PHILADELPHIA GAS WORKS

REQUEST FOR INFORMATION

Alternative Natural Gas Leak Detection Measures

Dated: February 18, 2014

Response Due Date: April 17, 2014

RFI No.: 28421
1 Background

Philadelphia Gas Works ("PGW") is considering issuing a competitive solicitation for alternative natural gas leak detection measures. In connection therewith, PGW is issuing this Request for Information ("RFI") to obtain information from vendors who may be asked to participate in such subsequent competitive process. PGW management would like to understand the full range of options that are available for alternative natural gas leak detection measures that are designed to enhance or improve the natural gas leak detection surveys and patrols currently performed by PGW for its natural gas distribution and transmission facilities located in the City of Philadelphia.

Responses to this RFI are due on or before: Thursday, April 17, 2014 at 2:30 PM EDT.

2 Overview of PGW/Current Leak Detection Approach

PGW is a municipally-owned utility managed by the Philadelphia Facilities Management Corporation (hereafter referred to as "PFMC"). PGW provides natural gas service to approximately 515,000 active accounts within the city of Philadelphia, using approximately 6,000 miles of natural gas mains and services. PGW is the only local distribution company currently distributing gas within the city of Philadelphia. The mission of PGW is to provide safe, reliable natural gas service to the citizens of Philadelphia at a reasonable cost. A summary of the natural gas leak detection surveys and patrols currently conducted by PGW, along with a description of the equipment currently utilized to perform such surveys, is set forth in Attachment A. PGW currently has in place a main replacement program which is described in Attachment B.

3 Scope of Information Requested

PGW is currently seeking information regarding alternative natural gas leak detection measures that would enhance or improve the natural gas leak detection surveys and patrols currently performed by PGW for its natural gas distribution and transmission facilities located in the City of Philadelphia.

Responses to this RFI may include alternative approaches, services, surveys, patrols, processes, procedures, equipment and/or technologies that are designed to enhance PGW’s existing leak detection program. Responses must include:

- a statement/description of how the proposed alternative approaches, services, surveys, patrols, processes, procedures, equipment and/or technology would enhance PGW’s existing leak detection surveys and patrols; and

- a statement/description of how PGW would measure the effectiveness of the enhancements included in the applicable response.

If a response entails the sale, lease or license to PGW of leak detection equipment or technology designed to improve PGW’s existing natural gas leak detection program, the
response should include a description of how such equipment or technology will both “pinpoint” and “classify” a leak.

Following review of the responses to this RFI, PGW may issue a competitive solicitation (e.g., a Request for Proposals, a Request for Quotations or both) with the intent of entering into, as appropriate, a master pipeline support services agreement, equipment supply purchase/lease agreement, a technology license agreement or other appropriate agreement pursuant to which PGW will test the subject enhanced leak detection measures on certain natural gas distribution and transmission facilities located in the City of Philadelphia during the 2014/2015 winter period.

4 Responses Requested

In addition to the requirements set forth in Section 3, above, responses to this RFI should include, at a minimum, the following information:

- Business name and address of the respondent, and name and telephone number of the primary contact person.
- General qualification of the respondent, describing the company, its business and corporate philosophy, and any professional affiliations.
- Detailed description of the alternative natural gas leak detection measures.
- Technical specifications for the alternative natural gas leak detection measures, if applicable.
- List of utilities for whom the described leak detection measures are provided by respondent.
- Respondents to this RFI are asked to provide indicative pricing and/or their preferred pricing methodology for the alternative natural gas leak detection measures being described. This is not a request for respondents to provide pricing for their solutions, but rather how the pricing request should be structured in a future competitive solicitation.

5 Reservation of Rights

This RFI and the process it describes are proprietary to PGW and are for the sole and exclusive benefit of PGW. No other party, including any respondent to this RFI or any competitive solicitation which may be issued by PGW, is intended to be granted any rights hereunder. No material submitted as part of this RFI will be returned, and respondents are solely responsible for all expenses associated with responding to this RFI.

Any response to this RFI, including written documents and verbal communication, may be subject to public disclosure by PGW, or any authorized agent of PGW and any materials submitted or ideas elicited in response to this RFI may be used and/or implemented by PGW without compensation, including, without limitation, to develop and/or issue further solicitations.
This RFI will not result directly in a contract to provide any specific services to PGW. A firm’s response – or lack of response – to this RFI will not provide that firm with any advantage or disadvantage if there is a solicitation for services or equipment related to this subject matter in the future and will not preclude any firm which does not respond to this RFI from submitting a response to a future solicitation. PGW is not obligated to conduct subsequent discussions with any respondent to this RFI, and reserves the right to conduct discussions regarding its subject matter with firms that do not respond to this RFI.

