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

Feb 2014

### Project Reference Number

NIA_SGN0018

## Project Registration

### Project Title

Microstop

### Project Reference Number

NIA_SGN0018

### Project Licensee(s)

SGN

### Project Start

September 2013

### Project Duration

3 years and 10 months

### Nominated Project Contact(s)

Alex Stewart, Innovation Project Manager

### Project Budget

£370,000.00

### Summary

The scope of this project is to assess the suitability of the Microstop system to support partial replacement of network risers where pipework is found to be in satisfactory condition, further to risk assessment. This includes technical appraisal as well as field trialling of the appropriate equipment.

During the initial review of the Microstop system, it was determined that further tests in addition to those originally specified were needed to satisfy the technical and safety requirements as the manufacturer was unable to provide sufficient evidence of the product's suitability. SGN therefore asked the project supplier MACAW to provide a series of tests to support the approval process and prove the equipment was fit for field trial. The additional tests include:

- An application test, to demonstrate the product satisfies the required functional performance and to allow a first-hand assessment of how the process works for their application. Further qualification tests may be defined as a result.
- A test to assess if the saddle could leak due to over tightening of the bolts. Considering the design, it is expected to be unlikely that the saddle could be deformed sufficiently to cause a leak by over tightening the bolts.
- Tests to demonstrate the force required to twist the mechanical saddle around the pipe. Torsional loads may occur during installation (i.e. from the weight of connections) or through third party interference. The proposed gasket to be used with the Microstop system is applied to 180 degrees of the pipe surface, therefore must be tested for adequate performance in the event of torsional movement.

Initially 2 years were allowed to assess the suitability of the Microstop system to support partial replacement of network risers where pipe work is found to be in satisfactory condition. However, further tests were required to satisfy the technical and safety requirements, as well as provide evidence for the field trial approval process. A suite of tests were then devised and carried out. This resulted in the previous scope of the project being changed. The original end date (September 2015) was extended by a year, with an additional cost of £72,800 being added to the project budget.

Unfortunately, there has been further testing issues in the last year with regards to the clamp fitting and the gasket system. Leakage paths were identified on various seals which required design modifications and retesting to enable the pressure testing to be successfully completed. These changes have inevitably resulted in a further delay to the project while the supplier identified satisfactory alternatives and the new samples were manufactured.

As a result, we are requesting that the project duration is extended by a further 9 months (until June 2017). There is no additional cost involved in the most recent project change.

The changes are beneficial as the additional testing programme will determine whether the system meets the necessary standard to be used on the GB Gas Network and allow completion of the objectives and success criteria as planned with no change to the expected benefits.

## Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

## Problem Being Solved

SGN have around 188,000 network risers within multi-occupancy buildings across our Scotland and Southern licence areas. These can range from 3 storey tenement-style properties, built in the 17th century to 40+ storey high rise properties built in the 1960's. The age of the buildings and their associated gas supplies vary significantly and standards for construction have seen significant change.

These risers are commonly found to be installed internally within high rise properties and it is not unusual for a building to contain more than one riser. Failure on these installations is usually recognised by our customers in the event of an emergency where a smell of gas has been detected, in the course of undertaking mains replacement work, or as a result of our proactive policy survey programme.

The root cause of failure can take different forms, be it from corrosion, fatigue and stress from thermal expansion, electrical fault conditions, fire or vandalism. The impact of failure varies significantly based on a number of factors, such as where on the riser failure occurs, where the riser is within the building, what the building layout is in terms of access and egress, the likelihood that escaping gas will result in a public reported escape, the occupancy level of the building, the vulnerability of the occupants and other social and environmental factors.

In any of these cases, all of the pipes supplying the property will be subjected to a risk assessment and in certain circumstances this may result in the need to disconnect supplies on the grounds of safety. Where it is possible to undertake a permanent repair, this will be carried out. A disconnection usually leads to an extended period of time before the gas supplies can be restored or alternative permanent arrangements made. From a customer service perspective, disconnection of gas supplies gives rise to a high degree of inconvenience and disruption, albeit unavoidable on the grounds of safety.

SGN has recently carried out a detailed review of network riser management, including the development of a risk model and associated management procedures to avoid unnecessary replacement of risers which causes significant disruption to our customers. A key output from this review is that network risers need not be replaced in their entirety, rather can be partially replaced as a suitable means of risk management.

