Northeast GAS ASSOCIATION
NYSEARCH

Technology Brief

Service Line Inspection & Maintenance Tools

Description: A convenient and innovative system to allow live inspection and maintenance of the gas distribution main and customer service line without excavation.

Status: Field testing initiated.

BENEFITS

Current methods of accessing the distribution mains to test for water blockages and pipe damage are tedious and time consuming to the operator. These activities have generally required service interruption to the customer and or excavation. Service line replacements due to minor leaks typically involve excavation and a high cost of replacement. Technologies are emerging that utilize radio transmission inside gas mains for communicating with inspection / service robots or sensors.

In order to provide operators with the ability to access mains without excavation or service interruption, NYSEARCH has developed a collection of service line inspection and maintenance tools. These tools were designed by ULC Robotics and Automatika for inspecting or servicing the gas main and the customer service line by accessing them through the service tee.

The Universal Entry Device (UED) was developed to allow operators the ability to insert tools into a service line under live conditions.

UED System

The Micro Camera was developed to allow the operator visual access to the main through the customer service line by maneuvering through service line fittings. The operator can now search for water blockages and other types of damage without excavation, service interruption or drip pot inspection.

An antenna system was developed to access the main via the service line for enabling communication with robots and sensors. The system works with the UED to provide service access without excavations or service interruptions.

A service line rehabilitation system was researched to repair minor leaks in the service line and tee. In contrast to other pipe 'insertion' type rehabilitation methods, the new rehabilitation system would repair leaking service lines and service tees by applying an anaerobic sealant on the inside of the pipe while accessing them via the service line.

BACKGROUND

NYSEARCH envisioned the concept of using the service line to access the main for performing various tasks relating to the operation and maintenance of a gas distribution network. These tasks include deployment of cameras into the main to inspect for water leakage, deployment of antennas for communicating with Explorer™ or Gasnet™ nodes, and rehabilitation of

service lines. At the core of a system intended to be deployed in a manner which does not interrupt service is the access mechanism into the service line. ULC Robotics and Automatika provided NYSEARCH solutions for these tasks. As a result, an access system and associated inspection / maintenance technologies were developed.

TECHNICAL APPROACH

A market assessment study was conducted to collect data regarding meter set and service line configurations in use at companies funding the project. From this study, specifications for the UED and a scope of work for the development of tools were developed.

The UED design is comprised of four components including a single packing gland unit, a reducing coupling, bushing and pipe nipple. A launch tube houses the required device to be inserted into the service line.

The Micro Camera System is comprised of a video camera fitted into a custom designed camera housing with 90-degree viewing capability for gas main pipe inspection. Rotation of the camera head while in the main is accomplished by twisting the push rod cable. The camera is connected to a 120' semi-ridged push rod cable with a gas tight connector. The push rod is stored on a heavy duty portable reel. An LCD monitor as well as all necessary controls are housed in a portable case.

Micro Camera & Reel

The Antenna was designed by Automatika to perform with the UED. Once in the main, the antenna provides communication with Explorer™ or Gasnet Nodes.

Antenna

PROJECT STATUS

The UED, Micro Camera, and the Antenna are at the field testing phase. These tools are designed to perform with service configurations having a service tee, street elbow, and plug valve down to 1-1/4". The Antenna is capable of performing in service configurations down to 1-1/2". The entire system performs on low pressure services with inside or outside meter set configurations having a valve, tee, or elbow as the first fitting. The system is compatible with high pressure services having a valve as the first fitting. Possible future phases will include the compatibility with a wider range of service types.

HIGHLIGHTS

- Video inspection of live mains without excavation
- Ability to increase the range of communication with wireless internal sensing technologies such as Explorer™ and Gasnet™

FOR ADDITIONAL INFORMATION

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