Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form. The full completed submission should not exceed 6 pages in total.

NIA Project Registration and PEA Document

Date of Submission

Jul 2016

Project Reference Number

NIA_NGN_170

Project Registration

Project Title

Paw Patrol (Gas Detection Dogs - Phase 2)

Project Reference Number

NIA_NGN_170

Project Licensee(s)

Northern Gas Networks

Project Start

August 2016

Project Duration

0 years and 8 months

Nominated Project Contact(s)

Gary Tupper

Project Budget

£18,500.00

Summary

This project is to conduct additional research to evaluate whether trained sniffer dogs can be added to operation teams.

BKI will collate all information gathered during the project and report the findings. This will focus the dog's performance, accuracy, sensitivity, and suitability for ongoing inspections.

Third Party Collaborators

BK Integrity Ltd

Newcastle University

Nominated Contact Email Address(es)

innovation@northerngas.co.uk

Problem Being Solved

Leakage Detection, pipeline or asset condition compliance methods in Great Britain have remained, predominantly, unchanged for decades. No disruptive innovation has ever been introduced to this highly critical area due to the very nature of our risk averse environment and regulatory nature of the energy sector.

In a recently conducted feasibility study, Northern Gas Networks has established that a dog can actually be trained to detect and pinpoint, accurately, the scent that we add to domestic natural gas. In order to capitalize on this successful study result an investigation is required into how gas detection dogs can practically be deployed within the gas sector in order to assist engineers to undertake field operations.

Method(s)

Natural gas is odorless to humans and the domestic supply is typically dosed with mercaptan to give it a scent to assist in leak detection.

The Phase 1 research consisted of a number of above ground tests and trials using various concentrations of Mercaptan to see how small of a concentration could be detected by the dogs.

Phase 2 of the project will conduct additional research to evaluate whether trained sniffer dogs can be added to NGN's rapid response team to detect and pinpoint a live gas leak. The evaluation will be based on the results from field trials which will be designed to test the dog's performance, accuracy, sensitivity and suitability for ongoing inspection in a variety of operational scenarios.

Scope

This project is to conduct additional research to evaluate whether trained sniffer dogs can be added to operation teams.

BKI will collate all information gathered during the project and report the findings. This will focus the dog's performance, accuracy, sensitivity, and suitability for ongoing inspections.

Project Update

This project has experienced significant delays due to the ability to find a suitable piece of land to build the test rig and the unexpected high costs associated with this. These delays have led to the supplier BKI integrity having terminate their relationship with the project, Newcastle University have been selected to complete the remainder of the project in its new format.

After exploring various different options the team have decided to abandon the test rig approach and utilize existing leaks in NGN's network.

The new plan of activities are highlighted below.

- Provide the Dog Unit with sample bottles of scented natural gas
- Train the dog to mercaptan scented natural gas using bottles provided
- Plan the trial, including University risk assessment, liaise with all parties and manage entire process
- Risk assessment and insurance confirmation
- One site visit to liaise with all parties and decide on protocol
- Five day trial on known leaks on live network: facilitate + human operative with gascoseeker
- Five day trial on known leaks on live network: dog inspection
- Five day trial on known leaks on live network: Oversee, manage, record results
- Summary Report (including collating / analyzing results)

The report will be published on the SNP to disseminate our findings from the project.

Objective(s)

1. Imprint the dog with domestic scented gas using sample bottles provided by the operator.
2. Design and install a test rig outlining requirements from NGN with known leak locations.
3. Confirm whether a dog can detect domestic gas in a controlled environment of buried pipework containing manufactured leaks.
4. Directly compare the dog's performance and detection ability with that of a Gascoseeker.
5. Confirm whether a dog can be trained to detect a leak on reported/known leaking infrastructure in an uncontrolled environment.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project will be deemed successful if a technical report has been issued summarising the project's outcomes based on the following parameters:

- The dog's performance in terms of accuracy and sensitivity
- It's suitability for ongoing inspections in comparison to conventional methods

- Identification of potential benefits in comparison to conventional methods through increased speed of leakage detection and avoided excavations and their associated financial, environmental and safety benefits

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

BKI has identified a suitable test site on NGN's network, which is an old gas storage facility and still has a number pipelines which can be used to supply gas for the trial in order to simulate real-life leakage situations. The scale of the selected test facilities is of a size that allows to draw conclusions on the dog's suitability to be used in real operational leakage scenarios.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

The test site is located within NGN's network: Clay Flatts Site, Workington, Cumbria.

