

REQUEST FOR PROPOSAL

DEVELOPMENT OF A TOOL TO PINPOINT LEAKS ON BURIED PIPES FOR THE NATURAL GAS INDUSTRY

BACKGROUND

NYSEARCH is a voluntary Local Distribution Company (LDC)-controlled R & D sub-organization of the Northeast Gas Association, with (19) members from around North America. [More information about NYSEARCH is available at www.nysearch.org and Northeast Gas Association at www.northeastgas.org.] NYSEARCH is re-initiating a program to investigate the development of a leak pinpointing tool. Efficient detection and precise location of gas leaks on buried piping and their subsequent repair are important operational needs of the U. S. natural gas industry. With changes in the federal and state regulation affecting LDCs, market pressures have increased, requiring LDCs to hold down expenses in order to remain competitive. In addition, anticipated changes in environmental regulations will place pressure on the LDCs to reduce methane emissions. According to industry sources, there were ~1,920,000 miles of buried distribution pipe in which 59% were mains (~1,140,000 miles) and 41% were services (~780,000 miles). There are approximately 68,000,000 services in the U.S. Based on informal information that is not required for OPS reporting, there is large number of reported leaks. Many of these leaks are repaired and eliminated (e.g. approximately 540,000 in 2004) but another portion is not. The combustible gas indicator (CGI) is normally used to pinpoint leaks on buried piping. The fact that the pipe is buried complicates leak identification and location. Normally (about 85 - 90% of the time) the highest gas concentration is over the leak and the gas leak is usually pinpointed within the first hole dug to expose the pipe. The problem confronting the industry is locating the remaining 10% of gas leaks. For those difficult leaks, the primary problem is locating the leaks without extensive excavation (and subsequent restoration). Due to the high safety standards of the gas companies, extensive efforts are spent locating the more insidious leaks. Pinpointing accuracy decreases when

- Gas migrates away from the leak
- Gas saturates the soil over a large area
- Multiple leaks are present
- The water table is high and displaces the gas in the ground (or the gas mains are below the water table)
- Gas migrates to manhole areas or areas with multiple sub-surface structures exist

Pinpointing the more difficult leaks costs the U. S. LDCs millions of dollars annually. Therefore additional tools for pinpointing the difficult leaks have long been desired to help the industry increase revenues and reduce costs.

OBJECTIVE

The objective of this project is to develop a tool that would pinpoint natural gas leaks for cases where pinpointing methods are ineffective. This tool should be innovative and eliminate the need for a high level of operator experience and knowledge of the area's leak history. Also, LDCs could benefit if the tool could eliminate one of the current activities that is part of a traditional leak pinpointing operation; 'barholing'. [Barholing makes use of a steel rod to penetrate the surface and provide access to the underground pipe area.]

The solution does not need to be limited to any specific technology. [One example of an innovation would be a technology that does not pinpoint based on measurement of gas CONCENTRATION.] The tool developed must be field rugged, user and environmentally friendly and safe, accurate and cost effective (when compared to existing products). Gas leak pinpointing devices must be sensitive enough to sense gas concentrations or the equivalent to 10% LEL (0.5% gas) (LEL = Lower Explosive Limit of natural gas, or 5% gas in air), and detect leaks from low pressure (less than 2 psi) services. The upper limit of the pinpointer must be 100% Gas (+/- 4% Gas). The device may utilize multiple sample scales (i.e. %LEL and % Gas are similar to the CGI).

We will accept proposals that focus on any or all of the following: 1) assessment of the problem and attempted technological solutions, 2) feasibility of the proposed technology, 3) basic research, and/or, 4) proof of concept / prototype development. In addition, interested parties should indicate more generally what they believe will be required for advanced research, product development and commercialization. If a concept is already available and has been tested, we can evaluate a proposal for the latter phases only.

Listed below is a series of research phases could encompass the program. Please use these as a guideline in preparing your response.

