

## NIA Project Registration and PEA Document

### Date of Submission

Apr 2016

### Project Reference Number

NIA\_NGGT0091

## Project Registration

### Project Title

Installation Risk and Technology Assessment Model

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NIA\_NGGT0091

### Project Licensee(s)

National Gas Transmission PLC

### Project Start

May 2016

### Project Duration

1 year and 8 months

### Nominated Project Contact(s)

Kirsty McDermott, box.GT.innovation@nationalgrid.com

### Project Budget

£159,000.00

## Summary

NGGT has over 200 installations on the Transmission pipeline system and 60% of these are operating beyond their original design life. This presents a major challenge to NGGT and an urgent requirement to develop innovative and cost effective solutions to assess the condition buried assets.

Inline inspection represents the most effective way of assessing the condition of buried pipework and is in the early stages of development. It will enable evidence based, targeted excavations that will reduce both the financial and environmental cost of asset management. Integral to any potential inline inspection activity is the physical connection to gain access to buried pipework. Standard connection methods have not changed for a long period of time and there is significant scope to reduce this cost by fundamentally challenging the end to end connection process and exploring new technology that will reduce cost and minimize disruption.

A fundamental challenge to the way connections are planned and constructed will greatly reduce the cost of establishing connections, reducing the cost of performing inline inspections and so further reducing the cost of maintaining these ageing assets.

## Third Party Collaborators

Pipeline Integrity Engineers Ltd

## Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

## Problem Being Solved

Once developed, internal inspection technology for buried pipework at high pressure installations will rely on standard connection techniques to access buried pipework which can be extremely expensive and potentially disruptive. Standard connection methods

have not changed for a long period of time and there is significant scope to reduce this cost by fundamentally challenging the end to end connection process and exploring new technology that will reduce cost and minimize disruption.

Innovative connection methods would represent a significant deviation from established practices and therefore represent a significant challenge to the business. As a result, this work falls outside the scope of existing inline inspection projects but is applicable to any form of internal technology employed in the future.

Although aimed at high pressure installations this approach could also be extended to National Grid pipelines that are currently not subject to in-line inspection (approximately 100km).

## Method(s)

An Installation Risk and Technology Assessment Model that will:

- Produce a matrix of inspection methods vs connection requirements.
- Recommend a streamlined process for the connection options.
- Provide a risk model to assess the most 'at risk' installations.

In order to:

Build a connectivity strategy that will maximise inspection benefits per site whilst minimising inspection costs.

Change Control 1 –In order to map to a NTS wide matrix, assist with the development of the model and define a clear ranking for the 28 selected sites, more rigorous assessments are required. Therefore additional site visits are essential and so additional time is required.

In addition the results from the Above Ground Installation (AGI) Cathodic Protection (CP) survey will be included in the model which will establish a full comprehensive diagnosis and what action is required for the asset.

## Scope

NGGT has over 200 installations on the Transmission pipeline system and 60% of these are operating beyond their original design life. This presents a major challenge to NGGT and an urgent requirement to develop innovative and cost effective solutions to assess the condition buried assets.

Inline inspection represents the most effective way of assessing the condition of buried pipework and is in the early stages of development. It will enable evidence based, targeted excavations that will reduce both the financial and environmental cost of asset management. Integral to any potential inline inspection activity is the physical connection to gain access to buried pipework. Standard connection methods have not changed for a long period of time and there is significant scope to reduce this cost by fundamentally challenging the end to end connection process and exploring new technology that will reduce cost and minimize disruption.

A fundamental challenge to the way connections are planned and constructed will greatly reduce the cost of establishing connections, reducing the cost of performing inline inspections and so further reducing the cost of maintaining these ageing assets.

## Objective(s)

The objective of the Installation Risk and Technology Assessment Model is to develop the framework for a new low cost connection strategy for inline inspection across the entirety of the NTS installations (circa 200).

## Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

## Success Criteria

Develop a connection strategy which will maximise inline inspection coverage whilst minimising inspection costs by optimising the connection process at a high pressure installation by 50%.

## Project Partners and External Funding

n/a

## Potential for New Learning

n/a

### **Scale of Project**

The project will be desk based.

### **Technology Readiness at Start**

TRL2 Invention and Research

### **Technology Readiness at End**

TRL3 Proof of Concept

### **Geographical Area**

Knowledge gathered from the project will potentially be applied to all NTS installations that cover the UK.

### **Revenue Allowed for the RIIO Settlement**

None

### **Indicative Total NIA Project Expenditure**

NIA expenditure - £159,000

## 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)

An estimated saving of £200k per connection point. Assuming a requirement for 3 connection points per site and a 10 year inspection programme across all 200 sites on the NTS, this represents a saving of £120m by the end of year 10.

#### Please provide a calculation of the expected benefits the Solution

The Installation Risk and Technology Assessment Model will provide an opportunity to reduce the cost of establishing a connection to enable internal inspection of previously unpiggable pipework at a fraction of the cost of the existing method. This represents a 66% saving over a 10 year period.

The method could be extended to pipelines not currently subject to internal inspection, creating further cost reduction and improved asset management strategy across the NTS

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

Providing the approach is successful across the pilot project it would then be extended to all NG installation sites and pipelines not currently subject to internal inspection..

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

Rolling out the method across the UK, assuming that all 200 sites on the NTS are subject to a 10 yearly inspection regime to monitor asset condition, the cost of installing connection points at all sites will be c£60m. This is a one off cost which will enable low cost inline inspection for the remainder of the life of the installation.

### 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

Across the UK there are approx. 3,500km of unpiggable pipelines, all of which have the same issues surrounding design life and asset condition data. The future of asset management at high pressure installations lies with inline inspection and the complexity and cost of connections is common to all Network Licensees.

Project learning will be disseminated on the National Grid website and the ENA learning portal.

#### 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 an enabling function within the 'Reliability and Operability' theme. It will seek to find the most cost effective way to enable future internal inspection of buried pipework.

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