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

Jun 2014

Project Reference Number

NIA_SGN0033

Project Registration

Project Title

Long handled PE Top Tee Cutter

Project Reference Number

NIA_SGN0033

Project Licensee(s)

SGN

Project Start

June 2014

Project Duration

2 years and 1 month

Nominated Project Contact(s)

Alex Stewart, Innovation Project Manager

Project Budget

£19,547.00

Summary

The scope of this project is to investigate and develop a tool to provide a safer, more user friendly and efficient method of commissioning a polyethylene top tee without having a detrimental effect on the integrity of the top tee.

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

Annually, Scotia Gas Networks (SGN) re-lays approximately 54,600 services as part of its replacement programme for ageing metallic gas infrastructure and installs approximately 21,000 new services as part of its Connections activities. SGN have identified a potential improvement to the current method of laying a new service to allow for a safer method of working, and a reduction in the cost of relaying a service.

When a new service is laid from a Polyethylene (PE) main, a connection needs to be made by electrofusing a Top Tee on to the parent main. Once the connection has been made and pressure tested, a cutter which forms part of the Top Tee is screwed in to the wall of the gas main to cut out a section and remove a ‘coupon’ of the mains wall to allow gas flow to pass through the service to the end user. This is known in the industry as ‘commissioning the service’ or ‘tapping the main’. To ensure the pressure applied for the cut is uniform and consistent the body of the Top Tee and the cutter are threaded and require a tool to wind the cutter down in to the main. These mains tappings are also required whilst carrying out other works on the gas network, including the fitting of pressure monitoring points, vent points and siphon points.

The current tooling designs available to be used to perform this operation are an allen key, or a short T-bar arrangement with the handle sitting approximately six inches above the top tee on the main meaning the operative commissioning the service must bend down in the excavation and lean over into a confined space to perform a live gas operation. Problems can also be encountered when third party plant or the face of the excavation is located in close proximity to the gas main obstructing the turning of the handle of the T-

bar meaning increased excavation size.

Method(s)

Following an invitation to partner, SGN will work with Pipetech Pipeline Technologies to develop the existing tooling available to provide a safer and more efficient method of commissioning a service. The design solution will be user friendly and supported by an independent assessor to encompass the major PE Top Tee manufacturers to ensure and confirm that no excessive force will be applied to the fittings or pipe during PE Top Tee cutting operations.

This product must meet relevant industry and SGN standards and specifications, so that the design meets GPS, Radius, Kimplas and Fusion Provida's minimum requirements. Also, it must be ensured that the maximum imposed torque and deflection specified by these manufacturers is not exceeded.

Scope

The scope of this project is to investigate and develop a tool to provide a safer, more user friendly and efficient method of commissioning a polyethylene top tee without having a detrimental effect on the integrity of the top tee.

The initial testing carried out looked at extremes in both pipe sizes and cutting angles. Although largely successful, this testing did highlight some issues when cutting larger diameter mains at a cutting angle of 20 degrees where thread damage and potential cross threading where an issue. It was decided that additional testing was required to confirm that this was not an issue on Tier one mains sizes only and look at potential solutions for these issues.

The Project problems, objectives, success criteria and cost arrangements previously outlined in the Project Registration Document remain unchanged.

This change to allow completion of the additional testing is beneficial as it will ensure full assessment of whether the equipment is fit for purpose and there is no change to the Project costs or expected benefits.

Objective(s)

The objectives of the project are to:

- Reduce the cost of relaying a service
- Reduce the amount of excavation and reinstatement required
- Remove the operative from the confined space to reduce the risk from any gas release
- Create a tool that reduces the impact of negotiating third party plant in the working area
- Incorporate in the design a piece of tooling that can be used in conjunction with the new core and vacuum excavation technology

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The successful development of the PE Top tee cutter will be determined by the following targets being met:

- A tool that will improve the position of the operative and reduce the risk of working in a confined space
- Gain independent external approval confirming the new design does not have a detrimental affect on the integrity of the PE Top tee.
- A reduction in the amount of excavation required to relay or connect a service
- A product that can be used in conjunction with the core and vac technology
- A reduction in the quantity of third party damages caused due to the reduction in excavation taking place, and the impact that the third party plant has on the commissioning of a service

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

This is a small scale project focusing on the development of an existing item of tooling used frequently across the gas industry. The project will also involve external testing of the forces applied to the top tee using the new equipment.

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

This project will be trialed in three depot locations, one in each of SGN's regional networks; Scotland, South and South East. The purpose of the trials being carried out in a number of depots is to ensure that the new product is used extensively in varying environments.

Revenue Allowed for the RIIO Settlement

While no revenue has been budgeted for in the RIIO settlement for the specific activity of commissioning PE Top Tees, the implementation of the new tooling has the potential to deliver financial benefits by improving efficiency, reducing the need to work in confined spaces which can reduce LTI's and reducing reinstatement costs.

Indicative Total NIA Project Expenditure

The project budget will be £19,547, 90% of which is recoverable under SGN's Network Innovation Allowance (£17,592)

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)

This project focuses on the development of the existing equipment used to carry out a frequently performed task more safely, easily and more efficiently than the methods currently in use. This tool will provide our workforce with a more comprehensive solution to commission a new tapping on to a PE main. Another advantage is the potential for this tool to be used with less excavation than conventional methods, which allows it the potential to be utilised in keyhole activities and where there is heavy congestion from other utilities in the vicinity of the gas main.

Please provide a calculation of the expected benefits the Solution

In 2013/14, the estimated average cost of a service connection (mains replacement or connections) and its associated activities was £560. Assuming a 20% saving can be made due to the reduced excavation requirement, saving of £112 can potentially be made per activity where this method is utilised.

The anticipated benefits of this initiative will not be known until completion of the field trial wherein both the technical and commercial benefits will be clarified. The cost benefit analysis will compare this technique, if successfully demonstrated against current methods and those in development to determine the actual cost benefit.

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

The number of services where this technology could potentially be utilised in SGN per year is approximately 75,600 per year. 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 151,200 similar services and Wales & West Utilities and Northern Gas Networks have around 37,800 each. Therefore, the estimated total number of services this technology could be applied to on a per annum basis throughout GB is around 302,400. If this method were utilised on only 10% of service connection activities this would still equate to a saving of £3,386,880 per annum across GB.

While this estimate provides an indication of potential applicability, it is important to note it is necessarily based on a number of assumptions. A more accurate measure of what proportion of these numbers would benefit from this long handled top tee cutter over the existing tooling will be known after the field trials have been carried out.

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

Other than the costs associated with purchasing the equipment. The costs of rolling out this equipment across GB are minimal as minimal training is required.

Assuming the rollout and training will cost £2,500 within SGN, and assuming a 4:2:1:1 split across the other GB GDN's, the approximate cost of roll out for GB will be £10,000.

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 is expected to provide all Network Licensees with the following learning:

A safer and more efficient method of commissioning a gas service with a fully approved product that can also reduce the amount of excavation required to commission a service with a reduced level of impact from other third party utilities in close proximity to the gas main.

The learning from this project will benefit Network Licensees as they are all currently using the same original method of cutting a top tee on to the main as SGN. Therefore, further development of this essential tool will provide Network Licensees with safety and financial benefits with minimal introduction costs.

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