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

Nov 2014

Project Reference Number

NIA_SGN0061

Project Registration

Project Title

40mm Serviflex

Project Reference Number

NIA_SGN0061

Project Licensee(s)

SGN

Project Start

November 2014

Project Duration

1 year and 4 months

Nominated Project Contact(s)

Stephen Tomlinson, Innovation Project Manager

Project Budget

£30,254.00

Summary

A prototype system has been developed by Radius Systems Ltd for the renewal of 2" nominal diameter house entry pipework installations. Usually servicing multi-occupancy dwelling houses, these pipes are often built into the structure of the building and are difficult to access. A system based on Serviflex technology has been developed that allows insertion solutions to be used to renew the pipe from the supply main to a point in the building that is more easily accessible. This avoids the need to construct new steel pipe installations which are costly, difficult to route and aesthetically unattractive.

The technology has been developed to a prototype stage where fitness for purpose evaluation of the pipe and fittings solutions has been performed giving confidence in the suitability for long term installation in a gas network. As part of the initial assessment of the technology, three installations were conducted at the proof of concept stage to confirm the basic insertion principles using specialist operatives supplied by the manufacturers.

A wider scale trial is now required to assess the suitability for use of the technique on a routine basis by GDN's. It is proposed that SGN will perform this wider network trial. The outputs of the trial will inform the network of the suitability of the technique, the probable model for operational use and a decision on whether to introduce the use of the system.

Summary of Work Required

In broad terms, the following is an itemised list of the key work streams in the deliverable:

1) Review of the outputs from the proof of concept stage (product approval, early trial experience)

2) Development of a method statement compatible with current Engineering Policy within the network

3) Development of a draft technical standard for Serviflex pipe technology that provides also for a third party peer review of the technique

4) The provision of installation toolkits to be distributed within SGN, a training package for their use and a training day to verify competency

The provision of an agreed number of installation consumable packages at each of the three network locations for field trial use. The project plan allowed 5 months for the field trial stage, ending in July. As only 30% of the required number of field trials have been undertaken, due to lack of suitable opportunities at appropriate sites, an extension to the project is required. The change is beneficial as it will enable the field trials to be completed and provide time for the proper assessment of the equipment which will benefit the accuracy of the project outcome and implementation recommendations. The project costs, objectives and success criteria remain unchanged.

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

SGN have approximately 188,000 Network Risers within multiple occupancy buildings throughout its Scotland and Southern networks. There is an inherent risk of incident with this asset group. The majority of Network Risers are constructed of materials and fittings that are subject to deterioration and ultimately failure. The route cause of failure takes different forms; such as corrosion, fatigue and stress from thermal expansion, electrical fault conditions, and fire or vandalism. The impact of failure varies significantly based on a number of factors, such as where on the riser the failure occurs where the riser is within the building, what the building layout is in terms of access and egress, what the likelihood that escaping gas will result in a PRE (public reported escape), the occupancy level of the building, the vulnerability of the occupants and other social and environmental factors.

SGN has carried out a detailed review of Network Riser management, including the development of a risk model and associated management procedures both for risk assessment and replacement. A key output from this review was that Network Risers can be partially replaced with a suitable means of risk management. This methodology formed the basis for SGN's Network Riser replacement strategy for the RIIO-GD1 price control.

A common factor that results in risers being deemed unsuitable and subject to a full replacement is the deterioration of the below ground approach mains sections of risers, which are commonly found to be constructed from 2" Steel. The adoption of using 40mm Serviflex to renew these 2" sections will allow SGN to carry out more partial repairs on risers, especially when used in conjunction with a piece of equipment called Microstop (currently being investigated by SGN under NIA ref: NIA_SGN0018) which provides the ability to temporarily isolate and permanently replace sections of Networks Risers subject to risk assessment. Resulting in time and cost savings being achieved for both the consumer and SGN.

Method(s)

In order to address this project, the work has been divided in to four stages. These stages will inform the final report which will detail the project progress and outputs and provide recommendations towards any outcomes. The stages of the project are below:

1. **Production of Training Package and Delivery of Training**

- Production of training package.
- Manufacture of suitable training rig.
- Delivery of training to SGN as required.

