

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

Jan 2014

Project Reference Number

NIA_NGGD0010

Project Registration

Project Title

PE Asset Life Research

Project Reference Number

NIA_NGGD0010

Project Licensee(s)

Cadent

Project Start

July 2010

Project Duration

3 years and 6 months

Nominated Project Contact(s)

John Reader and Darren White (NGGD) /George Watson and David MacLeod (SGN)

Project Budget

£2,119,648.00

Summary

The scope of this project includes; devising condition assessment methods for PE pipes and fittings, developing methodologies to determine residual service life of PE pipes & fittings, and developing a scheme to manage and rank ongoing risks to PE distribution networks which demonstrates to regulatory authorities that control of these primary assets is being maintained in a safe and planned manner.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

Polyethylene (PE) pipes, laid over the past 40 years, now constitute around 60% of the gas distribution supply networks in the UK. Whilst confidence remains high for the long term integrity of PE pipe materials, it has to be recognised that some parts of the installed network are now approaching their 50 year design life.

It is known that early PE materials, including those imported from the United States of America (USA) in the late 1960's and early 1970's, were supplied to a lower standard of stress crack resistance than current pipe materials. Similar materials installed in the USA and Europe have shown the expected signs of failure in service at points of elevated stress.

Method(s)

This project will collect and analyse samples of pipes and joints across the network from a variety of locations, covering a range of polymers and installation ages. This approach will require development of:

1. A technique to enable sample extraction from live mains without disrupting gas supplies.
2. New test methods to qualify the long term service performance of recovered sections of pipes and joints.

3. Chemical and physical characterisation methods of identifying PE material grades and obtaining condition assessment and residual life estimates from small samples.
4. Test methods to enable the performance of a pipe and joint to be measured and benchmarked against its original performance.
5. Software tools for managing ongoing and future integrity of PE gas distribution systems.

Scope

The scope of this project includes; devising condition assessment methods for PE pipes and fittings, developing methodologies to determine residual service life of PE pipes & fittings, and developing a scheme to manage and rank ongoing risks to PE distribution networks which demonstrates to regulatory authorities that control of these primary assets is being maintained in a safe and planned manner.

Objective(s)

The aim of this project is to develop methodologies; techniques and decision support tools that establish the current condition of the existing PE network, identifies potential threats to the integrity of PE pipes and joints, assesses the residual life of the PE network and identifies possible strategies and policies for asset management of these ageing assets included targeted replacement where appropriate.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Success of the project will be the development of decision support software tools and the development of new concepts and standards for site quality control standards and procedures which will be delivered leading to an Asset Integrity Management Scheme for PE gas distribution networks.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

This project encompasses a series of comprehensive research and development stages, including PE pipe and fitting samples from a number of locations within the gas network, which are required in order to fully assess the residual life of assets and to demonstrate to that this primary asset is being controlled in a safe and planned manner.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL6 Large Scale

Geographical Area

The work covers the distribution operating footprint of National Grid Gas and Scotia Gas Networks.

Revenue Allowed for the RIIO Settlement

No revenue allowed for in the RIIO Settlement, at this time.

Indicative Total NIA Project Expenditure

NGG

£992,220 IFI Project expenditure
£393,145 NIA Project expenditure
£1,385,365 total Project expenditure

SGN

£546,418 IFI Project expenditure

£187,865 NIA Project expenditure

£734,283 total 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)

£6.6m (see below)

Please provide a calculation of the expected benefits the Solution

If this work did not proceed PE replacement may be required starting in approx 2020. Between them NGG and SGN have approx 110,000km of PE mains. If only 1% were to be replaced each year this would equate to 1,100,000m. Assuming the early pipes were small diameter the replacement allowance would be circa £6.6m per annum. These costs will be effectively deferred until 2030.

We have used £6.6m as a conservative estimated smeared over 10 years with the output fully adopted in 2014.

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

This Method could be applied to PE replacement across the whole of GB, the scale of which will vary upon Network Licensee.

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

£50k estimate based on implementation of framework into existing Distribution Pipe Management Model (DPMM).

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

All Network Licensees will be able to use the learning generated as the outcomes will be presented in a clearly defined report that focuses on providing possible solutions to address the objectives.

The production of a PE materials database and software tools for predicting the residual life of PE systems will result in learning that can be applied by all Relevant Network Licensees where assessing the residual life of PE assets is required.

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 will result in a better understanding of the PE assets condition and resilience, and demonstrate that the reliability of the PE asset base is quantified.

- 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