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 2016

Project Reference Number

NIA_NGGT0084

Project Registration

Project Title

Valve Sealant Line Grouted Tee

Project Reference Number

NIA_NGGT0084

Project Licensee(s)

National Gas Transmission PLC

Project Start

June 2016

Project Duration

1 year and 1 month

Nominated Project Contact(s)

James Beardsley, box.GT.innovation@nationalgrid.com

Project Budget

£147,000.00

Summary

The proposed scope of this project is as follows:

PHASE 1

- Design of one Grouted Tee to accommodate the smallest diameter sealant line
- Manufacture of two prototype Grouted Tees
- Tooling for manufacture of new Grouted Tee seal profile
- Development of small Grouted Tee saddle seal
- Manufacture of multiple seals
- Carry out accelerated seal life assessment
- Design and manufacture Grouted Tee test rig
- Test programme to include:
  - Preparation & Installation with standard pressure test (with PMC)
  - Under pressure drilling (PMC)
  - Insert stopple plug (PMC)
  - Carry out differential pressure test
  - Replace pipe section downstream (PMC)

- Pressure test assembly
- Fatigue pressure test assembly – Max 150,000 cycles
- Pressure test to failure or agreed maximum pressure
- Produce design, development and qualification report

PHASE 2 (Subject to positive outcome of phase 1)

- Produce a manufacturing specification for all sealant line pipe sizes
- Design and manufacture an epoxy encapsulation clamp for the compression fittings on the sealant line pipework assembly
- Carry out installation and qualification testing on encapsulated pipework and compression fittings
- Produce design, development and qualification report
- Carry out G/19 assessment of the design and supporting documentation
- Development/modification and approval of a NG procedure for sealant line intervention work

Third Party Collaborators

DNV

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

There is no current safe and effective repair method for under pressure repairs to sealant lines. Over the years valve sealant lines that leak gas have been squeezed off to isolate the leak path. This process prevents further leakage but also prevents any further valve sealant from being injected. Consequently, there are now a large number of valves in service that are passing gas with no means to inject sealant. The only present solution is to replace the entire valve which is extremely costly.

Method(s)

A proposed solution is to develop a small Grouted Tee connection that will be attached to the sealant pipework, below the squeezed off location. The tee connection will allow hot tap access into the pipework to isolate the leak path and enable the remaining pipework to be modified or replaced. In addition this project will also provide an encapsulation solution to the sealant line compression fittings that are susceptible to leakage.

Scope

The proposed scope of this project is as follows:

PHASE 1

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Objective(s)

Develop and qualify a Grouted Tee that is suitable for sealant line intervention work.

Develop and qualify a compression fitting epoxy encapsulation sleeve.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The Grouted Tee passes the required qualification tests

The Grouted Tee seal passes the life assessment tests

The epoxy encapsulation sleeve passes the required qualification tests

Approval of new NG procedure for sealant line intervention work

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The proposed scope will be desk based and test laboratory based

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

The major development and qualification of the Grouted Tee and encapsulation sleeve will be undertaken at National Grid's site at Ambergate. The Grouted Tee seal development and accelerated life assessment will be undertaken by FTL Technology at their testing facility.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£147,000

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)

Total savings for replacing an estimated 25 defective sealant line replacements per year, at a saving of £200,000 per replacement avoided/deferred by use of a grouted tee, would be a saving of £5million per year.

Please provide a calculation of the expected benefits the Solution

The cost to replace a full set of vent and sealant line functionality to a typical 36in valve based with a feeder section would involve, feeder isolation, recompression, venting, excavation, valve works including replacement/refurbishment of the valve, reinstatement, commissioning at a cost of around £250-300k.

The use of a grouted tee to restore sealant or vent line functionality by the use of this new method is estimated to cost around £40k, and the life of the existing valve is extended. The cost saving comes from removing the requirement for a new valve, isolation, recompression, venting, valve works and reducing excavation and reinstatement.

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

The method is applicable to all NTS valves with sealant lines, the estimated population of NTS valves is several thousand. The method is equally applicable to LTS valves with sealant lines of other Network Licensees.

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

The total population of NTS valves is several thousand. Estimating 25 defective sealant line replacements per year, roll out costs have been estimated at £40k each, saving of £200,000 per replacement avoided/deferred by use of a grouted tee. The new method also extends the useful life of the valve.

Whilst the method is applicable to all sealant lines, it is not possible to estimate exact cost due to the number of relevant variables such as valve type, material, pressure rating, sealant line design, number of lines, current condition, operational use, rate of valve degradation, rate of sealant line degradation, location and depth of valve, whether buried or above ground etc.

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

Grouted tees currently have not been considered or trialed at sealant line pressures by the gas industry. This project will develop new learning around the suitability and practicalities of using grouted tees for very high pressure live sealant line intervention work for all gas networks with valves.

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

N/A

☑ 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