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

Feb 2014

Project Reference Number

NIA_NGGD0023

Project Registration

Project Title

MEG Improvement Phase 2B

Project Reference Number

NIA_NGGD0023

Project Licensee(s)

Cadent

Project Start

February 2014

Project Duration

0 years and 11 months

Nominated Project Contact(s)

Darren White – Innovation Portfolio Manager

Project Budget

£259,600.00

Summary

The scope of this project includes:

- Conceptual Design – conceptual design of the TouchSpray MEG Fogger.
- TTP Trial Site – installation of the test capability to enable injection of MEG into a realistic pipe flow.
- Prototype MEG Fogger – development of a 2 spray head MEG fogger, based on the output of the conceptual design work, suitable for use on the trial system.
- Droplet Size Testing – to test and analyse droplet dynamics in a representative environment in order to determine the droplet size required for the trial.

The scope of this project does not include the TouchSpray MEG Fogger trial preparation and trial, or the MEG Fogger development and certification, all of which will be carried out under a separate phase.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

The introduction of dry natural gas in the 1970s caused the yarn in these joints to dry out, creating leakage paths. For many years National Grid has replaced the lost moisture by operating gas conditioning plant, which injects mono-ethylene-glycol (MEG) into the gas stream at selected system source points chosen because of high levels of lead yarn joints downstream. The MEG is adsorbed by the yarn causing it to re-swell and re-seal the leak path.

Existing gas conditioning equipment is very old and supplier support for spare parts is increasingly difficult. In addition, the existing technology is difficult to control since the flow of MEG into the system is not matched to demand and the consistency of the fog in terms of drop size means the distance the fog can go in the system is limited.

National Grid operates 33000Km of cast and spun iron mains throughout its UK Low Pressure distribution networks. Approximately 8000Km of this iron main material was constructed using lead & yarn joints.

The number of active MEG units is over 300, with approx 60% extra planned to still be commissioned by 2021.

This project will provide an opportunity for National Grid to develop an alternative to the Norgren heads and vaporiser unit control panels, both of which are currently not in production.

Method(s)

This project will focus on developing equipment to the prototype stage and understanding the droplet dynamics in the pipe flow. Within the scope of this work is the construction of a TTP test capability.

Scope

The scope of this project includes:

- Conceptual Design – conceptual design of the TouchSpray MEG Fogger.
- TTP Trial Site – installation of the test capability to enable injection of MEG into a realistic pipe flow.
- Prototype MEG Fogger – development of a 2 spray head MEG fogger, based on the output of the conceptual design work, suitable for use on the trial system.
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Objective(s)

The overall aim of the MEG Improvement initiative is to design, develop, manufacture, install and commission a TouchSpray MEG Fogging system for use on the National Grid Gas Distribution network, in order to achieve a major improvement in MEG saturation levels across the network.

The objective of this project, under Phase 2B, is to produce the conceptual design of a TouchSpray MEG Fogger, produce the test capability, and understand the droplet size dynamics in the pipe flow.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The success of this project will be production of the prototype design TouchSpray MEG Fogger, production of the test capability, and the modeling and testing of MEG droplet size dynamics in air carrying pipes so as to understand what droplet size is required for a meg fogging system.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

This project includes further feasibility studies which build on the output from the works completed under the previous NIA ‘MEG Improvement’ project.

Further feasibility work is required to analyze droplet size dynamics and to produce a prototype design to take forward for the next stages of the MEG improvement initiative.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

Cambridge - TTP offices

Revenue Allowed for the RIIO Settlement

Revenue allowed for in the RIIO Settlement totals £1.491bn

Indicative Total NIA Project Expenditure

£259,600 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)

£0.78m estimated potential annual saving, based on a 10% reduction in lead yarn joint repairs, assuming a direct correlation between reduction in leakage and reduction in lead yarn joint repairs, for an average of 5,200 external lead yarn joint repairs per year, at a cost of £1,500 per repair

Please provide a calculation of the expected benefits the Solution

There will be nil expected financial benefits as a result of this Project, as the technology development will still be in preliminary stages.

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

This Method could be applied to Norgren fogger 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.

Early indications suggest the cost to upgrade each existing unit would be between £3,000 - £6,000 primarily depending on the number of units purchased.

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):

- [x] 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

- ☐ 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

Output from this project will consist of an initial design prototype to take forward into the TouchSpray MEG Fogger trial. This information will inform the overall initiative of improving MEG saturation levels across the gas distribution network.

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 – this issue is not confined to NGG therefore please refer to i) above.

- ☑ 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