6 PGW Contact

Questions concerning this RFI should be directed in writing by 5:00 PM EDT, Tuesday, March 11, 2014 towards Erica Patterson, Manager, Contracts Management, PGW Supply Chain Department, email: erica.patterson@pgworks.com with a copy to: procurement@pgworks.com. Respondents may not contact other PGW personnel regarding this RFI.

Responses to this RFI are due on or before: Thursday, April 17, 2014, 2:30 PM EDT to the contact listed above at Philadelphia Gas Works, Supply Chain Department, 800 W. Montgomery Avenue, Philadelphia, PA 19122.
Attachment A

Description of Existing PGW Leak Survey and Inspection Activities
Philadelphia Gas Works

Description of Leak Survey & Inspection Activities

A. Background

PGW is the largest municipally owned LDC in the country. PGW operates a distribution system which includes approximately 6,000 miles of gas mains and service lines; including over 3,000 miles in gas mains. The Company serves over one half million customers. PGW is typical of LDCs which serve older, urban areas in that its mains are mostly cast iron with some unprotected steel with the balance made up of plastic. Furthermore, because PGW serves such a highly concentrated, urban area, it has fewer miles of main than other similarly sized gas utilities. Of PGW's 3,026 miles of gas mains, 1,524 miles or 50% is cast iron. Of those 1,524 miles of cast iron main, over 1,239 miles, or over 81% of those mains, are more than four inches in diameter - a significant factor since larger diameter cast iron mains have a lower breakage rate and incident level. PGW's gas distribution system was designed and constructed as a "utilization pressure" or low pressure system. In fact, PGW operates almost all of the cast iron portion of its system at 0.25 pounds per square inch - significantly lower pressure than most other gas utilities. The low pressure nature of its system has and continues to contribute to the overall safety of the system.

Despite the age of its system, the vast majority of PGW's cast iron mains have never experienced a break. As with all gas distribution systems, PGW's system does experience gas leaks. In this regard, PGW has adopted and performed leakage surveys since as early as 1954, well before the implementation of federal gas safety regulatory requirements. In fact, PGW has always adopted policies which generally require leakage surveys far more frequently than applicable federal gas safety requirements and conducts surveys in instances when no federal requirement exists. PGW's practices and procedures applicable to leakage surveys demonstrate its serious commitment to a completely safe distribution system. PGW conducts a leakage survey of all structures in the roadway every year and all structures in the footway every three years despite the fact that federal gas safety standards only require such a leakage survey every five years. PGW surveys in advance of all resurfacing or paving projects, blasting or implosion activities. PGW also conducts three (3) winter patrols of the cast iron areas of system even though these surveys are not required under federal law. The following chart summarizes PGW's existing leakage survey program and compares the frequency of its leakage surveys to federal gas safety requirements:
PGW's Distribution Department Bulletin #127 ("Leak Survey Bulletin") establishes PGW's minimum schedule for leakage surveys. In addition to establishing a minimum frequency for various types of leakage surveys, the Leak Survey Bulletin provides that each leakage survey will utilize leak detection equipment to test the atmosphere system in manholes, at cracks in the pavements and sidewalks and at other locations, such as, gas and water curb stop boxes, sewer vents, etc. These procedures maximize PGW’s ability to discover gas leaks before they become safety concerns.

The details of PGW’s leak investigation procedures are established through PGW’s Distribution Department Bulletin #212 (Leak Response and Investigation Procedure). As reflected in the Leak Response and Investigation Procedure, the overriding objective of PGW’s efforts to investigate gas leaks is "Actions Must Always Be Taken to Protect People First and Then Property." The Procedure establishes the Gas Works’ minimum requirements for investigation of customer home leaks, street leaks, underground street troubles and general street troubles. For all reported outside odor complaints, fire and police emergencies and all reported water leaks and cavities, PGW investigative procedures, as reflected in the Leak Response and Investigation Procedure, includes the an "area check" to determine any leak migration and provides for numerous additional safety inspections in addition to planned survey work.

Furthermore, all inside leak complaints are subject to a minimum requirement of safety checks of two building basements, the home of the customer reporting the leak and the homes of the residents on both sides of reporting customer's premises. If a reading or odor is detected, PGW personnel are required to investigate at least five (5) properties in the surrounding area: the affected home, the contiguous homes and two additional homes neighboring the affected home. Again, these required procedures meet or exceed regulatory standards.

Overall, the good operational condition of PGW's distribution system combined with aggressive leakage detection and leakage investigation procedures which exceed regulatory standards provide PGW customers and Philadelphia residents with maximum assurance of a safe,
reliable system. Indeed, PGW prides itself on its exemplary safety record and its ongoing commitment to the safety of the public who live and work on or around its gas delivery system.