This project will aim to investigate the suitability of a new system to allow a network riser to be partially replaced whilst maintaining the supply to the end users, an option which currently isn't available.

## Method(s)

Microstop is a new innovative technique for flow stopping (diverting the flow gas around a section of pipework requiring maintenance or replacement whilst maintaining the flow downstream) on a network riser. The system has been developed by an Italian company, called Ravetti, who supply Pipetech Pipeline Technology Limited. To assess the suitability of the Microstop system, the project will be carried out in two stages:

Stage One involves an Independent review of relevant specifications and manufacturer information by MACAW Engineering who will produce a proposal for an appropriate test programme to investigate the performance of the Microstop equipment.

Stage Two will be undertaken by SGN operatives with continual support throughout the field trials from Pipetech Pipeline Technology, who will also be supplying the Microstop units to the field trial locations. In addition, Pipetech Pipeline Technology will work alongside SGN to deliver a satisfactory training package following successful completion of the works.

A detailed cost benefit analysis from the field trial and production of the technical report will be completed for presentation to other Network Licensees.

## Scope

The scope of this project is to assess the suitability of the Microstop system to support partial replacement of network risers where

pipework is found to be in satisfactory condition, further to risk assessment. This includes technical appraisal as well as field trialling of the appropriate equipment.

During the initial review of the Microstop system, it was determined that further tests in addition to those originally specified were needed to satisfy the technical and safety requirements as the manufacturer was unable to provide sufficient evidence of the product's suitability. SGN therefore asked the project supplier MACAW to provide a series of tests to support the approval process and prove the equipment was fit for field trial. The additional tests include:

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Unfortunately, there has been further testing issues in the last year with regards to the clamp fitting and the gasket system. Leakage paths were identified on various seals which required design modifications and retesting to enable the pressure testing to be successfully completed. These changes have inevitably resulted in a further delay to the project while the supplier identified satisfactory alternatives and the new samples were manufactured.

As a result, we are requesting that the project duration is extended by a further 9 months (until June 2017). There is no additional cost involved in the most recent project change.

The changes are beneficial as the additional testing programme will determine whether the system meets the necessary standard to be used on the GB Gas Network and allow completion of the objectives and success criteria as planned with no change to the expected benefits.

## Objective(s)

The aim of this project is to assess the suitability of the Microstop system to support partial replacement of network risers where pipe work is found to be in satisfactory condition.

The objectives of the project are to:

1. Review relevant specifications and manufacturer information to determine risk and suitability for use across GB.
2. Assess the practicality and feasibility of deployment on network risers.
3. Assess the product's potential to improve speed of operation and reduce customer interruption.
4. Assess the product's potential to resolve aesthetic issues associated with other live transfer techniques.
5. Assess the product's potential to reduce the amount of materials required to carry out riser replacement.

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

n/a

## Success Criteria

The success criteria for this project are to:

- A review of the manufacturer's specification, and their suitability to the GB gas industry.
- Completion of extensive field trials to test the equipment in a variety of different scenarios.
- A report containing the findings of the field trial.
- Improve speed of operation and reduction in customer interruption.

- Resolve aesthetic issues with other live transfer techniques.
- Maintain gas supplies whilst replacing below ground riser section.
- Reduce the amount of materials required to carry out riser replacement

If successful, Microstop will support partial replacement of network risers where pipework is found to be in satisfactory condition, further to risk assessment.

## Project Partners and External Funding

None

## Potential for New Learning

SGN want to provide a suitable alternative to costly and inconvenient riser replacement works. This project is expected to provide Network Licensees with a practical evaluation of the Microstop technology. The evaluation will generate learning on the performance, costs and benefits of the technology including its potential to reduce the time customers' supplies are interrupted and the cost of riser replacement works by allowing the reconnection of existing risers without interruption.

After the trials have been carried out SGN will be in a better position to highlight the advantages of utilising this technology as opposed to the current working practice for riser works.

## Scale of Project

This project has been designed to assess the suitability of the Microstop system to support partial replacement of network risers where pipework is found to be in satisfactory condition, further to risk assessment.

## Technology Readiness at Start

TRL7 Inactive Commissioning

## Technology Readiness at End

TRL8 Active Commissioning

## Geographical Area

The technical assessment of the Microstop equipment for use on SGN assets will be carried out at MACAW Engineering's offices in Newcastle Upon Tyne.

