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

Sep 2015

Project Reference Number

NIA_SGN0083

Project Registration

Project Title

Self-Amalgamating Tape (Stage 3)

Project Reference Number

NIA_SGN0083

Project Licensee(s)

SGN

Project Start

October 2015

Project Duration

3 years and 0 months

Nominated Project Contact(s)

Alex Stewart, Project Manager

Project Budget

£201,578.00

Summary

This Project will involve work alongside MACAW Engineering Limited to carry out a technical assessment to expand the use of SAT. It will look to verify its suitability as an alternative system to conventional repair techniques on below ground escapes. The Project will also focus on the suitability of Sat as a permanent repair when used in both below and above ground environments. The outcomes of the Project will be:

1. Full evaluation of current SGN repair methods including encapsulation, over joint repair clamps and Polyform, and evaluation of suitability for replacement with SAT.
2. Full review and gap analysis of potential SAT performance across the range of repair scenarios.
3. Production of a report detailing the findings of the analysis and recommendations for adoption or additional work to meet required repair specification.
4. Development leading to formal approval of use of SAT for any repairs identified as suitable.
5. Full life testing in Task 2 should clearly identify if the final repair is fit to be deemed permanent or interim under GIS/LC8-1:2006 including environmental testing.

It was recognised that the testing duration would have to be extended to meet the life testing requirements. Further discussion with the test house has indicated that the testing timescales will have to be extended. Therefore, it is necessary to extend the project for 9 months to allow full analysis and evaluation of the material to take place.

This change is beneficial as it will allow a full evaluation of the materials properties in line with the original project scope without any additional project costs.

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

Following completion of the field trial (Phase two) project to assess the performance of SAT (Self Amalgamating Tape NIA_SGN0030), the tape was approved as an interim repair method for above ground repairs on screwed joints on riser pipework.

The repair Method has been rolled out across SGN and prompted several suggestions that it be used for other joint types and in below ground environments. In order to examine the possibility of expanding the uses for SAT it was determined that further work was required. In order to prove the product as a permanent repair and its suitability for use on other joint types, the Project is split into two sections. Section one aims to look at existing repair methods and the suitability of SAT as a potential alternative. Section two will look at full life testing the SAT in order to assess its use as a permanent repair.

Method(s)

The previous field trial project for SAT (Ph2) proved that the repair was satisfactory as an interim repair on above ground, internal steel pipework, screwed joints up to 2" diameter only.

This Project will look at current repair, in particular encapsulation, Polyform and over joint repair clamps, and their viability of replacement with SAT. The Project will also look at the limitations of the tape wrapping repair technique, in particular the requirement to sufficiently tension the tape on application and the use of the SAT as a repair system externally and below ground.

The second part of the Project will look at proving the life of the repair in order to deem the repair as "permanent" and prove a 50 year life expectancy.

Scope

This Project will involve work alongside MACAW Engineering Limited to carry out a technical assessment to expand the use of SAT. It will look to verify its suitability as an alternative system to conventional repair techniques on below ground escapes. The Project will also focus on the suitability of Sat as a permanent repair when used in both below and above ground environments. The outcomes of the Project will be:

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Objective(s)

The objectives of the Project are to produce:

1. Produce detailed report with recommendations suitable to be used to seek approval for formal field trials of any repairs identified as potentially suitable to be replaced with SATR. This report should highlight potential limitations and gap analysis, detailing any additional testing required to meet industry requirements.
2. Production of detailed report and analysis of Life testing confirming recommendation of final repair either permanent or interim depending on outcome of test results.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The success criteria for the Project are to evaluate and test SATR against conventional repair techniques and compare the performance in terms of:

1. Evaluate the suitability of the tape as a replacement for conventional repair methods
2. Assess the limitations of SATR in terms of the pipe diameters and materials

3. Demonstrate the effectiveness of SATR as a permanent replacement for conventional repair on both above and below ground joint types. This will include above ground screwed joints already classed as interim repairs.
4. Evaluate performance versus conventional techniques
5. Produce detailed final report including test results and life expectancy of SAT as a repair in expected environments
6. Disseminate information and project outcomes.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The Project will focus predominantly on Laboratory testing to evaluate the suitability of the material in various circumstances. A small number of field trials will be required to confirm the initial findings from the test data and assess the potential use in the field.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The Project will predominantly be carried out at MACAW Engineer's base in Newcastle, however, a small number of field tests will be required. These field tests will be completed in Scotland, South and Southern East England.