WORK SCOPE

Phase 1 - **Assessment** – Evaluate on-going research studies, research past attempts (failed, semi-successful or successful), identify member needs including specifying differences among members (i.e. system pressures, age and material types of buried pipe, leak history, equipment presently used for leak pinpointing etc.) and identify technological as well as commercial hurdles. Prepare a report that details: the type of product(s) to pursue; the development plan / duration; and the capabilities of the firm to produce the research required.

MILESTONE – REPORT DETAILING PROPOSED TECHNOLOGY(S) AND MEMBER REQUIREMENTS.

Phase 2 - **Feasibility Study / Basic Research** – Perform technical analysis of potential solutions and barriers to overcome in design. Ensure that components proposed for product are optimized based on application and cost. [Study should include potential commercialization and marketability of product (i.e. cost / benefit analysis comparison to existing products)]. Investigate development of product based on findings of feasibility study.

MILESTONE – FEASIBILITY STUDY AND COST / BENEFIT ANALYSIS.

Phase 3 - **Proof -of -Concept and Prototype Development** – Develop first version of technology and construct product for field trials. Product should be sized correctly and practical for field application, user friendly, and where possible use commercially available componentry. Test the prototype in a laboratory setting and plan field tests with NYSEARCH and participating utilities.

MILESTONE – REPORT ON PROOF-OF-CONCEPT TO BE SUBMITTED FOR REVIEW. UPON NYSEARCH APPROVAL OF CONCEPT, PROTOTYPE TO BE DEVELOPED AND SUBMITTED TO NYSEARCH FOR FIELD TESTS.

Phase 4 - **Final Design** - After NYSEARCH review of field tested prototype, incorporate the design enhancements. Resolve all issues related to the design, construction, and

commercialization of the product. Also, complete a product cost / benefit analysis for marketing purposes. This analysis would include an updated review of products used by the industry and the target price of the product.

MILESTONE - FINAL DESIGN DRAWINGS, SPECIFICATIONS AND COST / BENEFIT ANALYSIS TO BE SUBMITTED TO NYSEARCH.

Phase 5 - Product Development / Pre-Commercial Testing – Perform development needed to verify capabilities and transfer technology to commercializer. Build pre-production prototypes for longer term field testing. [Number will be based on interest/number of sponsors.] Identify commercializer and develop commercialization plan.

MILESTONE - DELIVERY OF PRE-PRODUCTION PROTOTYPES AND COMMERCIALIZATION PLAN

At this time, NYSEARCH is requesting a pre-proposal document.

PRE-PROPOSAL GUIDELINES

A pre-proposal is a document, limited to 2-3 pages in length that provides an overview of an organization's approach to address the service pipeline leak survey problem. A pre-proposal is part of a two stage solicitation process, intended to reduce the investment required to both produce and evaluate new project concepts. Following selection of the candidates based on pre-proposals, a full proposal will be requested.

PRE-PROPOSAL CONTENT

- a. Project Description:** Provide a description of the proposed research effort, including the work to be performed. The summary must include a project goal and corresponding primary project objectives.
- b. Project Schedule:** Provide approximate duration required to complete major project tasks.
- c. Project Tasks:** Outline and describe major tasks to be accomplished for the successful achievement of the project.
- d. Deliverables:** List deliverables and duration to achieve each deliverable. Efforts should concentrate on Phases 1, 2 and 3 (Assessment, Feasibility / Basic Research, and Proof - of Concept and Prototype Development). Participant should detail plan for work required in the three phases.
- e. Cost:** Provide a description of anticipated costs. This should include total costs as well as an illustration of the underlying assumptions (such as material costs and labor costs) by phase. Costs for tasks in each phase should be itemized.

PRE-PROPOSAL SUBMISSION

Pre-proposal documentation will be due on **May 9th**. If participant is selected for a full proposal they will be notified by **June 15th**. All full proposals will be due on **July 20th**. NYSEARCH is planning to award this contract as early as October 2007 and no later than early November 2007.

Location: In addition to an email version sent to ddzurko@northeastgas.org, a single sealed package, containing the original of the pre-proposal, must be marked and returned to NYSEARCH at the submission location as follows:

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