Revenue Allowed for the RIIO Settlement

n/a

Indicative Total NIA Project Expenditure

External Costs £13,874

Internal Costs £6,624

Total Project costs – 18,498

Project Eligibility Assessment Part 1

There are slightly differing requirements for RIIO-1 and RIIO-2 NIA projects. This is noted in each case, with the requirement numbers listed for both where they differ (shown as RIIO-2 / RIIO-1).

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations (Please complete sections 3.1.1 and 3.1.2 for RIIO-2 projects only)

Please answer **at least one** of the following:

How the Project has the potential to facilitate the energy system transition:

n/a

How the Project has potential to benefit consumer in vulnerable situations:

n/a

Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

Please provide an estimate of the saving if the Problem is solved (RIIO-1 projects only)

The project has the potential to speed up the detection of gas leakages which could result in cost savings, avoided excavations and the associated need for re-instatement. However, identifying how the new method performs in comparison to conventional methods in terms of detection speed and avoided excavations is one of the project's objective and therefore a quantification of those benefits cannot be undertaken at this stage.

Please provide a calculation of the expected benefits the Solution

See above

Please provide an estimate of how replicable the Method is across GB

Should the use of dogs to detect gas leakages be feasible, further testing will be required to work out the scale of applicability of the new method which is why a statement about its reliability cannot be made at this stage.

Please provide an outline of the costs of rolling out the Method across GB.

The project starts at TRL 3 which is why a statement about rolling-out costs cannot be made at this stage.

Requirement 3 / 1

Involve Research, Development or Demonstration

A RIIO-1 NIA Project must have the potential to have a Direct Impact on a Network Licensee's network or the operations of the System Operator and involve the Research, Development, or Demonstration of at least one of the following (please tick which applies):

☑ A specific piece of new (i.e. unproven in GB, or where a method has been trialled outside GB the Network Licensee must justify repeating it as part of a project) equipment (including control and communications system software).

☐ A specific novel arrangement or application of existing licensee equipment (including control and/or communications systems and/or software)

☑ A specific novel operational practice directly related to the operation of the Network Licensees system

☐ A specific novel commercial arrangement

- [ ] A specific piece of new equipment (including monitoring, control and communications systems and software)
- [ ] A specific piece of new technology (including analysis and modelling systems or software), in relation to which the Method is unproven
- [ ] A new methodology (including the identification of specific new procedures or techniques used to identify, select, process, and analyse information)
- [ ] A specific novel arrangement or application of existing gas transportation, electricity transmission or electricity distribution equipment, technology or methodology
- [ ] A specific novel operational practice directly related to the operation of the GB Gas Transportation System, electricity transmission or electricity distribution
- [ ] A specific novel commercial arrangement

Specific Requirements 4 / 2a

Please explain how the learning that will be generated could be used by the relevant Network Licensees

The project addresses the problem of gas leakage which is prevalent in all GDNs. Should the project result in a solution to this problem then it will be applicable to all GDNs.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

The project has the potential to speed up the detection of gas leakages which could result in cost savings, avoided excavations and the associated need for re-instatement. The project thereby addresses NGN's innovation focus areas of Asset and Network Management and Environment, Health and Safety.

- [x] Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

Is the default IPR position being applied?

- [x] Yes

Project Eligibility Assessment Part 2

Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNF, NIA, NIC or SIF projects already registered, being carried out or completed.

Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

n/a

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

n/a

Additional Governance And Document Upload

Please identify why the project is innovative and has not been tried before

n/a

Relevant Foreground IPR

n/a

Data Access Details

n/a

Please identify why the Network Licensees will not fund the project as apart of it's business and usual activities

n/a

Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks(e.g. commercial, technical, operational or regulatory) associated with the project

n/a

This project has been approved by a senior member of staff

☑ Yes