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

Mar 2017

Project Reference Number

NIA_NGGD0096

Project Registration

Project Title

Mechanical Purge End Fitting

Project Reference Number

NIA_NGGD0096

Project Licensee(s)

Cadent

Project Start

March 2017

Project Duration

3 years and 1 month

Nominated Project Contact(s)

Andy Newton - NGGD Innovation Portfolio Manager
Quentin Bahlmann - NGGD Innovation Project Manager

Project Budget

£407,912.00

Summary

Development of a reusable mechanical Purge End fitting which can be used instead of both the EF fittings used during laying of P.E. mains for sizes 63mm, 75mm, 90mm and 125mm. This would eliminate the waste on site and also reduce the time spent during the operation, as electro fusion of these fittings will no longer be required.This is a proposal to replace the EF top tee and end cap, which are single-use products, with a reuseable mechanical fitting.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

During the process of laying PE pipe, the sections of new main must be purged to gas in accordance with T/PR/ML/41 Chapter 7. However, conventionally this process of direct purging requires the use of two electrofusion fittings, a top tee to purge through and an end cap. The process of installing these fittings is both time consuming and wasteful, as these fittings must be cut off and disposed of following this process.

Method(s)

The project will involve the following elements / stages;

2.1 Final Design and manufacture

Initially, 2no. prototype fittings to be produced for review with Cadent stakeholders & initial physical testing, pull off, pressure, damage at Rosen. This will allow agreement of the final prototype design and manufacture 50 units for proof of concept testing through lab testing and field trials.

2.2 Development of G23

Develop a G23 document to agree draft purge end operating procedures and requirements for field trials.

2.3 Showcase Event

Run a showcase event, for up to ten people, at Rosen facilities, where managers and other interested parties from Cadent, Operations, and Plasson can inspect the mechanical purge end fitting and ask any questions about the use, testing, removal, and reuse of the fitting.

2.4 Laboratory Tests

Carry out agreed laboratory testing, including;

Pressure Testing,

Flow tests,

Impact tests,

Integrity tests following multiple uses.

All tests will be performed using air as the test medium and will use 90 mm SDR 17.6 PE pipe.

2.5 Above Ground Trial

Run an above ground trial/demonstration, where Cadent staff and operations team leads who will be using the 90mm fittings in the field can see how they are fitted and removed, see the testing being carried out, and raise any queries or issues with their use. Team leads will have the opportunity to receive basic training and try out the production fittings during the trial. The above ground trial will use the final production fittings. Feedback from the trial will provide input to development of the training package and G23 documentation.

2.6 Field Trial Operative Training and Field Trial Supervision

Develop a training package for the purge end and provide this training for NGG and operations personnel involved in the field trial. The training will be carried out in the field on the first installation planned for each team, for a maximum of 5 operational teams. An installation video will also be prepared and made available to operational teams involved in the trials.

A number of installations and use of the purge ends for each team will be supervised to ensure that the installations and operations are being carried out safely. A data capture form will be developed, to be completed and returned following each operation. Each purge end will be allocated an identification number in order for tracking to be carried out.

2.7 Post-Use Fitting Assessment

At various intervals, a section of pipe, with the fitting still installed, will be removed and transported to for post-installation assessment. This will include pressure testing, disassembly, and examination of all components to inspect for damage incurred during installation and use.

2.8 Final Reporting

A final report will be provided covering all stages of the work, including the results of the laboratory testing, findings from the installation supervision, and the post-use fitting assessments.

2.9 Additional scope - Laboratory Tests 63mm & 125mm

Carry out a series of laboratory trials to confirm compliance with the functional and technical requirements document, as well as relevant international standards and gas industry standards (as referenced in the tests below). The objective of these tests is to confirm that the fittings are safe for use in pressure testing and purging operations at both low pressure and medium pressure, as well as to confirm the reusability of the fittings.

2.10 Additional scope - 90mm Medium Pressure field trials

Purge end fittings have been designed for use in low pressure (LP) and medium pressure (MP) applications. Initial field trials have been carried out by teams who only work on LP installations. In order to build confidence in the 90 mm purge end fittings for MP applications, two teams will be trained and provided with fittings.

2.11 Additional scope - GIS/PL3

Gas Industry Standard GIS/PL3:2014 requires that fittings intended for “temporary use” are tested as for Class B which is considered overly onerous. The deliverable will be a draft version of the updated GIS/PL3 in a Microsoft Word format ready for submission to the ENA Technical Services Forum.

Scope

Development of a reusable mechanical Purge End fitting which can be used instead of both the EF fittings used during laying of P.E. mains for sizes 63mm, 75mm, 90mm and 125mm. This would eliminate the waste on site and also reduce the time spent during the operation, as electro fusion of these fittings will no longer be required.This is a proposal to replace the EF top tee and end cap, which are single-use products, with a reuseable mechanical fitting.

Objective(s)

This is a proposal to replace the EF top tee and end cap, which are single-use products, with a reuseable mechanical fitting.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Specific success criteria are:

design and manufacture of prototype units resulting in successful proof of concept laboratory testing

Fitting achieving 20 uses before requiring servicing or replacement during field tests

Project Partners and External Funding

This project will be wholly NIA funded.

National Grid Gas Distribution

ROSEN Group – Nil external funding

Plasson UK Ltd - Nil external funding

Potential for New Learning

Following any issues and findings during the field trial, if necessary, recommendations will be provided for amendments to the installation procedure and any further development of the product.

The findings from the post-use assessments will consider any potential issues for long-term multiple uses of the fittings.

Scale of Project

The original trial focussed on fitting for 90 mm SDR 17.6 PE pipe only, with the intention of approving use over the broader size range following successful field trial. However, some specific differences in sealing features across the size range require additional laboratory testing to be undertaken on the 63mm & 125mm fittings prior to full approval.
The Purge end fittings have been designed for use in low pressure (LP) and medium pressure (MP) applications. Initial field trials have been carried out by teams who only work on LP installations. In order to exploit the full potential, it is proposed to extend the 90mm fitting field trials to include two MP teams

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

Rosen will conduct the majority of the testing in their own facilities. However, Rosen will organise and manage field trials, working closely with NGGD operations / partners

Revenue Allowed for the RIIO Settlement

There are no direct saving benefits anticipated.

Indicative Total NIA Project Expenditure

Total of NIA funded phases.
Total cost £407,912

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)

Estimated Cadent Annual saving = £365k

Please provide a calculation of the expected benefits the Solution

Cadent assumptions
• Size range 63mm, 75mm, 90mm & 125mm
• Volumes based on ESRI lay length using average 130m per push (insertion length). This has been cross referenced with team no's & productivity, which equates to an average of 1.1 pushes per week.
• Reduced EF fittings comprises 1no EF tee, 1no EF end cap, 2m PE pipe
• Reusable fitting based on 50 reuses - already exceeded 20 uses in field trials without signs of wear, in excess of 50 reuses envisaged.

Base cost (£516k pa) – Method (£151k pa) = Benefit (£365k pa)

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

Assuming the other GDN's have similar usage, this method could be rolled equally in all GDN's

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

The cost of rolling out the method is estimated at £100k in order to cover training and roll out. The benefit of the trial is reliant on the outcome of this trial on volume manufactured and the manufacturer engaged and therefore cannot be accurately estimated at this time.

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 project will develop a new reusable mechanical Purge End fitting which could replace the conventionally used EF fittings for the purge process associated with laying of P.E. mains for sizes 63mm, 75mm, 90mm and 125mm. This could be adopted and implemented by all the GDNs.

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

n/a

☑ 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, or something similar, has not been developed 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