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

Dec 2015

Project Reference Number

NIA_NGGD0066

Project Registration

Project Title

Sealback II (Testing)

Project Reference Number

NIA_NGGD0066

Project Licensee(s)

Cadent

Project Start

November 2015

Project Duration

3 years and 5 months

Nominated Project Contact(s)

Andrew Newton – Innovation Portfolio Manager

Project Budget

£337,164.00

Summary

The scope of this project is to field trial the Sealback II system. This will include the development of a strategy for efficient utilisation and deployment. Sealback II integrates CCTV systems for the pre-works, inspection and installation of the installed equipment. This solution is for Low Pressure mains use only, and provide an insertion distance of up to 20m of replacement pipe with a stretch target of up to 30m, for CI4" and CI6" 'child' main leading on to any size 'parent' main.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

The existing Sealback I technique for live mains transfer has several limitations in that it does not work effectively in situations where tapered pipe sections or change in pipe diameters are encountered. It is also limited in the length of main that can be inserted: furthermore obstructions to the insertion process within the main cannot be easily seen or dealt with. Sealback II is to be developed, to overcome these limitations.

Method(s)

This project will build upon the lessons that have been learnt in deploying Sealback 1.5 and the success of the Sealback II feasibility study which was previously carried out under the Innovation Funding Incentive (IFI) and the Sealback II design development funded under IL142.

The feasibility study proposed the use of an innovative expanding sealing bag nose cone, as an identifiable solution, while IL142 developed this solution to a stage where it was ready for field trials.

This project will look at the field trialing of the identified 'Sealback II' solution which incorporates camera technology advances, developing and recommending an appropriate sealant deployment method, and finalize a suitable implementation strategy.

Scope

The scope of this project is to field trial the Sealback II system. This will include the development of a strategy for efficient utilisation and deployment. Sealback II integrates CCTV systems for the pre-works, inspection and installation of the installed equipment. This solution is for Low Pressure mains use only, and provide an insertion distance of up to 20m of replacement pipe with a stretch target of up to 30m, for CI4" and CI6" 'child' main leading on to any size 'parent' main.

Objective(s)

This project seeks to successfully trial an improved method to replace short lengths of metallic main in specific locations of engineering difficulty (short lengths of main that connects onto its parent main in a major road junction) in a safe, efficient and practical manner and to agree an efficient implementation strategy for the technique.

The primary anticipated benefits of this project will be that Sealback II will:

• Reduction in operational risk and expenditure when replacing the cast iron tee sections. Sealback II would allow the mains located in areas of engineering difficulty to be replaced: e.g. tee's under major roads and road junctions. In particular this technique delivers a solution to the requirement to replacement short length stub pipes under Appendix F of T/PM/REP2.

- Reduced excavation and reinstatement costs, contributing to the 'No Dig' targets;
- Reduced flow stop operations on the parent pipe and associated risks;
- Reduced cost associated with the insertion of replacement tees in large diameter parent mains;
- Enabling the replacement of mains that are not easily accessible;
- Reduced disruptions to the public and requirement for traffic management;
- Reduced damage to third party apparatus;
- Reduce risk associated with working in the highway and costs from lane rental;
- Reduced safety risk to the public due to reduced excavations;

• Considerably reduce impact on the environment and minimize inconvenience to the road user

- Reduce environmental impact by both minimizing all associated works as above including the requirement for imported backfill and landfill of excavated spoil and impact on trees;
- Increased reputation for minimizing disruptions.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Successful field trials of the Sealback II technique for CI4" and CI6" diameter and up to 20m in length: with a stretch target of 27m.

Project Partners and External Funding

- National Grid Gas (NGG)
- Synthotech Limited
- Macaw
- Steve Vick International

NIA, Nil External funding.

Potential for New Learning

This project is designed to confirm the Sealback II technique. Development of an implementation strategy and training material will enable the technique to be successfully disseminated for use in the UK gas industry.

