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

Mar 2014

Project Reference Number

NIA_SGN0027

Project Registration

Project Title

Water Extraction Reel & Y Branch

Project Reference Number

NIA_SGN0027

Project Licensee(s)

SGN

Project Start

November 2013

Project Duration

2 years and 3 months

Nominated Project Contact(s)

Sam Wilson, Innovation & New Technology Project Manager and David McLeod – Innovation Delivery Manager

Project Budget

£100,480.00

Summary

The scope of this project is to bring to the industry a new and improved piece of equipment to be used in conjunction with current mains camera equipment to detect and remove the water inside of the low pressure network.

The project will:

- Design and develop proof of concept
- Develop 2 prototype working models
- Conduct a field trial for product verification
- Product training for selected field staff.

The registered project duration and costs have been amended due to the following reason:

A significant redesign was necessitated after final stages of offsite testing highlighted an issue that could not have been determined prior to this stage. Specifically, it was found that there was a requirement to 'walk' the water extraction hose and camera (both of which are inserted through the Y Branch) into the pipe. Due to the orientation of the two components (camera and hose) in the original design this was not possible. A full redesign was then required to enable the hose and camera to be inserted in parallel to allow the 'walking' action to be carried out. Which has resulted in the additional costs and time delays.

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

The safety of our assets and ensuring they operate to their full potential is of paramount importance. A not uncommon problem on our networks is water ingress. Water ingress is most commonly caused by water entering the gas mains through small pockets of corrosion on metallic mains or due to third party damage. Water ingress can lead to a loss of system pressure and a loss of supply to customers, both of which can have cost and safety implications.

Currently there are a number of basic techniques used to find water build up points inside the main. A common approach to identifying the location of the water is to carry out pressure surveys on the area of the network where the pressure problem has been identified, this helps narrow down the possible location of the water. The water in the main always travels to the lowest point, therefore in order to extract the water, the low point must be found and excavated around and below in order to fit a siphon point to drain the water.

However, unless there is a visible change in ground level, it is very difficult to determine the low point of the main. Therefore, an informed estimate has to be made where to dig down. It is very rare that the location is correct first time and most often a camera is inserted into the main at this location and pushed along the pipe until the location of the water (ie the low point) is established and then a second excavation is made to fit the siphon. The problem with this method is that it is time consuming and costly.

This project aims to design a prototype piece of equipment that will combine a camera and a water extraction device, therefore negating the need for more than one excavation and thus providing a quicker and safer method for dealing with water ingress incidents with considerable financial and environmental benefits.

Method(s)

This project will focus on the design and development of an original prototype developed by SGN to aid the removal of water in conjunction with our current camera systems to remotely across long distances remove water from the network. The solution will be mobile, compact in size, lightweight for manual handling purposes and require minimal maintenance.

The method proposed by this project is, after establishing the rough problem area using pressure surveys, to excavate the gas main and insert the camera through a drill point. The camera will be attached to a water extraction hose which will be feed along the main until the camera identifies the location of the water. The extraction hose will then suck out the water in main.

This project will seek to develop a solution that allows licensees to become more efficient in the way that they detect and remove water ingress. The Project will collaborate with Pipeline Technology Ltd (Pipetech) in order to design and develop the prototype.

Scope

The scope of this project is to bring to the industry a new and improved piece of equipment to be used in conjunction with current mains camera equipment to detect and remove the water inside of the low pressure network. The project will:

- Design and develop proof of concept
- Develop 2 prototype working models
- Conduct a field trial for product verification
- Product training for selected field staff

The registered project duration and costs have been amended due to the following reason:

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Objective(s)

The key objectives of this project are to design and develop a single-line water removal system, to be used in conjunction with the current camera systems, to detect and remove water from the network from one excavation.