Revenue Allowed for the RIIO Settlement

SGN's RIIO Allowance for Repair activities is £209.6m. Given that the Project is successful and identifies where SAT can be used as an alternative solution it is likely that there could, potentially, be a reduction in the repair expenditure. It is envisaged this would be down to material costs and, potentially, excavation sizes, although this will become clearer as the Project progresses.

Indicative Total NIA Project Expenditure

The total Project expenditure is £201,578, 90% of which is allowable NIA expenditure (£180,951).

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)

Conventional mains and service repairs are designed on a case by case basis with various different materials and techniques being employed to repair leaking gas mains and services. These range from a Denso temporary tape repair which will have to be checked on a regular basis and protected from the elements to very expensive bespoke repairs where the repair system is specifically designed and built for the job in hand.

The conventional mains repairs being considered to be replaced by SATR are:

1. Encapsulation where the joint leaking is contained within a fabric or metallic housing and then the housing is filled with a resin which is then pressurised.
2. Polyform – The joint is prepared and then covered in a resin. The resin may be pressurised by means of polythene wrapping
3. Over joint clamps – A metallic housing with seals is placed around the leaking joint and the seals tightened onto the pipe face.
4. Due to the various different joint types and diameters being considered it is anticipated that, if successful, there would be a reduction in costs based on the material costs required to carry out a successful repair. The process of using SAT as a repair method involves tensioning the tape to apply a force to the leaking joint, it is therefore anticipated there will be a restriction of the maximum pipe diameter this will be effective .
5. On the presumption that the Project proves the repair as effective up to 6" pipe diameter it is anticipated the estimated average costs saving per job would be around £60.

Please provide a calculation of the expected benefits the Solution

On the basis of the presumptions made above and if the Project were to successfully prove these as correct it is anticipated that with SGNs Networks the repair would be used on average 1,500 per year.

On this basis and taking into account the anticipated average savings mentioned above :

1. Annual savings – 1500 repairs x £60 saving per repair = £90,000 per year

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

Taking the figures mentioned above as an estimate on SGN figures and taking account of the potential estimated savings calculated.

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 3000 similar repairs whilst Wales and West Utilities and Nothern Gas Networks have around 750 each. Therefore the estimated

number of joints that could be repaired using the alternative SAT repair technique across GB would be 6000 per year.

On the basis of the anticipated £60 per joint saving this equates to approximately £360,000 of anticipated savings per year.

While this estimate provides an indication of potential savings, it is important to note it is necessariyl 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.

As the number of potential repairs the process could be used for across GB is unknown, it is difficult to determine the exact roll out costs. It is anticipated that the cost of disseminating the learning outcomes and findings from the Project would be approximately £45,000 for SGN (including training costs). Based on the 4:2:1:1 split (applied with reference to the size of each network) it is estimated that the total cost of training before the technique could be used operationally throughout GB would be £180,000. This estimate is based on an assumption of training courses and operatives per Network Licensee, provided by the project partner and is subject to change.

SGN will continue to share Project progress throughout the duration of the Project with the other Network Licensees.

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 could be used to allow Networks additional, more efficient and cost effective, options when choosing which repair techniques to use on both above and below ground assets. The outcome from the previous project proved that SAT was effective as an interim repair on Network Risers within limited diameters and joint types. This Project, if successful, could potentially extend the scope of the low cost SAT repair technique across the repair spectrum of both mains and services. The Project will also attempt to provide evidence of the suitability of the technique as either a permanent, interim or temporary repair in each of the different joint types and environments.

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