

NIA Project Registration and PEA Document

Date of Submission

Mar 2021

Project Reference

NIA_NGN_284

Project Registration

Project Title

ESeal 2 Extension

Project Reference

NIA_NGN_284

Project Licensee(s)

Northern Gas Networks

Project Start

January 2021

Project Duration

1 year and 3 months

Nominated Project Contact(s)

Christopher Reed

Project Budget

£187,620.00

Summary

Northern Gas Networks currently abandon metallic stubs using a mixture of ESEAL and traditional tee piece cut out techniques. The ESEAL system and ESEAL 2 system can be employed on metallic Tier 1 and Tier 2 pipes currently up to 14", beyond this there are difficulties and inconsistencies in applying the current methods available. Northern Gas Networks, and all other Gas Distribution Networks, have a vast array of larger diameter pipes that could benefit from the ESeal system, which was proven successful through previous NIA funded projects, and still to date delivers benefits.

The cost for cutting out tier 2 diameter tees using standard techniques is substantial. There is a large impact on the environment due to excavation size and the resulting traffic management to accompany this.

Standard cut out practices also introduces further risks to our own gas engineers and members of the public. The majority of Tier 2 tees and stubs will require deep excavations in highways in order to cut them out, bringing with it further risks.

Nominated Contact Email Address(es)

innovation@northerngas.co.uk

Problem Being Solved

Northern Gas Networks currently abandon metallic stubs using a mixture of ESEAL and traditional tee piece cut out techniques. The ESEAL system and ESEAL 2 system can be employed on metallic Tier 1 and Tier 2 pipes currently up to 14", beyond this there are difficulties and inconsistencies in applying the current methods available. Northern Gas Networks, and all other Gas Distribution Networks, have a vast array of larger diameter pipes that could benefit from the ESeal system, which was proven successful through previous NIA funded projects, and still to date delivers benefits.

The cost for cutting out tier 2 diameter tees using standard techniques is substantial. There is a large impact on the environment due to excavation size and the resulting traffic management to accompany this.

Standard cut out practices also introduces further risks to our own gas engineers and members of the public. The majority of Tier 2 tees and stubs will require deep excavations in highways in order to cut them out, bringing with it further risks.

Method(s)

In order to solve this problem, a 15" diameter system and above is required.

Technical design work will be based on learning from the previous size ranges of ESEAL and ESEAL2. The project will be managed in phases.

Project Stage – Phase 1 – Data Gathering

Description – NGN and stakeholders to investigate expected work basket for the future.

Purpose – Allows for the project scope to be detailed and drawn up with clear objectives in the short and long term.

Project Stage – Phase 2 – Design, Development and Testing

Description – SVI to undertake all Design, manufacture and testing of new equipment. Documentation of the phase will also be produced for stakeholder review.

Purpose – A necessary phase in the progression of the project. It will establish the correct design and methodology to take forward into the Field Trial stages for all Tier sizes.

Project Stage – Phase 3 – Field Trials

Description – SVI and NGN to undertake field trials of the newly designed 15" system.

Purpose – Assess the project in its entirety and establish if it has met the initial scope and objectives formulated during Phase 1. It should leave the project in a situation where implementation into the NGN and SVI business models is easily achievable.

Scope

The system will use established GIS:LC14 approved sealants.

The established tier 2 design will be adapted and developed to work in pipe diameters of 15". Adaptation of current designs, instead of redesign, will speed up development and testing times.

The initial prototypes will be installed into sample metallic pipes of 15" Tier 2 diameters. They will then be injected with LC14 approved sealant and allowed to cure. Once cured, the remaining void in the metallic pipe behind the prototype Foambag will be mass filled with MP-41 sealant and allowed to cure. These pipe lengths will then be pressure tested from end to end using metallic endcaps and the SVI SMARTester Bluetooth pressure logger. Pressure data will be collected from the cloud and detailed in the Design & Development Log.

Once a successful system has been produced, the project will move forward into the Field Trials phase. Field trial sites have already been identified for new system.

A total of 5 field trials on 15" diameter pipe will be required in order to provide substantial evidence to ensure safe roll out of an end solution.

Objective(s)

Design - Tier 2 ESEAL sealing system for abandoning 15" stubs

Measured using pressure testing, installation validation testing and data collection via the Project Log document. Phase success measured at the stage gate meeting. Overall success measured with Field Trials and reporting to be assessed at the project closeout phase.

