

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

Sep 2014

### Project Reference Number

NIA\_NGGD0041

## Project Registration

### Project Title

Development of Specification for PE Repair Systems

### Project Reference Number

NIA\_NGGD0041

### Project Licensee(s)

Cadent

### Project Start

September 2014

### Project Duration

1 year and 10 months

### Nominated Project Contact(s)

National Grid Gas Distribution – Sharon Harrison, Scotia Gas Networks – Stephen Tomlinson, Northern Gas Networks – Alan Hopton

### Project Budget

£407,151.00

## Summary

The scope of the project is as follows:

- Analysis and understanding of the most frequent types of PE pipe leaks/failures.
- Gap analysis of currently used alternative repair techniques to assess whether the established 'Temporary' PE repair techniques currently used could meet the Draft Specification as either 'Interim' or 'Permanent' repairs.
- Production of draft technical specification for 'Interim' and 'Permanent' methods of repairing PE gas mains, operating at low pressures of up to 75mbar and also at pressures above 75mbar.
- Initial User acceptance tests.
- Initial engagement with manufacturers.

### Nominated Contact Email Address(es)

Innovation@cadentgas.com

## Problem Being Solved

Current procedures for the repair of Polyethylene (PE) gas piping systems only allow cut out and replacement as a permanent repair for a leaking or damaged section. However, the availability of alternative interim, or permanent, repair techniques could offer significant reductions in the time and costs to undertake repairs to damaged PE piping.

Under previous NIA project 'PE Asset Life Research', carried out by National Grid and Macaw, work was undertaken to look at potential repair techniques for PE pipe systems that could provide an alternative to cut out and replacement.

This study found that the most common leakage occurrence was on 63 to 180mm diameter PE pipe operating at low pressure, and that an alternative repair technique completed on the first visit under live leakage conditions could provide savings in the region of 35% to 55%.

## Method(s)

This project would consist of data analysis around the most frequent types of PE pipe leaks/failures and currently available alternative repair techniques for PE pipe systems.

## Scope

The scope of the project is as follows:

- Analysis and understanding of the most frequent types of PE pipe leaks/failures.
- Gap analysis of currently used alternative repair techniques to assess whether the established 'Temporary' PE repair techniques currently used could meet the Draft Specification as either 'Interim' or 'Permanent' repairs.
- Production of draft technical specification for 'Interim' and 'Permanent' methods of repairing PE gas mains, operating at low pressures of up to 75mbar and also at pressures above 75mbar.
- Initial User acceptance tests.
- Initial engagement with manufacturers.

## Objective(s)

The aim of this project is to look at potential repair techniques for PE pipe systems that could provide an alternative to cut out and replacement.

## Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

## Success Criteria

Success of this project would be a successful conclusion and understanding as to the most frequent types of PE pipe leaks/failures and assessment of current repair techniques in order for a draft technical specification for 'Interim' and 'Permanent' to be produced.

If successful this would lead to further work under a separate project to undertake development of a repair technique, field trial demonstrations, and updating of the required policies, procedures and industry standards.

## Project Partners and External Funding

n/a

## Potential for New Learning

n/a

## Scale of Project

The scale of this project is limited to data analysis only, in order to understand the challenges around using repair techniques for as an alternative to cut out and replacement on PE pipe systems.

This project does not include undertaking development of a repair technique, field trial demonstrations, or updating of the required policies, procedures and industry standards, which would potentially be carried out under a later project.

## Technology Readiness at Start

TRL2 Invention and Research

## Technology Readiness at End

TRL3 Proof of Concept

## Geographical Area

This project will be undertaken at Macaw's research facilities in Newcastle-upon-Tyne.

## Revenue Allowed for the RIIO Settlement

No Revenue Allowed for in the RIIO Settlement

## **Indicative Total NIA Project Expenditure**

The total recoverable allowance will be 90% of the project costs shown below for each Licensee under the Network Innovation Allowance (NIA):

### **NGGD**

£181,568 external costs

£60,522 Internal costs

£242,090 total NIA Project Expenditure

### **SGN**

£82,531 external costs

£27,510.19 Internal costs

£110,041 total NIA Project Expenditure

### **NGN**

£41,265 external costs

£13,755 Internal costs

£55,020 total NIA 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)

As this project focuses purely on the proof of concept it is difficult to quantify the potential financial benefits at this stage.

If the Problem is solved it is envisaged that this would lead to cost savings in the region of 35% to 55%, compared with traditional cut out and replacement methods.

Cost savings would be associated with:

- Avoided replacement costs
- Avoided excavation and reinstatement costs
- Risk reduction

#### Please provide a calculation of the expected benefits the Solution

Not required (Research only)

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

This method could be applied to repair of PE gas pipe systems across the whole of GB.

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

There are no costs associated with sharing the conclusion and recommendations of this study, which will be the first in this initiative towards achieving an alternative to cut out and replacement on the PE network. As this project is in the early stages of the technology readiness level it is therefore not possible to estimate the costs of associated roll out 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

Learning generated will be in the form of an output report that will be shared with the GDNs and made available to other Network Licensees.

The output report produced will articulate the most frequent types of PE leaks, an assessment of the market potential for PE pipe repair systems depending upon the most common failure types, analysis of currently used alternative repair techniques, and a draft technical specification for PE pipe repair.

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

Not applicable

- 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