**B. Inspections and Surveys**

As the foundation for the inspection and survey program, PGW has existing procedures in place providing for winter patrols of the cast iron portions of its distribution system. In fact, PGW has been performing mobile leakage surveys of its system since the technology became available in the early 1970’s. First with mobile flame ionization equipment and later with upgraded Optical Methane Detection (OMD) mobile unit surveys. Under PGW’s existing survey procedures, vehicles equipped with Optical Methane Detection mobile equipment survey PGW's distribution system throughout the year.

Because PGW believes that any and all breaks in the cast-iron portion of its distribution system are potentially hazardous, PGW conducts the General Winter Frost Patrol equally on all blocks served by cast iron mains. The normal start-up date for PGW's General Winter Frost Patrol is the 1st of December. This General Winter Frost Patrol has proved itself to be a valuable tool in assuring the safety of PGW's distribution system and protecting the general public.

In response to the Commission's Order of September 13, 2000, PGW initiated an additional inspection program which specifically focused on the "higher risk" portion of PGW's distribution system as identified by PGW ("Prudent Winter Patrol"). PGW currently has in place a main replacement program (See attached document entitled ‘Main Replacement Programs) which prioritizes mains that need to be replaced on a project-by-project basis based on a risk assessment of all the mains based on a number of factors:

- Main Breakage History
- Leak History
- Breakage Zones (Calculated)
- Main Pressure
- Main Material
- Main Size
- Main Age
- Gas Leakage Migration Data
- Depth of Main
- Type of Paving (Continuous vs. Lawns)
- Public Buildings – Population Density

The Prudent Winter Patrol focuses its inspection efforts on the portions of PGW's system which have been identified for replacement within PGW's main replacement program. The MRP top 300 mains. Furthermore, the criteria for replacement along with the frequency of patrol (bi-weekly) of these higher risk areas effectively account for and closely scrutinize the potential effects (leaks and breaks) that corrosion and frost may have on certain portions of the distribution system, particularly the cast iron portion.
The Prudent Winter Patrol is conducted with vehicles equipped with state-of-the-art Optical Methane Detection equipment. These vehicles patrol higher risk blocks (to the best of PGW's ability) on a bi-weekly basis and provide continuing surveillance of higher risk blocks every two weeks. This supplemental Prudent Winter Patrol utilize established PGW Block Survey Procedures and Leak Investigation Procedures, as discussed above, including an area check when required and a house check at the front foundation wall.

As set forth in PGW’s December 5, 2011 Comments to the Commission’s Order, PGW revised both its General Winter Frost Survey and Prudent Winter Survey. PGW supplemented the General Winter Frost Patrol surveys by doing a separate survey of its 12 inch cast iron high pressure (10-35 psi) main. PGW’s also started two additional enhancements to the Prudent Winter Frost Patrol. First, PGW doubled the survey coverage area to the top 600 blocks in the MRP model ranking. These 600 blocks are surveyed on a monthly basis after frost begins. Second, PGW now calculates Frost Degree Days (“FDD”) in addition to its current procedures which include PGW’s distribution crews measuring and reporting ground frost on a daily basis. By calculating FDD, there is a possibility that this enhanced survey would start sooner than would be required by frost conditions that are field reported. These surveys are conducted every 2 weeks using mobile optical methane detector technology as soon as there is a measurable amount of frost reported for a period of five days. This survey continues until seven days after the last report of frost.

C. Testing Instruments

As indicated above, PGW has been utilizing flame ionization gas detection units since the early 1970's when the technology was first introduced. In addition, a new generation of mobile gas detection technology was introduced in late 1998 called Optical Methane Detection or OMD. At the time the technology was introduced in the marketplace, PGW pursued the acquisition of OMD devices to replace its flame ionization units. In the spring of that year, PGW purchased two OMD units. Several more OMD units were purchased in the early 2000’s. These units eventually replaced all of the flame ionization units, the OMD units are now utilized all year long.

Currently, PGW provides the most advanced instruments for leak detection as follows such as:

a. Parts per Million (PPM) leak detectors – parts per million gas detection instruments used by every PGW first responder employee.

b. Optical Methane Detection (OMD) mobile units – vehicles mounted units which detect trace amounts of gas while driven through the city. Used year round and covering every city street.
D. Enhanced Frost Patrol Protocols

Consistent with the direction from the Commission, PGW submitted a Leak Detection Pilot Program (“Pilot Program”) to the Commission. The Pilot Program was approved by an Opinion and Order entered on July 26, 2013. As part of its Pilot Program, PGW proposed the following enhancements to both its Prudent Winter Patrol Survey as well as its General Winter Patrol Survey Protocols:

1) All Sizes High Pressure (10-35 psig) Cast Iron mains
   • All High Pressure (10-35 psig) Cast Iron mains in PGW’s gas distribution system (~100 miles) will be mobile surveyed twice a year (or every 6 months). Currently, all high pressure (10-35 psig) mains are mobile surveyed once a year within the General Survey program.

