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 2017

Project Reference Number

NIA_CAD0008

Project Registration

Project Title

Management of Brittle Plastic Materials

Project Reference Number

NIA_CAD0008

Project Licensee(s)

Cadent

Project Start

January 2018

Project Duration

2 years and 3 months

Nominated Project Contact(s)

Cadent Innovation Team

Project Budget

£433,892.00

Summary

The scope of this project is concentrated on the non-standard polymer materials (brittle plastics).

The scope of the planning phase is to define the extent of potential issues that NSM's cause within the gas distribution network.

The scope of the delivery phase is to validate the appropriate tools and techniques through initial laboratory and yard testing, followed by limited and extended field trials.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

The PE Asset Life project (IFI63) confirmed that a number of non-standard polymer materials have been installed in the gas distribution network. There are also a number of other "legacy" materials (e.g. asbestos cement, copper, Muntz Barwell, PVC etc.) which are approaching the end of their design life. These Non-Standard Materials (NSM's) within the network operated by Cadent have a lack of suitable fittings, flow stopping practices and repair techniques. The pipe material is often too brittle to be repaired using existing methods and currently there are no techniques available for NSM repair activities other than to cut out and replace.

The continued operation of NSM's will lead to increasing levels of risk within the network and they will gradually require replacement. In the meantime, procedures to maintain these assets will need to be developed – alongside this, there is a requirement of network operators to have access to a suite of approved methods for dealing with leaks from NSM's.

It is envisaged that the Project will initially focus on non-standard polymers (brittle plastics) and, dependent on the results of the Project, it could be extended to cover the other NSM's mentioned above in further phases

Method(s)

This Project includes**:**

Planning & Delivery

Planning:

The initial tasks will define the extent of the potential issues that NSM's could cause within the gas distribution network. The later tasks will define the actual development required to enable approval of the most appropriate tools and techniques.

- **Assess and understand NSM population and performance**
- **Develop initial operational guidance**
- **Define test plan**

Delivery:

These tasks will validate the use of the appropriate tools and techniques through initial laboratory and yard testing, followed by limited and then extended field trials.

- **Delivery of the repair techniques identified in test plan**
- **Development of Draft Procedures**

It is proposed that 6 systems (could be 2 for flow stop, repair and service connections) will be assessed.

Scope

The scope of this project is concentrated on the non-standard polymer materials (brittle plastics).

The scope of the planning phase is to define the extent of potential issues that NSM's cause within the gas distribution network.

The scope of the delivery phase is to validate the appropriate tools and techniques through initial laboratory and yard testing, followed by limited and extended field trials.

Objective(s)

The main objective of this project will be the development of a number of appropriate tools and techniques that can be utilised when leaks from NSM's are discovered, leading to a reduction in customer disruption due to less time off gas, smaller excavations and there no longer being a requirement to cut out and replace.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The success criteria for the Project are the deliverables below (limited to NSMs identified in Project Proposal):

1. **Analysis of the performance of NSM's** – Data extraction, configuration and analysis. Report summarising the main findings from the data analysis.

2. **Development of initial operational** guidance – Initial guidance documents to help operators to identify brittle plastic materials in the field and to help decide on the most appropriate repair type.

3. **Phase 1 report and definition of Phase 2 sub-projects** – Report summarising the main findings from the data analysis and initial product assessments. Definitions and scopes of work for Phase 2 sub-projects for agreement with Cadent.

4. **Limited acceptance, lab performance testing** – Report summarising the main findings from the initial performance assessment of the products

5. **Limited acceptance, yard testing and long term testing** – Report summarising main findings from the yard testing and

performance assessment of the selected products.

6. **Full acceptance, limited field testing** – Report summarising the main findings from the limited field trials and associated testing of the selected products.

7. **Full acceptance, extended field testing** – Report summarising the main findings from the extended field trials of the selected products.

8. **Finalise procedure documents** – Completed versions of the G/23 and the performance specifications

9. **Guidance** – Provision of a short training DVD and associated written materials

Project Partners and External Funding

Project partners are as follows:

Cadent Gas Ltd

ROSEN

The project will be wholly funded by the NIA.

Potential for New Learning

The potential for new learning in this Project comes in a number of forms. There will be analysis undertaken in order to understand the performance of these Non Standard Materials, their leak rates relative to leak rates for standard materials whilst also identifying the likely failure modes for the range of NSM's. There is potential for new learning in the development and exploration of repair techniques required for NSM's in the network. For example, live repair of NSM mains and services and flow stopping of NSM mains and services for repair which do not currently exist.

Scale of Project

The scale of the Project is across all Cadent Networks where Non Standard Materials are present. This work will inform all Gas Distribution Networks that have NSM populations. The scale of investment in this project is necessary due to the levels of new learning potentially produced. Currently, we have no repair techniques for the non-standard material population in the network. Therefore, we are delivering a project of this scale to ensure that we have a suite of tools and techniques to deal with leaks from NSMs in a timely and efficient manner, bringing both business and customer benefits

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL6 Large Scale

Geographical Area

All Cadent Gas Distribution Networks.

Lab Trials will be conducted at ROSEN facilities in Newcastle upon Tyne, field trials will be conducted within a Cadent Network (location tbc).

Revenue Allowed for the RIIO Settlement

Expenditure allowed for in RIIOGD1 that is likely to be saved as a result of this project will be seen in mains replacement costs that will no longer be paid due to repair techniques being available for non standard materials. These cost reductions are seen in labour, travel time and reinstatement volumes.

Indicative Total NIA Project Expenditure

External costs: £295,910
Contingency @ 10% £ 29,591
Internal costs @ 33.3% £108,391
Total (£) £433,892

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 tools and techniques developed during this project have the potential to offer great financial savings when compared to the current process of temporary repair followed by cut out and replace, these financial savings will be seen in a reduction in labour time, a reduction in reinstatement costs due to small excavations and a reduction in customer disruption due to live repair techniques being developed

Please provide a calculation of the expected benefits the Solution

Base cost is £252,000.Method cost is estimated to be £189,000 in the first year (3/4 of base cost), £126,000 in the second year (1/2 of base cost) and finally an estimated future cost of £84,000 (1/3 of base cost) per annum.

Base cost minus eventual method cost equates to an estimated annual saving of £168,000 and financial repayment in 1.93 years.

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

The repair methods will be replicable across all networks which contain a non standard material population, this population is estimated to be 10% of our distribution network and could be used on the 105 non standard material failures that we have per annum.

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

Roll out cost will include training costs, cost of change to documents and policy, sustained embedding of techniques within Operations. It is expected that the cost of rolling out the method across all networks will initially be greater, due to new techniques and equipment, however once implemented across the networks these costs will be off set by the financial savings delivered by 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

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

Potential for NSM's to be present in other relevant Network Licensees Networks; therefore the learning, tools and techniques developed will aid all other Network Licensees with Non Standard Materials within their networks.

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 does not lead to unnecessary duplication as it is directly targeting repair techniques for Non Standard Materials within Cadent Networks, and these techniques are not currently available within the gas industry.

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 (not business as usual) due to the exploration of new tools and techniques for dealing with leaks from non-standard materials within the networks.

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 will not fund this Project as business as usual due to its innovative exploration of new techniques for dealing with leaks from NSMs.

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

This project can only be undertaken with the support of the NIA as it directly looks to innovatively explore and test new and previously unused tools and techniques for NSM repair. The project directly targets specific operational risks linked to NSM leaks, which currently in business as usual we cannot target. The project will also benefit all relevant network licensees that have NSM population in their networks, and through the NIA learning will be shared amongst these licensees.

This project has been approved by a senior member of staff

☑ Yes