2. **Manufacture of Tooling and Consumables and Delivery to SGN**

- Manufacture of suitable consumables and toolkits for field trials.
- Delivery of toolkits and consumables to each SGN Network.

3. **Production of Draft Standard and Method Statement**

- Completed review of relevant standards and specifications including gap analysis.
- 3rd party reviewed written standard for Serviflex use.
- Production of method statement in SGN format.

4. **Field Trial Support and Documentation**

- Design of observation reporting requirements for field trials.
- Observe field trials and report against agreed requirements.

Scope

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Objective(s)

The objective of this project is to prove the suitability of using 40m Serviflex pipe to renew 2" steel on the GB gas network. The main application that this will provide benefit to is the replacement of the below ground approach mains for Network Risers. The use of 40mm Serviflex in these riser repair applications will allow the partial repair and refurbishment of existing risers as opposed to the full replacement of them, resulting in time and cost saving to both SGN and the consumer. It will also allow for these activities to be carried out with less disruption (excavations, lifting floor boards etc) both within and outwith consumers premises.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The following success criteria apply to this project:

- SGN review and approval of 40mm Serviflex concept history.
- Completed review of relevant standards and specifications including gap analysis.

- Development of SGN approved method statement.
- SGN Approval of third party reviewed technical standard for Serviflex pipe technology.
- Delivery of 40mm Serviflex kits, training packages and training.
- Completed field trials with support documentation.
- Full project reporting.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

This is a small scale project that will assess the suitability of using 40mm Serviflex on the GB Network via a small number of field trials. It is anticipated that SGN will carry out approximately 10 live trials to determine this. It would not be feasible to locate more than this number of trial sites within the project timescales and carrying out fewer trials would not gather sufficient evidence to support the use of this equipment.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

This project will be carried out on live sites on SGN's Scotland, South and South East Networks.

Revenue Allowed for the RIIO Settlement

During RIIO-GD1 SGN has a Repex allowance for risers of approximately £108m. This is based on the risk model that recommends that risers are partially replaced and not fully renewed. 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 £30,254, 90% of which is allowable NIA expenditure (£27,228)

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 estimated potential saving that could be achieved if this technology is utilised is based on the ability to partially renew a riser as opposed to the full cut off and replacement of these assets. It is estimated that the approximate cost of carrying out a partial renewal is between £430 and £890 and that the cost of carrying out a cut off and full replacement is approximately £7,500. Therefore the potential saving that this technology is utilised on is estimated to be between £7,070 and £6,610 per activity.

Please provide a calculation of the expected benefits the Solution

SGN have an estimated 188,000 Network Risers within multi-occupancy buildings in its Scotland and Southern networks. On average SGN currently carry out 380 Network Riser repairs and 580 full replacements per year and these figures are expected to increase throughout RIIO-GD1 as more of this asset group reaches the end of its useful life. The approximate cost of carrying out a repair is between £430 and £890. The cost of carrying out a Network Riser full replacement is approximately £7,500.

If it is assumed that 40mm Serviflex will allow SGN to carry out 15% fewer full replacements and therefore increase Network Riser repairs by 15% then the approximate annual benefit to SGN, based on current workloads and the lowest repair cost estimate, is detailed in the below table.

	Full Replacement No	Repair No	Full replacement Cost	Repair Cost	Total
Base	580	380	£4,350,000	£163,400	£4,513,400
Method	493	467	£3,697,500	£200,810	£3,898,310
Difference	-87	+87	-£652,500	+£37,410	-£615,090

If it is assumed that the potential benefit across GB can be calculated using a 4:2:1:1 split amongst the GB GDN's then the potential saving across GB could be approximately £2.46m per annum.

In addition to enabling savings in the refurbishment of Network Risers, this product also has potential in other areas where 2" steel pipe is located, such as back rail renewals and below ground 2" main and service applications.

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

The potential outcomes of this project are replicable across GB. Using the 4:2:1:1 ratio and SGN's current numbers of Network Risers (188,000) it can be assumed that there are 752,000 Network Risers across GB where this innovative technology could potentially be utilised.

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 Grid's training costs would be approximately £20,000, 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 £40,000.

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

All Network Licensees will be able to use the learning from this project as the outputs will be presented in a clearly defined report that will be available to them 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)

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