

NIA Project Registration and PEA Document

Date of Submission

Sep 2019

Project Reference Number

NIA_CAD0041

Project Registration

Project Title

Duraseal Repair Method

Project Reference Number

NIA_CAD0041

Project Licensee(s)

Cadent

Project Start

September 2019

Project Duration

2 years and 4 months

Nominated Project Contact(s)

Jeff O'Donnell

Project Budget

£589,684.00

Summary

Further advancing development of the product brand name Duraseal, manufactured by Enduratec, to gain approval for use as a joint repair method for metallic mains operating at low or medium pressure with diameters ≤ 18 ", currently approved for use only on above ground metallic small diameter pipework screwed joints.

ROSEN UK (Rosen) will support Cadent and WWU with qualification of self-amalgamating tape as a recognised metallic joint repair method that can be buried by completing a series of tests including Failure Mode Effect Analysis (FMEA), Laboratory tests and field trials referencing and complying with existing standard and policies and where applicable additional testing will be incorporated.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

Cadent Gas forecast that there will be circa 45,000 unclassified escapes during the financial year 2018/19. Where existing methods approved for the repair of leaking mains and services on the Low and Medium Pressure Gas Distribution Network are applied there are a number of instances where the initial repair technique is unsuccessful. For specific joint types on metallic mains a specialist contractor is then employed and will encapsulate the leaking component using a steel fitment or fabric muff, this repair technique is valid for metallic pipes. These repair techniques result in additional costs and disruption to the public/customer. The approval of self-amalgamating tape as a recognised permanent repair for a range of diameters and joint types on metallic mains operating at LP and MP has the potential to reduce the costs associated with the current go to method of employing the services of a specialist contractor by offering an alternative repair method.

Method(s)

Further advancing development of the product brand name Duraseal, manufactured by Enduratec, to gain approval for use as a joint

repair method for metallic mains operating at low or medium pressure with diameters ≤ 18 ", currently approved for use only on above ground metallic small diameter pipework screwed joints.

ROSEN UK (Rosen) will support Cadent and WWU with qualification of self-amalgamating tape as a recognised metallic joint repair method that can be buried by completing a series of tests including Failure Mode Effect Analysis (FMEA), Laboratory tests and field trials referencing and complying with existing standard and policies and where applicable additional testing will be incorporated

Scope

The scope of the project is to:

- 1) Define and validate the test work scope including a detailed FMEA
- 2) Undertake component level testing
- 3) Undertake Repair level testing
- 4) Undertake long term performance testing
- 5) Complete field trials

Objective(s)

- Perform Failure Mode Effects Analysis to identify potential failure modes of the proposed system components
- Perform component level testing
- Perform system performance testing to GIS/LC1 for ferrous pipe systems
- Perform long term performance testing according to agreed scope
- Develop and submit a G/23 to gain approval for field trial use
- Undertake a series of field trials to assess self-amalgamating tape performance as a permanent repair for a range of applications to varying joint types on metallic mains in the diameter range 4" to 18" operating at pressure ranges Low to Medium
- Approval of self-amalgamating tape as a recognised repair method for joints on metallic mains as above

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project is deemed successful if the products and approvals are gained so:

- Meeting the objectives of the project
- Achieves technology readiness level as detailed below.

Project Partners and External Funding

This is a collaborative partnership between Cadent and Wales and West Utilities (WWU) and costs will be apportioned on a 4:1 split.

The project will be wholly funded by the NIA.

Cadent total Cost = £465,684

WWU total Cost = £124,000

*Above costs include contingency

Potential for New Learning

- 1) Understanding of the relative failure modes of encasement repair techniques
- 2) Development of joint repair methods that can be utilised across all Gas Distribution Networks

Scale of Project

The scale of the project is across all Cadent Networks where metallic pipe joint repairs are required. This work will inform all Gas Distribution Networks that have similar issues with pipe joint repairs in their networks.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

Laboratory testing and assessment will be carried out at the ROSEN facility in Newcastle Upon Tyne.

Field trials will be completed at selected sites across the East Midlands Network which is part of the Cadent Gas Distribution Network.

The exact location for field trial is to be determined.

Revenue Allowed for the RII Settlement

Yes for repair and maintenance of existing metallic pipe assets. Innovation funding is to support new and novel metallic pipe joint repair techniques that have not been considered by the gas industry previously.

Indicative Total NIA Project Expenditure

£589,684

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)

Cadent estimate the project has the potential to reduce current operational repair costs associated with specialist joint repairs for metallic mains diameters ≤ 18 " and operating at low or medium pressure by circa 20% in years 7 and 8 of RIIO. In addition there are customer and stakeholder benefits associated with this project due to reduced lead times to effect a repair to the leaking joint.

Please provide a calculation of the expected benefits the Solution

The savings for this project will be on specialist contractor and fittings costs associated with repairs to joints on metallic mains in the range currently outlined and where conventional joint repairs have failed i.e. anaerobic sealant.

Cadent Gas assumptions:

- Current costs for specialist joint repairs per annum circa £1.2m per annum
- Year on year benefit due to 20% reduction in above estimated at £240k per annum

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

Self-amalgamating tape as a joint repair technique as per the scope set out earlier will be replicable across all networks.

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

There will be an initial cost due to the upskilling/training of team leaders, at this stage an exact figure is not available as this will be subject to any limitations that are identified during the project.

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

RIO-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 determine if self-amalgamating tape can be used as an alternative joint repair technique as per the scope set out earlier in this document. Upon approval the use of self-amalgamating tape as an alternative joint repair method could be adopted by all GDNs.

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

This project supports Cadent Gas' drive to develop more efficient methods of repairs and maintenance of Gas Distribution assets.

- ☒ 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 does not lead to unnecessary duplication as it is directly researching an encasement joint repair technology.

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

This Project is innovative as it testing self-amalgamating encasement repair technique has not been approved for use on UK buried metallic pipe repairs up to 18".

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 Network Licensee would not fund the project as BAU as developing mains repair techniques/applications outside the gas industry carries significant risk both technically and operationally.

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 Network Licensee is funding the project via NIA due to risks associated with new or novel untested repair techniques and the associated costs of qualification and long term field trials associated with their adoption/approval

This project has been approved by a senior member of staff

☒ Yes