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_SGN0030

Project Registration

Project Title

Self-Amalgamating Tape (Stage 2)

Project Reference Number

NIA_SGN0030

Project Licensee(s)

SGN

Project Start

October 2013

Project Duration

1 year and 2 months

Nominated Project Contact(s)

Alex Stewart, Innovation Project Manager

Project Budget

£27,990.00

Summary

In 2012/13 SGN funded a project through their Innovation Funding Incentive (IFI) mechanism to carry out a technical assessment of self amalgamating tape as a potential repair technique for leaks on screwed joint from network risers and lateral pipework. This report offered SGN with a number of valuable conclusions, but ultimately indicated that self amalgamating tape could provide an appropriate repair solution for gas leaks on threaded risers and laterals.

As a result, a decision has been made to continue to work alongside MACAW Engineering Limited to carry out a project that will introduce the following:

- Demonstrate the suitability of self-amalgamating tape for in-service repair applications
- Refine the application method statement (if required) to overcome any in field issues
- Provide an in-service track record of the longer term performance of repairs
- Define and justify suitable inspection intervals based on field trial performance.

In addition, this project will involve accelerated aging tests to define the repair design life as an interim or permanent repair and also develop a standard to qualify self amalgamating tape repairs to be suitable for use as a permanent repair and also perform qualification tests.

Throughout GD1 there will be greater focus towards riser replacement and this project will seek to develop a solution that allows licensees to maximize their opportunities and eliminate the costs associated with repairing riser and lateral pipework in the future and reducing the disruption to our customers.

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

Scotia Gas Networks (SGN) has an estimated 188,000 network risers within multi-occupancy buildings across our Scotland and Southern license areas. 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. The route 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 it has failed, 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 public reported escape, the occupancy level of the building, the vulnerability of the occupants and other social and environmental factors.

Approximately 572 riser supplies were cut off and replaced in 2011/12. SGN's network riser replacement strategy for the RIIO price control is estimated to be approximately £108m subject to risk managed output. It therefore presents an excellent outperformance opportunity with regards to the total Repex allowance.

In order to avoid the high cost associated with traditional riser replacement, the aim of this project is to evaluate a solution to repairing screwed joints, up to 2" diameter only, on network risers and lateral pipework.

Method(s)

This project allows the field trial and performance evaluation of self amalgamating tape as a repair activity for screwed joints up to 2" diameter on riser and lateral pipework to be undertaken, which will ensure a safe and reliable gas supply to our customers and limit the need to replace network risers and lateral pipework in RIIOGD1.

Scope

In 2012/13 SGN funded a project through their Innovation Funding Incentive (IFI) mechanism to carry out a technical assessment of self amalgamating tape as a potential repair technique for leaks on screwed joint from network risers and lateral pipework. This report offered SGN with a number of valuable conclusions, but ultimately indicated that self amalgamating tape could provide an appropriate repair solution for gas leaks on threaded risers and laterals.

As a result, a decision has been made to continue to work alongside MACAW Engineering Limited to carry out a project that will introduce the following:

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Objective(s)

The objectives of this project are to:

- To validate the tape as a robust repair solution.
- Establish cost benefit and efficiency improvements in terms of reduced time for repairs and reduced disruption for customers.
- Training material provided in support of field trials.
- SGN to carry out field trials to comprehensively review the new repair technique and provide a technical report for the other Licensees to disseminate the outcomes of the field trial.
- Provide installation method statement and record template in order to document every individual repair.
- Detailed costs benefit analysis from the field trials.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The success criteria for this project are to trial and test the method against the traditional methods currently used to compare its performance in terms of:

- Demonstrate onsite suitability as a temporary repair technique.
- Provide an in service track record which can be used as justification or otherwise to increase inspection intervals and classify self amalgamating tape as an interim repair.
- Demonstrate repair longevity or otherwise.
- Capture a case study on the avoidance of replacement in terms of environmental and customer benefits.
- Increase in productivity.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

In order to ensure that learning associated with this project is maximised and that the future application of this technology is well understood, it is necessary to trial a good sample of risers across a number of site locations , both in Scotland and Southern to ensure a sufficient range of scenarios are covered. However, a decision has be made to limit this project specifically to screwed joints up to 2" diameter on network risers as SGN did not
want to commit to funding a larger scale project until the feasibility was established.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

This project will be trialed in a number of depot locations in each of SGN's regional networks; Scotland, South and South East England. As mentioned above, the purpose of the trials being carried out in a number of depots is to ensure that the new technology is used extensively in varying environments to ensure the integrity of the findings.

Revenue Allowed for the RIIO Settlement

The approximate RIIO-GD1 Allowance for Repex operation throughout SGN is £1,804.1m. SGN's network riser replacement strategy for the RIIO price control is estimated to be approximately £108m subject to risk managed output. It therefore presents an excellent outperformance opportunity with regards to the total Repex allowance highlighted.

Indicative Total NIA Project Expenditure

The total project expenditure is £25,190, 90% of which is allowable NIA expenditure (£22,671).

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 approximate RIIO-GD1 Allowance for Repex operations throughout SGN is £1,804.1m. 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 at an average cost of £3,000 per riser (based on average costs for tenement renewals in Scotland). It is expected
that if successful this solution could be applied to approximately 50% of the proposed riser replacement figures per annum and therefore provide net financial benefits to customers, as a result of the improvements made to the existing methods used to repair the riser and lateral pipework. The estimated saving of a riser replacement for SGN where the new self amalgamating tape solution could be applied is £1,300. This takes
into account the avoidance of excavations required to renew the below ground section of the riser.

Please provide a calculation of the expected benefits the Solution

In 2013/14 SGN are anticipating to replace 500 risers and lateral pipework. The total cost of labour and materials to perform this operation in the traditional manner is estimated to be £3,000. Therefore, SGN are expected to spend £1,500,000 this financial year.

The introduction of the new self amalgamating tape solution, is anticipated to reduce the need to carry out riser and lateral pipework replacement on 50% of the population per annum i.e. 250 (based on 2013/14 figures). This would allow our Repex and Repair teams to become more productive and eliminate the need for customer disruption and could potentially result in a savings of around £1,300 per riser, which equates to a total saving of £325,000 across 250 risers.

Therefore; £1,500,000 - £1,175,000 = £325,000 per annum.

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

Based on SGN figures, the total number of risers to be replaced in 2013/14 is 500, of that it is proposed that approximately 250 could be avoided due to the introduction of self amalgamating tape. 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 500 similar risers that could avoid replacement and Wales & West Utilities and Northern Gas Networks have around 125 each. Therefore, the estimated total number of risers and lateral pipework that could avoid replacement on a per annum basis throughout GB is around 1000.

Using these estimated figures, the potential savings if the anticipated savings are found will be around £1,300,000

While this estimate provides an indication of potential avoidance of 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 this 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 the product manufacturer has been carried. Therefore, until this project nears the latter TRL 8 it is difficult to quantify the cost of rolling this method out across GB.

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 self amalgamating tape repair solution. If successful the learning from the project will allow network licenses to make informed decisions on whether they would rather repair riser and lateral pipework, as opposed to replacing it. Where introduced, the learning will enable self amalgamating
tape to be used to repair leaking joints, reducing costs and improving customer experience by reducing disruption and the time which customers are without a gas supply.

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