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 2018

Project Reference Number

NIA_NGN_228

Project Registration

Project Title

Internal Live Service Insertion (ILSI)

Project Reference Number

NIA_NGN_228

Project Licensee(s)

Northern Gas Networks

Project Start

June 2018

Project Duration

3 years and 10 months

Nominated Project Contact(s)

James O'brien

Project Budget

£191,580.00

Summary

The Internal Live Service Insertion (ILSI) project seeks to extend the completion date of the project following complications during initial field trials.

Currently, service renewals to properties are carried out using several techniques, one of which is the 'Live Service Insertion' (LSI) method. The standard LSI technique requires a small excavation in the customers private land or garden. The relining of the service is carried out from this excavation towards the parent main and back towards the customers property to the existing meter position. Internal LSI has been designed for use from within a customer's property, permanently abandoning the annular space between the existing metallic service and the new PE liner, allowing the undertaking of excavations within the customer's land boundaries to be avoided.

Reason for extending the project

Following the first project extension in September 2019, in which the project was extended on the basis that further field trials were required:

"Field trials were undertaken to assess the newly designed ILSI system against the project success criteria. Field trials are the last phase of the ILSI project and carried out under G23 documentation.

Selected field trial sites were found to be unsuitable. The services selected had a substantial amount of Dupont service pipe connecting the existing service to the parent main. This prevented the passage of the Nosecone system. CCTV inspection revealed that all the remaining field trial sites were of the same design and therefore not suitable for ILSI"

Since then, the project has identified a further issue with identifying trial sites. The identification of suitable network services applicable for use with the ILSI technique is somewhat reliant on local knowledge, making it extremely difficult to identify the necessary volume of field trials and impractical for everyday deployment. The issue subsequently requires addressing, before the technique can be implemented into business as usual.

To resolve the outstanding issue, the project will carry out an additional work activity, identifying all suitable services for the use of the ILSI technique across the network. Once identified, the remaining field trials will be undertaken.

To continue with the project, the project timeline requires extending. There will be no impact to the project cost.

Recommendation
The projects original drivers and anticipated forecasted benefits remain current. Although delays to the original project timeline have occurred, it will not attract any additional Capex costs. However, internal overhead cost will be impacted, but are expected to be minimal.
Continuing with the project is deemed a credible option, therefore It is recommended the project completion date is extended to 30th July 2020.

Third Party Collaborators

Steve Vick International Ltd

Nominated Contact Email Address(es)

innovation@northerngas.co.uk

Problem Being Solved

Currently, service renewals to properties are carried out using several techniques, one of which is the 'Live Service Insertion' (LSI) method. Developed by Steve Vick International (SVI) to be a safe, efficient and reasonably non-invasive method of service renewal.

The standard LSI technique requires a small excavation in the customers private land or garden. The relining of the service is carried out from this excavation towards the parent main and back towards the customers property to the existing meter position.

The annular space between the new PE and the old metallic service has the potential to be a gas carrying leak path into and adjacent to the property which if ignored will be putting members of the public at greater risk of gas leaking into properties and potentially fires and explosions. The service insertion method, both 'Live' and 'Dead' requires that this annular space is filled with a sealant that conforms to GIS:LC14 for annular sealants.

SVI currently supply several sealants that conform to GIS:LC14 and it is hoped that they will be able to perform with an increase of service length without the need to redesign.

NGN currently carry out around 29,000 planned service renewals and 5,000 unplanned service renewals throughout their network. When considering customer satisfaction, NGN have identified that the excavation in the customer's private land is potentially a problem.

Method(s)

Steve Vick working in partnership with Northern Gas Networks will design, develop and demonstrate a suitable method for live inserting polyethylene (PE) pipes into an existing metallic service from within a customer's property. It is hoped that this development will remove the need for an excavation in a customer's private property and therefore increase customer satisfaction levels in the NGN gas distribution area.

