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NIA Project Registration and PEA Document

Date of Submission

Jul 2014

Project Reference Number

NIA_NGGD0037

Project Registration

Project Title

TD Williamson Guided Wave Non Destructive Testing Inspection For High Rise Buildings

Project Reference Number

NIA_NGGD0037

Project Licensee(s)

Cadent

Project Start

July 2014

Project Duration

0 years and 9 months

Nominated Project Contact(s)

NGG - Neil Russell (Project Manager), TD Williamson – Andrew Little

Project Budget

£114,154.00

Summary

The project is to be a trial on a specific six storey riser in London as a pre-cursor to a potential further trial on other types of risers if the results from this project are positive

The field trial will look at using the 'Low Profile' GUL device to access the condition risk of risers to assist in prioritizing the networks high rise building (HRB) stock.

A report will be produced detailing the operation and results of the trials.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

National Grid and other GDNs are required to ensure that their assets are adequately maintained as fit for purpose. In multiple occupancy buildings our assets, the risers, are very often built in within the building, therefore a full visual assessment of that pipework is not reasonable or practical. Visual assessment results can be open to misinterpretation and localised NDT can only give details of the wall thickness loss at that one location.

Method(s)

The Method is to use a wavemaker supplied by Guided Ultrasonics Ltd (GUL) which has been specifically developed for use in restricted access locations such as gas riser pipes in tower blocks.

The GUL technology is connected to the riser at the lowest convenient point on the riser. A "shot" wave is fired along the steel work in both directions, (referred to as front shot and back shot). The readings are immediately recorded on to an on-site visual screen where

the readings are interpreted. The readings include the length inspected assisting the operator in selecting the location along the pipeline for a second area for the equipment to be set up. In best case scenarios the complete vertical riser, (up to circa 50m), may be covered by one shot.

There may be scenarios though where the distances covered are reduced because of certain pipe features, such as the existence of threaded joints, or particular bends. In these circumstances the inspection would need to be conducted in smaller sections (more sample points).

It is expected that all individual horizontal service pipes to each property will require an individual inspection using the GUL system but this will be on a case by case basis and confirmed during the trial. As indicated above, the method may enable laterals to be assessed for condition without entering customers homes.

The operator, TD Williamson has a well-developed system for categorizing the seriousness of issues identified. Any corrosion, damage or fault identified within a pipeline will have a measured score level of risk against the result, high, medium or low.

If particular 'hot spots' are identified TD Williamson would where possible inspect these particular anomalies with standard ultrasonic wall thickness measurements as a further confirmation of accuracy.

Scope

The project is to be a trial on a specific six storey riser in London as a pre-cursor to a potential further trial on other types of risers if the results from this project are positive

The field trial will look at using the 'Low Profile' GUL device to access the condition risk of risers to assist in prioritizing the networks high rise building (HRB) stock.

A report will be produced detailing the operation and results of the trials.

Objective(s)

The objectives are to -

- Prove that the smaller guided wave device design overcomes the barriers experienced in the 2007 trial
- Demonstrate to what extent the riser pipework can be assessed objectively, and with minimum disruption to customers
- Demonstrate that the results of this version of a guided wave device can provide a valuable resource for riser replacement management.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The success criteria for the project are:

- A report confirming that guided wave technology has the potential be used to prioritise HRB service replacement, so focusing operational costs on the assets at risk and deferring investment, thus managing costs efficiently.
- Confidence that the total lengths of each riser has been inspected and there were no pipe regions that cannot be assessed
- A report that confirms that all readings obtained by GUL can be successfully interpreted and all readings can be identified
- Evidence that surveys can be conducted with low levels of customer disturbance
- Evidence that the majority of laterals can be surveyed without the need for entering customers homes
- Confirmation that Guided Wave Technology can be transferred from mains inspection to HRB risers and that the results give confidence to trial the technology on other riser types in a further NIA project
- The report is in a format that can be used by tRIIO to inform their decision on the action to be taken at Kensington Heights, following the guidance laid out in LC/21

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The project will be a single stage trial on a specific seven storey building with multiple risers in London as a first stage in trialling this Method

Technology Readiness at Start

TRL7 Inactive Commissioning

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

A single site in London – Kensington Heights

Revenue Allowed for the RIIO Settlement

During RIIO-GD1 it is estimated that SGN, NGN ,WWU & NGG will need to replace 5% / annum of their High rise building services stock attend 135,000 gas escapes per annum that are attributed to Gas mains, spending approximately £135m on repairs. As this Project is to assess an asset condition assessment method the potential for future savings will be determined by the outcomes of this project.

Indicative Total NIA Project Expenditure

Total Indicative NIA Project expenditure - £114,154

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)

Savings mentioned below.

Please provide a calculation of the expected benefits the Solution

National Grid are forecast to spend £52m in the next 5 years on riser replacement. If this technology only reduces this number by 1% then we have a saving of £500,000. It is likely that this technology would be used on our taller buildings, as this is where this is more complicated pipework, therefore the savings will be greater.

Additionally, the trial will also allow us to calculate any savings from undertaking the physical inspection of the riser. For WWU, a typical inspection takes one and a half days for 2 men but this can be longer if access issues present themselves. Assuming a rate of £50 per hour, per man and 64 risers on 16 buildings (above 6 storey) to be inspected per year. The costs would be £50 x 2 x 12 = £1,200. Multiplied by 16 scheduled annual inspections (average WWU inspection numbers), totals an annual cost of £19,200 (base cost) Should this technology allow the inspection of a building to be undertaken in an 8 hour day the savings would be £6,400 (method cost). This calculation illustrates costs for WWU's network area & would need to be applied to all gas distribution network areas, for instance the number of surveys conducted by National Grid each year is significantly greater, with the North London network alone undertaking approximately 370 surveys last year, which using the WWU assumption would lead to savings of £292,000 in one year (excluding equipment costs).

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

The method is replicable across GB and all networks would be able to benefit from the learning as all networks have risers associated with Multiple Occupancy Buildings, and all networks will have risers which currently are inaccessible and therefore are unable to undertake a full visual assessment of the pipework. The amount the networks benefit will vary depending on the number of risers they operate.

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

There would be no up front investment cost in rolling the Method out across GB as the Method would be a bought in diagnostic service on a site by site basis.

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

The end of Project report will be shared with all Network Licensees detailing the performance of the Method, the experiences and knowledge gained from the trial and its limitations, lessons learnt, the range and resolution of the system and examples of successful diagnosis. This will help inform the asset and risk management strategies of other Network Licensees, and inform the decision as to whether this Method should be trialled on other types of risers in a further project.

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

All Network Licensee strategies indicate a need for solutions to the cost effective risk management of risers in multi-occupancy buildings.

- 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