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

May 2014

Project Reference Number

NIA_NGGT0053

Project Registration

Project Title

Pipeline Noise Mitigation

Project Reference Number

NIA_NGGT0053

Project Licensee(s)

National Gas Transmission PLC

Project Start

June 2014

Project Duration

2 years and 1 month

Nominated Project Contact(s)

Russ Nattrass, box.GT.innovation@nationalgrid.com

Project Budget

£40,000.00

Summary

There are instances where noise from above ground gas pipework has been the cause of complaints from neighbours of some National Grid Gas Sites.

The current practise of lagging the pipework with noise insulation is effective but can cause access, maintainability and corrosion problems.

This project will be innovative in that it will, in one carefully managed arena, be assessing all aspects of vibration and noise generation, transmission and propagation, and noise radiation, and may therefore include solutions in the following areas:

- Methods to reduce the noise at source, and thereby reduce turbulence in the pipework, e.g. through use of low noise trim regulators, flow straighteners internal to the pipe etc.

- External pipework treatments, e.g. constrained layer damping, alternative acoustic lagging materials.

Third Party Collaborators

DNV

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

Noise from gas flowing through pipework can be caused by:

- Turbulent flow through a straight pipe
- Turbulent flow past bends or in-pipe disturbances. This can cause extra pressure wave reflections and possible amplification of noise
- Acoustic and mechanical resonance, which could be further excited by the flow-stream itself or by any pulsations in the flow-stream.
- Vibrations in the pipe wall caused by:
    1. turbulent flow
    2. resonances
    3. structural noise

The currently accepted Best Available Technique to mitigate noise from above ground pipework is to lag the pipe, valves etc. This technique, however, has been known to initiate under-lagging corrosion of pipework, which can then lead to costly remediation work.

Method(s)

All Technical Methods;

> Phase 1 - Technology survey to identify candidate techniques with the potential for being deployed as a 'Best Available Technique'

This may include solutions such as methods to reduce the noise at source, and thereby reduce turbulence in the pipework, e.g. through use of low noise trim regulators, flow straighteners internal to the pipe and external pipework treatments, e.g. constrained layer damping, alternative acoustic lagging materials.

Phases 2 and 3 are not costed at this stage but are expected to include:

> Phase 2 - Laboratory testing of selected technologies
>
> This may include noise and vibration testing on small-scale test pieces and integrity/corrosion testing, which could include adhesion, salt spray, and humidity tests
>
> Phase 3 - Field trials of the most promising technique(s)
>
> Testing would include noise measurements in the vicinity of the pipework, together with vibration measurements on selected locations, both before and after the solution has been implemented in order that the relative improvement can be evaluated.

Scope

There are instances where noise from above ground gas pipework has been the cause of complaints from neighbours of some National Grid Gas Sites.

The current practise of lagging the pipework with noise insulation is effective but can cause access, maintainability and corrosion problems.

This project will be innovative in that it will, in one carefully managed arena, be assessing all aspects of vibration and noise generation, transmission and propagation, and noise radiation, and may therefore include solutions in the following areas:

- Methods to reduce the noise at source, and thereby reduce turbulence in the pipework, e.g. through use of low noise trim regulators, flow straighteners internal to the pipe etc.
- External pipework treatments, e.g. constrained layer damping, alternative acoustic lagging materials

Objective(s)

To deliver a series of reports relating to Pipeline Noise Mitigation covering:

- Tests and subsequent results of a selection of different noise mitigation technologies,
- Identification of a new technique, or techniques, that could be put forward to become a "Best Available Technique",
- Recommendations for further actions.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Success will have been achieved when the reports for each phase of the project have been received and agreed.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The project will be carried out in a series of stages of increasing complexity;

1. Survey of materials & technology
2. Laboratory testing of selected materials & technology
3. Field trials of selected techniques

This approach will allow the opportunity to stage gate and review project progress as appropriate. Robust laboratory and field trials will be necessary to ensure the final solution is fit for purpose prior to business roll out.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

It is anticipated that the project will be predominantly desk based at the supplier offices for stages 1 & 2 and at Ambergate in Derbyshire for stage 2 and at an operational AGI in the UK for stage 3.

Revenue Allowed for the RIIO Settlement

This project has the potential to reduce the requirement for re-lagging pipework after maintenance, to reduce the potential for noise complaints and therefore the need for noise surveys.

Indicative Total NIA Project Expenditure

£40k - for phase 1.

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)

National Grid deal with a number of complaints associated with noise from compressor stations from neighbouring properties. Complaints can be made directly to National Grid or the Environment Agency and can incur high costs associated with commissioning consultant reports and internal man power and expertise. The Environment Agency can issue improvement notices, or in extreme cases, prohibition orders, to the compressor station. The cost of dealing with one complaint can be up to £30,000 and National Grid see approximately 3 of these per year.

Please provide a calculation of the expected benefits the Solution

n/a - this is a research project.

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

The new technique/technology will be designed to be adaptable to most, if not all, above ground gas transportation pipework installations both on the national transmission system and gas distribution systems.

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

As this project is currently at the initial screening stage it is not possible to estimate roll out costs. These costs would vary significantly depending on the final choice.

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

Noise from above ground pipework is a common issue in gas transportation. Findings from this project can be shared with other gas transporters.

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

The project is aligned to our reliability and environmental theme.

☑ 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