It is hoped that the established SVI GIS:LC14 approved sealants will be transferable to the new system without the need for redesign. Should it be necessary to redesign a sealant, the GIS:LC14 technical specification criteria will need to be met. However, with increased service insertion lengths, there is a requirement to redesign the application hardware.

Design & Development of sealant applicator systems and pipe pushing equipment will be covered in this proposal but due to the cost and the complexity of testing required for GIS:LC14 approval, design changes to any sealant will require discussion between NGN and SVI before being considered.

The Internal LSI system will be designed and developed by SVI and will require rigorous in-house laboratory testing on pipe diameters and lengths to be agreed upon with NGN. An SVI Project Manager will be responsible for the entirety of the project and will report to a representative from NGN.

All testing will be reported in the form of a written report and verbal communication which will include photographic evidence of testing and development. As and when required, an NGN representative will witness testing at the SVI depot in Bradford on Avon and will also be present during any field trial activity.

The developed system will require G23 status and enter a period of field trials whereupon a set number of installations will be carried

out on a range of pipe diameters and lengths. The project team will monitor progress throughout this period and undertake feedback from all interested parties.

Scope

This stage will be trailed in the Newcastle Upon Tyne area, with the capability of rolling out to the wider network

There will be agreed acceptance criteria for the completion of stage one. This will focus on ease of use, and improved quality of working practices

Pipe diameters between 1” and 1.5” to be used in length no greater than 20m

Reason for extending the project

The project has experienced significant timeline delays. These have been due to impact of Covid 19 situation; restricting work in our operational areas and prioritising essential only jobs for the safety of our customers and colleagues. It was envisaged with the easing of restrictions that this work could be picked up again but the overall lifecycle of the project has been impacted.

The project faced difficulties relating to identification of optimal sites to undertake testing in the most suitable environment initially, this was then compounded by the Covid-19 pandemic where access was strictly prohibited. When mains replacement and planned work activity resumed, this was under controlled conditions and with social distancing rules negatively impacting the resumption of pre-enabling surveys to identify sites. Non-essential activity taking place in customer premises was restricted creating an impact on the project timescale.

The project end date has therefore been extended to enable the remaining field trials to be completed and deliver through to completion what has been, and is expected to be upon completion, a successful NIA foundered innovation project. The project will be complete within CNIA governance arrangements and completion achieved before 31st March 2022.

Please see the 2021 progress report for further details

Objective(s)

The agreed sealing length will have an impact upon the final design for the Nosecone used in the system as well as all other tooling including sealant injection and pipe pushing systems. SVI will use their extensive knowledge of sealants and injection techniques to help determine the best possible solution.

Sealant Application

The standard sealant application systems will not be suitable for use inside a customer’s property. They are inherently bulky and are not clean enough to be transferred from an external scenario to an interior one. A new applicator system will be able to inject sealant via the service head adapter port with a steady flow. SVI will aim to incorporate a self-mixing system into the applicator gun, this will remove the potential risk of spillages inside a customer’s property when mixing a two-part sealant by hand in buckets or within a sealed sachet. Powering the applicator will require discussion between NGN and SVI to establish an acceptable power source. It is thought that the agreed power source may also be used to power the PE pipe pushing system.

Alternative Mixing - Options

In order for a clean and simple injection of LC14 sealant to be carried out, it will be necessary to investigate and produce a system with the capabilities to mix the LC14 sealant as it is injected. This will reduce the risk of spillage within a customer’s property.

Nosecone

A redesigned nosecone will be required in order for the new system to negotiate an increased number of bends and increased length of service. It will be necessary to carry out gas flow testing on the new Nosecone to assess its performance when compared to the original Nosecone design. A redesigned Nosecone should outperform the original Nosecone design in all aspects with minimum pressure loss once installed. It may be decided that the Nosecone design will incorporate a ‘lead in’ or extended nose portion to allow the easy insertion of PE into the metallic service. Design consideration will be made to allow the easy reconnection to the new PE

parent main.

