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

Jan 2019

### Project Reference Number

NIA_SGN0135

## Project Registration

### Project Title

Foam Annular Sealant for Keyhole

### Project Reference Number

NIA_SGN0135

### Project Licensee(s)

SGN

### Project Start

January 2019

### Project Duration

1 year and 1 month

### Nominated Project Contact(s)

Stuart Sherlock, Innovation Project Officer

### Project Budget

£84,560.00

### Summary

Foam sealing is a required process in the gas industry when replacing metallic mains with PE pipe. During the insertion process PE pipe is inserted through the live or dead metallic mains. The annular gap is created between the two pipes through the insertion process which must be closed before the excavation can be reinstated. This requirement is to prevent issues such as soil backfilling into the annular space and to avoid gas leaks from travelling along the annular space.

There are a number of techniques and methods currently in place to close the annular space, however these require several personnel, take a long time to apply, and can expose the operative to harmful chemicals in a confined space and be quite expensive for such a high volume stock item.

This project aims to develop a method for applying foam within the annular space between the inserted PE pipe and metallic main. Once the foam system has been developed prototypes will be manufactured for inhouse testing. Following successful inhouse testing preparation for field trials will be made to trial the system in a live environment.

### Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

### Problem Being Solved

Current methods within the gas industry for replacing metallic mains with PE pipe involves inserting PE pipe through the live or dead metallic mains, resulting in an annular space between the PE pipe and metallic main being created.

When carrying out a service connection the metallic main is opened exposing the PE pipe for connection. Once the service has been connected and before the excavation can be reinstated, the annular space must be closed. This requirement is to prevent issues such as soil backfilling into the annular space and to avoid gas leaks from travelling along the annular space. Current methods are expensive, cumbersome, require several personnel, take a long time to apply, and exposes the operative to harmful chemicals in a confined space.

This process can also be difficult to apply due to confined spaces and other utilities within the excavation. As a result a new low cost, safer and quicker alternative that can be applied outside of the excavation is required.

## Method(s)

This project aims to develop a method for applying foam within the annular space between the inserted PE pipe and metallic main. Once the foam system has been developed prototypes will be manufactured for inhouse testing. Following successful inhouse testing preparation for field trials will be made to trial the system in a live environment.

After all trials have been completed a final project report will be created. The project will involve working along with Steve Vick International (SVI) for the development and technical evaluation of the equipment.

## Scope

The aim of this project is to develop a foam technology to seal the annular space between the PE and metallic mains. The developed technique will be capable of being applied from outside the excavation using long handled tooling, with the option to apply from inside the excavation by the operative.

This will involve carrying out inhouse testing and field trials to demonstrate the suitability of the developed foam technology.

## Objective(s)

The objectives of this project are to:

- Develop annular sealant product approved against existing sealant standards GIS/LC14:2009.
- Inhouse testing of annular sealant product and delivery method to prove against existing sealant standards GIS/LC14:2009.
- Produce report detailing the findings of the concept design and inhouse testing.
- Delivery of detailed work instructions report.
- Complete SGN/PM/G/23 document alongside field trials.
- Carry out field trials as required as part of the SGN/PM/G/23 document to prove field readiness.
- Produce report detailing the findings of the field trial.
- Delivery of final project report.

## Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

## Success Criteria

The following success criteria for the project include the completion of:

- Development of a complete foam system capable of fully sealing the annular space.
- Successfully complete inhouse laboratory testing and compile results against existing sealant standards GIS/LC14:2009.
- Detailed report outlining the product concept development and inhouse testing, including all evidence of compliance with GIS/LC14:2009.
- Develop a user manual and training instructions.
- Successfully compile SGN/PM/G/23 report including feedback.
- Completion of field trials as required by SGN/PM/G/23 documentation including feedback report from both material and tooling use. Modify, as required, any tooling highlighted by field trial feedback to meet required standards.
- Detailed report outlining the field trial data, foam system performance and tooling feedback.
- Completion of final project report outlining points above.

## Project Partners and External Funding

Steve Vick International (SVI)

## Potential for New Learning

The project aims to develop a new solution for sealing the annular gap using a safe and easy to apply foam sealant system and delivery tooling without the need for the operative to enter the excavation. The project is expected to deliver the following new learning for Network Licensees:

- Provide all the GDNs with an understanding of the new foam sealant system.
- Awareness of a method and product for sealing the annular space.
- Understanding of the costs and benefits of the method and product.
- Whether the methodology has the potential to be applied to existing practices and techniques.

## Scale of Project

The project involves carrying out inhouse laboratory testing to develop the foam sealant technology. This will be followed by live field trials to demonstrate the technique and gain feedback from the operatives.

## Technology Readiness at Start

TRL4 Bench Scale Research

## Technology Readiness at End

TRL8 Active Commissioning

## Geographical Area

The inhouse testing will be carried out at SVI head office in Bradford on Avon, Wiltshire. Live trials will be carried out at SGN sites.

## Revenue Allowed for the RIIO Settlement

If the project is successful, the developed solution has the potential to reduce the Mains Replacement expenditure. This cost would be down to reduction in material costs, labour time and excavation sizes. This project represents an opportunity to assist with this policy and to potentially out perform in respect to this allowance.

## Indicative Total NIA Project Expenditure

The total project expenditure is £84,560 , 90% (£76,104) of which will be recovered via the NIA funding mechanism in line with the funding conditions.

# 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)

It is expected that if successful this project could provide Network Licensees with an opportunity to make savings during service connections operations, therefore providing net financial benefits to customers.

## Please provide a calculation of the expected benefits the Solution

The estimated cost saving between the new and existing systems is approximately 45% reduction in unit costs. Based on units purchased last year within SGN (Scotland and south) equates to a potential saving of £264,000.

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

Given that service connections are carried across the UK, this project is applicable to all Gas Networks.

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

Cost for full testing and demonstration would be determined upon completion of the project.

## 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

This project applies to all Network Licensees as service connection are carried out across the UK. This is an ongoing issue that needs to be addressed.

The outputs will be presented in a clearly defined report that will be available to the Gas Networks on request, this will allow the GDN's to make informed choices as to whether to invest in this technology.

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

Within the innovation strategy key 'Innovation Themes', this project primarily addresses Distribution Mains Replacement' as well as 'Reliability' and 'Maintenance'.

☑ 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.

A review has been made of all other Network Licensees and no other similar projects have been carried out.

### 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

Methods already exist within the Gas Industry to close the annular seal, however, these methods are costly, time consuming and expose the operative to harmful chemicals. This project looks to address these issues by developing a new concept. This method also looks to address keyhole operations where the equipment will be capable of being operated using long handled tooling outside of the excavation, as well as by the operator from inside the excavation.

### 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

This project involves developing a new method to close the annular space which requires field trials.

## 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

A review of all other Network Licensees Innovation Funding Incentive Annual Reports and NIA portfolios has been performed and no similar projects have been identified.

## This project has been approved by a senior member of staff

☑ Yes