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

Oct 2017

Project Reference Number

NIA_CAD0012

Project Registration

Project Title

CIPP for Services

Project Reference Number

NIA_CAD0012

Project Licensee(s)

Cadent

Project Start

October 2017

Project Duration

0 years and 10 months

Nominated Project Contact(s)

Christine Gunter - Cadent Project Manager

Project Budget

£213,872.00

Summary

The UK gas sector is undertaking a major replacement programme of ferrous mains to reduce the risk of leakage and mains breaks. To achieve the mains renewal target within the current RIIO-GD1 period, it is estimated that 2,000 km of service pipe will also need to be replaced by Cadent.

Currently, only plastic polyethylene (PE) or steel pipes are allowed as permanent replacement solutions. In many cases the CIPP technologies can be less expensive and less disruptive and provide better capacity than standard replacement methods. As such, the gas industry is considering the potential to deliver cost savings and reduce social and environmental disruption through the use of these technologies. Lining technologies are also often more practical, especially in congested urban environments where they have a smaller site 'footprint' and typically a faster installation rate than conventional techniques.

The ideal solution would offer a fully structural replacement back to original meter position therefore leading to less re-sited meters

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

Service pipes have been identified by the GDSP's as more time consuming and costly than mains replacement and report customer side intervention (ie. meter re-sites) in many of the replacement schemes undertaken. Cadent need a lower-cost, alternative fully structural solution for gas distribution service pipes that meets our operational requirements.

Method(s)

The overall aim of this project, building on the CIPP for gas distribution mains project, is to demonstrate that CIPP is fit-for-purpose as a permanent repair and replacement technique for gas service pipes.

The cured-in-place pipe (CIPP) technique is a method whereby a host pipe is lined with a flexible tube which is impregnated with a thermosetting resin; this produces a tough pipe-in- pipe replacement solution after resin cure. The resin may be cured by the use of heat or UV light. The technique was developed in the early-1970s and is now used extensively throughout the world, with at least 70,000 km installed to date in adjoining sectors. An advantage of the technique is a smaller site footprint and less excavation and local disruption compared with conventional techniques.

Scope

The UK gas sector is undertaking a major replacement programme of ferrous mains to reduce the risk of leakage and mains breaks. To achieve the mains renewal target within the current RIIO-GD1 period, it is estimated that 2,000 km of service pipe will also need to be replaced by Cadent.

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Cadent will work with the Water Research Council (WRC) to deliver this project in five stages:

1. **Review and report on currently available CIPP products**

There are many variants of these liner technologies; for CIPP liners the major variables include thermosetting resin type, installation method, curing method, wetting-out procedure and location (factory, on-site), lining with and without reinforcement fibres.

A comprehensive desk review will be undertaken to summarise the available liner and end fitting systems. This will include contact with WRC's extensive worldwide industry contacts and web searches.

2. **Development of a performance specification for CIPP for Services with Cadent Policy teams (and HSE if required)**

A Performance Specification and Best Practice Guide will be written for CIPP in services technologies. A single performance specification and best practice guide will cover all liner techniques.

The Best Practice Guide will include recommendations such as design and installation practice guidance, standard operating procedures (SOP), scheme for assessment of conformity (including quality control) and for example, including a decision tree detailing which technologies are appropriate for specific site situations with accompanying SOP.

3. **Open call to technology providers, evaluation and selection of liner and fitting to proceed to a further (separate) stage of the project**

An open call "technology challenge? to developers and providers will be made to seek out the best possible solutions to this problem. This will ask technology providers to submit their ideas or existing products which fit the challenge. This approach has been used successfully by other utility sectors where there is a benefit in extending a search beyond known supplies and it is believed there is benefit in this approach here. In addition to the companies identified in the Stage 1 Desk Review the call will go out via technical groups and forums, trade associations and social media.

WRc and Cadent will then undertake an assessment of each potential technology put forward. This will take the form of a 'gap analysis' using the Performance Specification. The output from the assessment will be used to provide recommendations to the Steering Committee on which CIPP products should be taken forward.

4. **Risk assessment and testing framework.**

WRc will devise an appropriate framework for measuring safety, operational and business risks associated with the deployment of CIPP for services, to enable an objective comparison with the risk profile of standard replacement techniques.

5. **Development of detailed programme for future stages**

Based upon our research review, risk assessment framework and building upon any additional learning gained from gas distribution CIPP, WRc will prepare an updated proposal and detailed work programme for future project stages in consultation with Cadent.

Objective(s)

The objective of this project is to assess the market for potential products to progress to a future manufacture and testing phase and to assess the viability of utilising CIPP technology as a replacement for small diameter pipes (3/4” to 3”).

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

- Published draft performance specifications for the gas sector on small diameter CIPP.
- Delivery of a CIPP for services risk assessment framework to guide future comparative analysis of safety and operational risk between CIPP and standard techniques for pipeline replacement, agreed by all project stakeholders.
- Delivery of a best practice guide including how, when and where CIPP can be an economically advantageous alternative to standard replacement techniques, working in collaboration with Sean Kelly of TRIIO.
- Shortlist of candidate products for a future testing/evaluation phase (where applicable).

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The findings will be applicable to all GDNs in the UK, and potentially internationally as well.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The project will be delivered from the WRC facilities in Swindon and the Cadent offices in Hinckley.

Revenue Allowed for the RIIO Settlement

No revenue allowed for in the RIIO settlement.

Indicative Total NIA Project Expenditure

£213,872

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)

The financial benefits of CIPP for service pipes are expected to be primarily due to a reduction in private excavations and meter re-sites. Cadent data suggests a meter re-site or a private excavation is required for between 60%-70% of service relays and this technology could lead to a significant reduction in these figures.

It should be noted that this project will not deliver these benefits as it is primarily a research project. Depending on the outcome of this project, there may be a further phase of development, manufacture and testing of products identified in this phase of the project.

Please provide a calculation of the expected benefits the Solution

The financial benefits of CIPP for service pipes are expected to be primarily due to a reduction in private excavations and meter re-sites. (The major cost benefits for larger diameter CIPP pipes are reduced material costs (10% - 20%) and a smaller site footprint.)

Other benefits include:

- Size for size pipe replacement.
- Likely to be easier to install around complex service configurations than PE/serviflex and, therefore, less service excavations may be required with this technology.

As noted above, this is a research project and will not, in itself, lead to financial benefits.

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

The findings will be applicable to all GDNs in the UK, and potentially internationally as well.

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

Roll-out costs are currently unknown as the objective of this project is to assess the marketplace for suitable technologies to progress for development, manufacture and testing. However, there will be a requirement that any new technology is on a cost parity with current replacement methods.

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 will therefore determine whether and how it could be a cost-effective option for inclusion in the GDN's toolbox, and in which circumstances alternative technologies to standard replacement can be best, and most cost-effectively applied.

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

This project supports Cadent Gas' drive to develop more efficient replacement technologies.

☑ 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