PE Insertion Device

It is expected that the increase in service length and the increased number of bends will have a detrimental effect on the ability to insert a Nosecone and PE pipe. There is also the distinct possibility that the area in which a skilled service layer is required to work in will be dramatically reduced. It is therefore necessary to investigate a new method/machine that will enable the insertion of the new service from a confined space within a customer's property and be able to overcome the requirement for additional force to be applied during insertion.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project will be judged a success if the project results in:

- The system can be installed at the existing meter location.
- The current GIS:LC14 approved sealants can be injected successfully into the annular space.
- It realises an increased ability to plan 'Live Service Insertion' projects on the NGN area.
- Enables an agreed volume of metallic service to be sealed with an LC14 approved sealant
- Reduces overall disruption to customers during service renewal projects.
- Removes the necessity for an excavation inside the customer's private property.
- Benefits cost savings due to the reduction in excavations and reduced risks of cable strikes.
- Improve safety to members of the public.
- Improve safety to Service Laying staff by reducing cable strikes.
- Greatly improve customer relationships. (Primary driver.
- Produces a new, agreed work procedure for inclusion in SL1. (Service Laying Manual)

Project Partners and External Funding

Phase 1: Steve Vick International Ltd and NGN

Potential for New Learning

Field trials have been identified as a project activity, they will follow a coordinated approach, capable of evaluating the overall success of the trial. The success of the trial will be measured against predefined quantifiable objectives, evaluated has a pass / fail outcome.

The project is governed by NGN/PR/G/23, the trial will be captured within the G23 process which will be relevant and transferable to all GDN's.

Scale of Project

The project will be focused on:

- A solution that will provide a safe and efficient way of working.
- LSI from property as an end to end solution
- G23 evidence to support approval and implementation into BAU

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

NGN Network area

Revenue Allowed for the RIIO Settlement

Yes, as part of the operational delivery of the GD1 outputs.

This type of technology does not exist at present and is technically impossible.

The development of this proposal may unlock a future way of service renewal with the requirement to excavate removed.

Indicative Total NIA Project Expenditure

External costs - £143,685
Internal costs – £47,895
Total project costs – £191,580

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 is a development and demonstration project that will focus on improving the efficiency, safety and customer impact of gas service renewals, the need for excavation will be removed which reduces time, risk and repeat visits by operational teams.

The forecasted future project benefits are primarily qualitative. Whilst there will be some immediate quantitative financial benefits, the quantifiable benefits will need to be proven over time to allow assessment relating to improvement over the existing manual process.

This project will enable operational teams to complete work with greater efficiency with a financial benefit of c.£191,325 per annum

Please provide a calculation of the expected benefits the Solution

Forecasted applicable workload is 750 tasks per annum at a saving of £255 per task

750 x £255 = £191,325 per annum

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

This application and method is replicable across all GDN's as is specifically linked to the renewal of gas services

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

Costs to be confirmed upon completion of the project. Implementation costs not yet known and are subject to development options.

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 networks are required to undertake gas service renewal as part of operational deliver and this solution could therefore be transferable.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

The challenge identified for improvement in this instance relates to Customer Service and also Asset and Network management, this project has the potential for network Licensee's to undertake gas service renewals without the requirement to excavate which will deliver a more efficient and high-quality service.

☑ 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.

The project concept has been shared at the Gas Innovation Govenrance Group to ensure no duplication with any other innovation projects.

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

The project is innovative and has become possible as a result in the advancement of technology to deliver and improved and viable option for the complete sealant of the gas service annulus.

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

This method is unproven and there is a degree of development and risk associated with the new task which makes it relevant to be funded by NIA rather than the business as usual activities.

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

The benefits from this project are primarily qualitative and are the key drivers that make this project suitable for NIA funding. The improvement in this instance relates to efficiencies in both Customer Service and removal of risk through reduced reinstatement, also Asset and Network management. Modern sealant has never been applied in this manner and requires significant development over the existing established method.

This project has been approved by a senior member of staff

☑ Yes