Scale of Project

This project includes manufacture of developed nose cone assemblies, development of suitable sealants delivery methods, a limited amount of lab and field testing to a scale which is deemed necessary in order to gain accurate performance reporting to gauge the acceptability of applicability of the Sealback II solution.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL6 Large Scale

Geographical Area

Lab Testing – Harrogate & Bradford Upon Avon

Field Trials – Gas Distribution Networks provided by NGG

Revenue Allowed for the RIIO Settlement

Tier 1 mains replacement/risk removal under Efficient and Safe Work Delivery and Removal of Risk.

Total Repex in allowance = £3.2bn.

Allowances as per Ofgem RIIO-GD1 Final Proposals and all figures are in 2009/10 prices.

Indicative Total NIA Project Expenditure

£337,164 Total Project Expenditure

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)

Safety Benefit

The Sealback II approach will potentially allow for the insertion of PE main up to 27m: 14m longer than the current SealBack I / 1.5 approach. The ability to insert over double the length of PE will allow SealBack to be used in a higher number of locations. This will both reduce the requirement for excavation and remove 'at risk' mains from the network.

At the time of writing there was no discrete information relating to incidences around the use of Sealback: however, it is acknowledged that every excavation presents a risk, particularly those which Sealback will be reducing. On this basis, the 'Safety Benefit Per Reported Case' is taken as Medium (3) – Reduction in reportable injuries >£20k.

Social and Environmental Benefit

Using the Sealback II system will reduce the requirement for excavation within areas of engineering difficulty: e.g. busy road junctions and roads of high usage. This is difficult to quantify in terms of the Benefit Scorecard, but the author suggests a Minor (2) >£1k benefit can be claimed: albeit, this could be argued to be significantly higher for some locations

Carbon Saving

The carbon saving for the use of Sealback II system, over Sealback I/1.5, relates to the reduced amount of excavation required to complete the works: based on the potential ability to insert up to 27m of PE main rather than the 13m upper limit for Sealback I/1.5.

Therefore, assuming the trench to be 0.6m wide and 1m deep, the difference in trench volume will be 8.4m3. This volume will be made up of back fill material: crushed rock (3.70 kg/CO2 per tonne); sand and gravel - land-won (3.90kg/CO2 per tonne) and asphalt production (27.40kg/CO2 per tonne). Assuming an average density of 2.5 ton/m3 and assuming that making the trench good will utilise 1/3 of each material this resulting in:

(8.4/3x2.5x3.7) + (8.4/3x2.5x3.9) + (8.4/3x2.5x27.4) = 245 Tonne of CO2

With a Non Traded Carbon value of £62 £/tCO2e the save would therefore be

315 x 62 = £15,190.00

The reduction in CO2 for this is considered Significant and therefore >£10k £/tCO2e

Project Benefits Score = 9

Please provide a calculation of the expected benefits the Solution

Cost of existing method (on average) £12k

Cost of achieving same output utilising Sealback II estimated at £4-6k

Actual benefits case dependent on frequency of use. Estimated at around 50-100 per year in NGG.

Non-Network Derived Benefits:

Safety + Carbon + Social = £20,000 + £19,530 + £1,000 = £40,530

This result is based on the assumptions and information available at the time writing: these are also only applicable to this stage of the project. It is suggested that this benefits case is revised upon completion of the deliverables identified in this project.

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

This Method could be applied to short length stub pipe (<30m) replacement across the whole of the UK, the scale of which will vary upon Network Licensee asset population characteristics.

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

Training costs and some specific tooling and equipment to isolate the section main concerned and deliver the foam. Dependent on method of rollout.

This will not be a specialist contract activity but Networks may chose to rollout widely or restrict to specialist internal teams.

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 successful development of and demonstration of Sealback II, as well as production of the relevant training material, will result in a solution and associated learning that can be applied by all Relevant Network Licensees where a solution to the requirement to replace short length stub pipes in areas of engineering difficulty is sought.

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

Tier 1 mains replacement/risk removal under Efficient and Safe Work Delivery and Removal of Risk

☑ 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 not been carried out by any other Gas Transmission Group or Gas Distribution Group.

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