-destructive measurements instead of cutouts and reduces the number of destructive tests. The team developed a set of models using the ASME B31G-modified (wall loss defects) and the Maxey-Folias Leak-Rupture Boundary model. The design work completed the development of an application to help operators. The project team also identified a new compiler to replace Fortran/Ruby language-based tools to improve computer performance for new and existing computer programs. The project team has completed importing a 10-million-point dataset and is using it in model calculations. The project deliverables included a developed application, "ECA Tools," along with a final report. SoCalGas could use this tool as a reference for ECA depending upon the final version of the rule.

Aboveground Service Tee Identification and Mapping System (8.20.j)

Program: Gas Operations
Sub-Program: System Design & Materials

Benefits
Improved Air Quality

Start Date
February 1, 2021

End Date
February 16, 2023

Total Project Cost
$220,000

Total SoCalGas Cost
$25,287

Total Co-Funding
$194,713 by OTD Members

The objective of this project is to test and demonstrate a three-dimensional electromagnetic technology to locate subsurface metallic infrastructure such as metal cutters in polyethylene (PE) service tees. Most locating technologies do not have high-accuracy antennae to find underground facilities with high confidence, much less with plastic. Knowing the precise locations of buried infrastructure has the potential to save money by mitigating dry-hole excavations. In 2021, the team used the project data to determine the accuracy and effectiveness of the pipe-locating technology in identifying metallic cutters in buried PE service tees, which generates an intrinsic and unique fingerprint. In 2022, sponsors provided a variety of service tees that were classified and tested, with the system yielding positive results of geospatial accuracy and pipe depth. The data was collected and analyzed to determine the accuracy of the 3D position (latitude, longitude, depth) of the service tee cutter and to distinguish the service tee cutters from other metallic anomalies, such as emplaced clutter, against data in the library. The project team found that the emplaced clutter creates a fingerprint that is not unique to any tee cutter and instead creates a false positive. The team presented the results in a webinar and delivered the testing and field demonstration reports to sponsors. The ability to locate subsurface metallics could benefit SoCalGas by aiding in reducing the potential of damage to its lines, thereby reducing damage to life, property, and community.