Phases - Tier 2 ESEAL sealing system for abandoning 15" stubs

The project must meet the requirement of each phase stage gate in order for it to progress onto the next phase. All documentation must be published and approved to G23 standards by SVI and NGN

Preparation to enable – 15" system

The project will be measured using all of the published and presented data and reports.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The system MUST permanently seal the metallic 15" stub. This is measured by testing and field trials documented throughout the project. Assurance of sealant lifespan provided by previous GIS:LC14 testing and historical data from ESEAL 1 and 2.

The system MUST be deployable using existing ESEAL2 methodology. This is measured by Testing and field trial data along with witnessed installation testing which will all be documented in order to facilitate quick roll out into business as usual.

The project must remain within expected time scales.

Project Partners and External Funding

Northern Gas Networks
Steve Vick International

Potential for New Learning

It is expected that the new system will be suitable for use in 15" stubs, however, there is potential for the system to be developed for stubs in excess of 15". The successful testing and field trials of the 15" system will reveal any potential difficulties in application on stubs of a larger diameter than 15". If the system has potential to be developed to suit diameters in excess of 15", potential benefits to NGN and the gas network are also increased.

Scale of Project

The scale of the project will consist of the following;

- Design & Development of 15" Tier 2 ESEAL prototypes
- Design & Development of 15" Tier 2 ESEAL methods and techniques
- Carry out 5 field trials successfully under G23
- To create and manage a project log consisting of design, development and field trial data
- To produce an executive summary & closure report

Following this completion of the above will enable Northern Gas Networks to maximize the opportunity to seal and abandon 15" Tier 2 stubs.

Technology Readiness at Start

TRL6 Large Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

This project will take place in Northern Gas Networks area and at Steve Vick International.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

External cost = £92,340

Internal cost = £95,280

Total Cost = £187,620

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)

As a mixture of resource time, cost and materials, the potential benefits of which are totaled as follows: **£589,400**

Potential benefits of the new 15" system are as follows:

- Substantial reduction in excavation size and a safer working environment in the highway
- Substantially reduced traffic management as installation takes place from a remote location in a less sensitive area of the highway leading to less traffic.
- Reduction in traffic management leading less affected journey times.
- Reduction in greenhouse gas pollution in the local area.
- Reduction in noise pollution formed by queuing traffic.
- Substantially reduced excavation size.
- Substantially reduced traffic management costs.
- Reduction in operational cost.
- Less time required to carry out ESEAL2 operation than traditional cut out.
- Removing NGN staff from deep excavations
- Removing NGN and SVI staff from the center of highways under traffic management.
- Removes public road users from risk in traffic managed areas where excavations are present.

Please provide a calculation of the expected benefits the Solution

A forecasted workload of 14 jobs has been identified with potential suitability for this technique in the first period of RIIO-2 within Northern Gas Networks. An initial CBA exercise has determined a forecasted average cost benefit per job to be £42,100.

Base cost per operation would be £56,000 with Method cost per operation being £14,500.

Potential annual cost benefit of £42,100 x 14 = £589,400

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

All Networks are required to abandon stub ends as part of the enforced gas mains replacement programme. Learnings will be adaptable to all other Gas Distribution Networks.

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

All Networks are required to abandon stub ends as part of the enforced gas mains replacement programme. Learnings will be adaptable to all other Gas Distribution Networks.

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

n/a

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 innovation challenges this project meets are Asset and Network Maintenance and Distribution Mains Replacement. The ability to abandon 15" Tier 2 stubs has a massive benefit to the customer as well as preventing additional workload for operational delivery due to reduced excavation size and traffic management.

- 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.

This project has been shared at GIGG and several checks, including a search of the SNP have been undertaken to ensure no current solution exists to address the outlined challenge.

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

There is currently no method or solution which delivers the full abandonment of 15" Tier 2 stubs as Current ESEAL techniques are only approved for use on 14" and below diameter pipes on the networks.

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

The task in this project start at a mid-level TRL and there is a degree of risk through the development phase to deliver a solution which will meet the project objectives. Due to this uncertainty and level of risk it is not a project suitable to be funded via business as usual methods.

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

Commercially, the lower diameter ESEAL method is well established and allows all networks to operate efficiently. The move to provide a method for the 15" Tier 2 stubs presents significant operational and technical uncertainty which involves not just a high direct cost to NGN but also significant social, customer and environmental impacts due to large excavations, traffic disruption and resource time taken is commercially uncertain. Therefore, this is appropriate to fund via the NIA mechanism.

This project has been approved by a senior member of staff

Yes