   Philadelphia Gas Works
   Cast Iron Mains (10-35 psig)
2) **12” High Pressure (10-35 psig) Cast Iron**

- All 12” HP cast iron mains are currently being mobile surveyed twice during the winter period (December to March). PGW proposes to enhance this survey program from two times a year to 6 times a year (or every two months year round).

### E. Conclusion

Overall, by PGW maintaining its aggressive inspection procedures, implementing these proposed enhancements and utilizing the best technology available, demonstrates PGW’s continued commitment to an exemplary safety record. It is this commitment which has and will continue to assure that all Philadelphia customers served by PGW are provided service which is not only dependable and reliable, but which is safe and adequate as well.
Main Replacement Programs

The Distribution Department is responsible to administer PGW's main replacement programs. Since the 1980's, the overall goal at PGW was to replace 18 miles of cast iron main per year, which is approximately 1% of the existing cast iron pipe.

The goals of Main Replacement Program are:
- Prevent Incidents
- Eliminate Cast Iron Main Inventory in a Finite Number of Years
- Stabilize Break Rate
- Maintain Safety & Reliability
- Reduce Maintenance Costs
- Reduce UAF

There are two main replacement programs that contribute to this 18-mile target, specifically:

**Prudent Main Replacement** - These are mains that the Engineering Department determines need to be replaced based on the Advantica Main Replacement Program (MRP). The MRP program is Geospatial Model that uses Main Characteristics and Leakage History to Prioritizes Main Replacement Projects by Calculating: "Condition" and "Risk". Condition is "What's the possibility that the main will leak, again" and Risk is "What's the possibility that the leaking gas will migrate into a premise and cause an incident"? PGW normally does 12 to 14 miles of prudent main replacement per year.

The MRP ranks the mains that need to be replaced on a project-by-project basis based on a risk assessment of all the mains based on a number of factors:
- Main Breakage History
- Leak History
- Breakage Zones (Calculated)
- Main Pressure
- Main Material
- Main Size
- Main Age
- Gas Leakage Migration Data
- Depth of Main
- Type of Paving (Continuous vs. Lawns)
- Public Buildings- Population Density

With the Advantica program, PGW is able to prioritize the top 100 to 200 blocks replaced each year, while still having reasonably sized projects (so that PGW is not doing a lot of small, disjointed projects). In doing this, PGW combines smaller projects, even if some of the projects are not at the top of their priority list. PGW also takes into consideration the main's proximity
to schools, hospitals, greenways, etc. into the project prioritization process. The Advantica MRP database is updated with information that is extracted by a script from the system maps and with data from the Underground Facilities Database (UFD) on an annual basis. Both main break repairs and outstanding leaks are contained in the UFD.

**Enforced Main Replacement**: These main replacements are driven by work projects done by PennDOT, the water department, and other utility projects. Generally, four to six miles of main replacement is done each year under this category. PGW will usually replace all the pipe in a construction area due to the increased potential for leaks occurring as a result of the pipe being undermined during the construction process.

On February 14, 2012, Act 11 was signed into law, providing Pennsylvania utility companies with a supplemental recovery mechanism (a Distribution System Improvement Charge, “DSIC”) for costs related to incremental/accelerated distribution system repair, improvement and replacement. Act 11 permits gas utilities to recover 5% of their non-gas revenues via the recovery mechanism (which for PGW will be approximately $22 million). In order to establish such a recovery mechanism, PGW submitted a Long-Term Infrastructure Improvement Plan ("LTIIP") to the PaPUC for review and approval. Accordingly, PGW submitted its LTIIP in December 2012.

The LTIIP is a five year plan (i.e. FY 2013- FY 2017) for accelerated main, service lines and meter set replacement over and above PGW’s base line cast iron main replacement program of 18 miles of small diameter cast iron replacement. The LTIIP proposes to accelerate the replacement cycle for PGW’s large diameter cast iron pipe (i.e. 12 inch and smaller diameter high pressure main and 30 inch diameter high pressure main) by over 60 years, with full replacement by 2023. Additionally, the much more extensive smaller diameter pipe (i.e. 8 inch and smaller low/intermediate pressure main) replacement program is proposed to be accelerated by 17 years.

The LTIIP which PGW submitted included several key elements.

1. The current baseline program of replacing 18 miles per year of small diameter, low/intermediate pressure cast iron main will increase by an additional 3 miles per year.
2. The replacement of larger diameter, high pressure cast iron mains that have been identified as potential risks will begin in FY 2013:
   a) 30 inch cast iron mains that has been identified as being in poor condition as defined by PHMSA, and
   b) 12 inch cast iron mains, similar to those that have been involved in two separate incidents in PGW’s system (i.e. "Torresdale" and "Longshore"). A 12 inch cast iron main was also involved in the incident within UGI's service territory.