To achieve this the key objectives will be:

1. Pipetech to research, develop, and produce working drawings of product
2. Pipetech to produce two working models of product and factory test
3. Training, for the purpose of the field trial, on the use of the new equipment provided by Pipetech
4. SGN to field trial new equipment on suitable sites yet to be identified
5. SGN to present the outcome of the project to the other Licensee’s

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The success criteria for the project is to develop a product which:

- Allows water ingress incidents to be dealt with only 1 excavation
- Can identify the location of the water and extract the water

In order to determine whether this project has been successful or not at various stages it will be reviewed at key milestones set throughout the project, this will ensure value for money is received by the customer, with the avoidance of unnecessary expenditure. The new product will be trialled on the network in a number of different environments from urban to rural settings. Following field trials a review and product evaluation will be carried out to determine whether this equipment is suitable and successful in aiding the detection and removal of water from the network.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The project involves testing and designing a prototype in a laboratory followed by three field trials on sites yet to be identified. There would be less potential for learning if the scale of the project was any smaller than this. Similarly there would be no merit in having a larger scale project.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

This equipment will be trialed in each of SGN's networks across Scotland, South and South East across a variety of depots with varying geographical operating areas. The purpose of the trials being carried out in a number of depots is to ensure that the equipment is used extensively in varying environments to ensure the integrity of the findings.

Revenue Allowed for the RIIO Settlement

SGN's RIIO Allowance for Repair activities is £209.6m; some of this allowance includes monies for dealing with water ingress incidents. It is likely that a proportion of this expenditure can be saved from the introduction of the water extraction equipment to be used in conjunction with the existing cameras.

Indicative Total NIA Project Expenditure

This project expects to fund 90% of the project costs from SGN's Network Innovation Allowance (NIA), therefore the total recoverable allowance is £90,432

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 anticipated savings of this initiative will not be known until completion of the field trial wherein both the technical and commercial benefits will be clarified. SGN's RIIO Allowance for Repair activities, which this device will aid, is £209.6m.

Please provide a calculation of the expected benefits the Solution

Internal investigations have shown that, in one of our Operational depots (Glasgow), there were approximately 270 water ingress related jobs recorded during 2010/11, with an approximate interruption delay of 2 days per customer. For every day a single domestic customer is without gas after an initial 24 hour period, it costs the relevant Licensee £30. Therefore, on average each customer was entitled to £30 compensation for each of these jobs we failed to supply gas too, which potentially equated to £8,000 for the Glasgow depot alone. Due to water ingress in to the mains network often affecting a group of properties rather than one individual property, the majority of these instances occurred at the same time on the same stretch of main.

This accumulated with the one necessary excavation (average cost £1000) required for each of these jobs generates an estimated total cost for the Glasgow depot of approximately £288k. Using these figures it is anticipated that the amount of time a customer is 'off gas' for can be reduced and the size and quantity of excavations can also be reduced by 5%.

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

The trials to be carried out will provide a sound basis for the replication of this equipment. Due to the fact that we will be trialing these techniques in Scotland, South and South East, across all of SGN's operational depots it allows us to cover a whole variety of operational scenarios. Therefore, the majority of methods will have been evaluated, making the results more valuable to the other Network Licensees.

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

Excluding the cost of purchasing the equipment, it is anticipated that the cost of disseminating the development outcomes and findings from the project and training costs incurred before the product can be used would be approximately £10,000 for SGN. Using the 4:2:1:1 split with reference to the size of the networks, It could be assumed that National Grids training costs would be approximately £40,000, and Wales & West Utilities and Northern Gas Networks would be £5,000 each. Therefore, the estimated total cost of training before the equipment can be used operationally would be £60,000.

This figure includes three training courses for 12 people for each Network Licensee in three separate locations across their network with an allowance for travel included, and approximate costs for one practical demonstration of the equipment by SGN for representatives from each Network. It is anticipated that each Licensee would have their internal training carried after an initial training program from the product manufacture to a selective proportion of their workforce.

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

RIIO-2 Projects

☐ 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 learning from this project will benefit network licensees as it will provide them with a clear evaluation of the new techniques developed to detect and remove unwanted water from the gas network. If successful the learning from the project (new system design and evaluation of trial results) will allow network licenses to make informed decisions on the introduction of this equipment into their operational activities. Where introduced, the learning will enable licensees to begin detecting and removing water simultaneously, and to utilise their current camera systems.

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

n/a

☑ Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

Is the default IPR position being applied?

☑ 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