

NIA Project Registration and PEA Document

Date of Submission

Jan 2020

Project Reference Number

NIA_NGGT0141

Project Registration

Project Title

Sarco Stopper

Project Reference Number

NIA_NGGT0141

Project Licensee(s)

National Gas Transmission PLC

Project Start

January 2020

Project Duration

1 year and 1 month

Nominated Project Contact(s)

Robbie Williamson

Project Budget

£95,000.00

Summary

To design and implement a solution that creates a double vapour barrier system, to isolate steel riser and valve bridle pipework from the depressured buried pipe, and allow a guaranteed seal and monitoring to be achieved when completing hot work adjustments to the required pipework.

Third Party Collaborators

DNV

Sarco Stopper Limited

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

St Fergus gas terminal contains over 200 2" steel riser stabbings and valve bridle lines that need to be either repaired or replaced due to identified corrosion issues; this remediation would entail hot work being carried out.

Using current maintenance techniques, hot work permits would require vast site outages, excavations, venting and purging to create the required isolations and conditions to carry out the repair or replacement of the riser/bridle line pipework which is costly, wasteful and operationally challenging.

Method(s)

To design, manufacture and prove a bespoke 2" steel riser/valve bridle line pipework isolation solution to form a gas vapour barrier system, to control and make safe the hot working area from the potential effects of residual gas being present in the main pipeline.

Scope

St Fergus pipework, along with a lot of NTS pipework, was installed in the 1970's and over the years has been subject to the effects of external corrosion. There are a significant number of 2" steel risers and valve bridle lines (above ground) stabbings that are adjoined to (buried) main bore pipework. Due to external corrosion issues, especially around the flanges, these 2" stabbings require maintenance and the majority will require replacement.

The required work to repair or replace the affected 2 inch stabbings will involve hot work. Under National Grid's management procedure T/PM/TR/17 (Isolation of Above 2 Bar Plant and Equipment), the isolations required to create a suitable double block and bleed system and carry out the work needed on the stabbings would require large sections of operational pipework to be isolated and purged to air. Due to the operational criticality of St Fergus terminal, this is not a viable solution.

The main bore pipework from which these stabbings stem from will already be de-pressurised, but there will still be some residual gas present. To carry out a repair or replacement using the traditional methodology, the main bore pipework would have to be purged to air. This is what the vapour barrier solution hopes to negate the requirement for.

St Fergus gas terminal has been chosen as the site for this project and all technical validation will be specific to St Fergus. However, with additional work and validation in a future scheme, there is no reason why this solution could not be deployed NTS wide.

Objective(s)

To develop an adequate vapour barrier isolation solution that allows operatives to complete pipe asset repair and maintenance activities without the risk of explosive gases propagating into the working area (thus de-risk the operation) while keeping any residual product in the main pipeline.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Successfully demonstrate that the proposed isolation solution creates a sufficient vapour barrier system, to isolate steel riser pipes and allow a guaranteed seal and monitoring to be achieved when completing hot work adjustments to the riser pipe work. It will also prove the capability to apply this kind of barrier isolation at a bend location which is currently unavailable from other isolation methods.

Project Partners and External Funding

Main Project Partners - SARCO Stopper and DNV GL.

External Funding – Nil.

Potential for New Learning

The outcome from this programme may change the methodology and various maintenance procedures in which remedial works are carried out in the future.

Scale of Project

Trial in a working environment.

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

National Grid Site.

Revenue Allowed for the RIIO Settlement

None.

Indicative Total NIA Project Expenditure

£95000

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)

> £1 million.

Please provide a calculation of the expected benefits the Solution

Due to the complexity of current remedial strategies, accurate costs are hard to calculate. However, this isolation solution would help enable the following just at St Fergus terminal:

- Negating the need for excavations. To repair all the riser/valve bridle pipework at St Fergus, it is estimated that between 5 and 20 excavations (of varying size and depth) would be required with a cost of up to £250k for each excavation.
- Negating the requirement for late night working for onsite staff - saving £25k per isolation.
- Significant reduction in material requirements cost (e.g. Nitrogen tankers, air movers, lighting etc.) required to purge the pipeline to air and subsequently re-gas - saving £15 - £20k per isolation.

Additional cost savings are as follows:

- Costly outages not required from Incomers e.g. Shell, PX Group and Ancala Partners.

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

This method could potentially be rolled out across all locations across the NG network where similar 2" risers or stabbings require corrosion / damage remediation by hot work, E.g. above ground installations (AGI's), compressor stations and terminals.

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

The method would have to be independently verified for safe use on other complex sites at an approximate cost of £10k per site.

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

This programme may provide a different methodology for pipeline isolations that both National Grid and distribution networks may benefit from.

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 challenges this will address are:

Efficiency

- To create a less disruptive, costly and time consuming isolation, purge and repair procedure.
- To provide a hot work repair option to specific locations that otherwise would be unavailable to NG.

Reliability

- Corrosion – allowing NG to repair or replace affected riser pipework.
- Condition – allowing NG to ensure the NTS remains in a functional state.

Safety

- Gas escape – this procedure will allow repair to essential pipework to minimise the risk of a loss of containment in the future.

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.

The twin bag vapour barrier system has not yet been proven for the on-shore gas industry with the capability to meet the requirements stated in this document, especially with ability to isolate at a pipe bend.

SGN have registered an NIA project partnering with Sarco, project/nia_sgn0031 to develop a stent bag system that can maintain gas supplies during high volume gas escapes, which is significantly different to the requirements of this project.

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

The project is innovative as this method of creating a vapour barrier system using a twin bag design has not been investigated for its effective use as a suitable isolation to allow the facilitation of hot works.

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

The effectiveness of this method of isolation to provide a safe vapour barrier system to allow hot works to be carried out safely above it has not yet been proven. To make a viable business decision as to whether this isolation method is effective to allow the riser pipework to be repaired/replaced, a trial is required with the development of a prototype part and evidence will need to be provided; this is the aim of this programme. The use of the NIA framework will mitigate the financial risk to the business of this unproven application and will ensure the end results are available to all stakeholders.

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

NGGT operates under a comprehensive standards framework. The latest advances of innovative isolation techniques may offer NG and other network operators considerable cost and efficiency savings if their capabilities are proven. However due to the lag in standards development, new isolation equipment may not be compatible with the standards as written and hence their use is restricted. A full capability assessment requires a dedicated programme of evaluation by the relevant technical experts. Innovation funding provides a robust framework that enables these assessments to be undertaken and ensures that all the necessary updating of procedures and standards are captured and approved decreasing the business implementation time. The risk of not adopting these innovative isolation techniques are that we may risk interrupting supply if traditional isolation requirements must be followed to repair/replace the steel riser/valve bridle line pipework. Innovation funding ensures the dissemination of the generic findings are communicated to all networks which improves efficiency and ensures that relevant proven equipment is readily deployed.

This project has been approved by a senior member of staff

Yes