The field trials associated with this project will be undertaken in three of SGN's regional locations; Scotland, South and South East of England. The purpose of the trials being carried out in a number of regional locations 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 network riser replacement strategy for the RIIO-GD1 price control is estimated to cost approximately £108m subject to risk managed output. While no savings on this are allowed for during project implementation, it is expected that if successful this project could provide Network Licensees with an opportunity to make cost savings on riser replacement during RIIO-GD1.

## Indicative Total NIA Project Expenditure

The total project expenditure is £370,000

# 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)

SGN have an estimated 188,000 network risers within multi-occupancy buildings in our Scotland and Southern networks. There is a high inherent risk of major incident with this asset group. The majority of network risers are constructed of materials and fittings that are subject to deterioration and ultimately failure. SGN's network riser replacement strategy for the RIIO price control is estimated to be approximately £108m subject to risk managed output.

The number of riser estimated to be replaced in 2013/14 is estimated to be 500. From that a large portion are high rise renewals (greater than 4 storey and require welded steel pipework), which equates to an average cost of £20,000. If successful, Microstop will support partial replacement of network risers where pipework is found to be in satisfactory condition, further to risk assessment.

We estimate this solution could be applied to approximately 40% of the proposed riser replacements per annum and therefore provide net financial benefits to customers, as a result of the improvements made to the existing methods used to replace the riser and lateral pipework.

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

The cost for riser replacement varies depending on size, location, and the number of customers. The estimated cost to renew a riser fully for an average high rise property (greater than 4 storey and requiring welded steel pipework) is around £20,000. The savings are based on the reduction in time it takes to renew, which directly impacts on the reduction in interruption payments, cost of labour and materials.

It is assumed that the introduction of the Microstop technology would generate savings of approximately 25% as opposed to original techniques, as Network Licensees would avoid the need for customer disruption and also the requirement for scaffolding.

Therefore; £20,000 – £15,000 = £5,000 saving per high rise property renewal

Using the 500 riser renewals estimated in 2013/14 as a baseline, and the estimate that approximately 40% of renewals could apply the Microstop technology, this would equate to an estimated annual net financial benefit of £1,000,000 per annum on SGN's networks.

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

Based on SGN estimates, the total number of risers to be replaced in 2013/14 is 500, of that it is proposed that approximately 200

could be avoided due to the introduction of Microstop. Based on a 4:2:1:1 split with reference to the size of the networks, It could be assumed that National Grid may have approximately 400 similar high rise properties requiring renewal and Wales & West Utilities and Northern Gas Networks have around 200 each. Therefore, the estimated total number of high rise properties that could be renewed using this new solution on a per annum basis throughout GB is around 800. Therefore, it is estimated that the potential savings across GB are around £4,000,000 per annum.

While this estimate provides an indication of potential riser replacement, it is important to note it is necessarily based on a number of unqualified assumptions and therefore subject to a large sensitivity margin

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

There are no costs associated with sharing the conclusion and recommendations of this project as SGN will continue to share project progress throughout the duration of the project with the other Network Licensees, which will be the first step towards roll out across GB.

Upon successful completion, Network Licensees will make a decision on whether to implement the new Microstop solution throughout their organizations. Excluding the cost of purchasing the equipment, it is anticipated that the only foreseeable costs will revolve around the training costs for operatives. At present it is unclear as to how many operatives will be trained and whether Licensees would have their internal training departments carry out further training once the initial training program from Pipetech Pipeline Technology has been carried. As this project advances the Method's TRL and quantifies its costs and benefits, these uncertainties will be reduced and enable further assessment of the costs of rolling out the method to be undertaken. This will also depend on the final equipment price.

### 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 current techniques against the new Microstop system solution to support partial replacement of network risers where pipework is found to be in satisfactory condition, further to risk assessment. If successful the learning from the project will allow network licenses to make informed decisions on whether to carry out full or partial replacement of network risers.

Licensees will be able to use these outputs to determine whether Microstop technology provides benefits that outweigh the costs and disadvantages of current methods of replacing network risers.

### 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.

A review of all other Network Licensees' IFI Annual Reports has been performed and no similar projects have been identified. A similar review of current academic literature and journals has also been performed to avoid any potential overlap with the current project.

The supplier has provided clarity that no unnecessary duplication of this project is currently being undertaken in GB.

### 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