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

Jan 2014

Project Reference Number

NIA_NGGT0011

Project Registration

Project Title

Composite Pipe Supports

Project Reference Number

NIA_NGGT0011

Project Licensee(s)

National Gas Transmission PLC

Project Start

September 2012

Project Duration

3 years and 7 months

Nominated Project Contact(s)

Simon Cowling (box.GT.innovation@nationalgrid.com)

Project Budget

£227,000.00

Summary

The proposed project will review of the existing styles of pipe supports in use across the UK gas National Transmission System (NTS) and determine concepts for trial to remove the existing manual handling issues and allow for inspection without the need to damage/break out the associated concrete plinths. The subsequent design would also eliminate the inherent corrosion risk with existing materials.

Third Party Collaborators

Capita

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

The existing pipe supports on National Transmission System (NTS) sites are installed by different means and to different designs. Certain large diameter pipe supports cannot be removed without the breaking out of concrete plinths in order to inspect for corrosion between metallic surfaces underneath them.

These steel pipe supports are also very heavy and present a manual handling issue to both remove and replace. Other pipe supports in use are welded to the pipe and as such the sliding mechanisms cannot be maintained without damaging the support and concrete plinth.

This project looks to research potential alternative solutions to the above existing pipe support materials and design.

Method(s)

First phase – study and produce options for different styles of pipe supports fabricated from composite materials.

Second phase - design, development and any identified modifications of preferred option and field trials. Finite element analysis on a support of selected nominal diameter representative of the current split design in steel components. This will permit direct comparison with future design proposals incorporating alternative materials of construction.

Phase three - Design proto-type, develop pipe support adopting the principles findings of the previous phases. Finite element analysis on 600mm and 900mm designs. Produce a manufacturing Specification. Presentations to National Grid technical stakeholders.

Phase four – Trial composite supports in a working environment.

Additional funding (£76k) Following a series of peer reviews at design meetings it was identified that finite element analysis are required for all remaining pipe sizes (300mm, 450mm, 750mm, 1050mm, 1220mm), and a G/19 (Procedure for application of model design appraisals) application and approval is required. Therefore Phase 4 has a revised list of deliverables, including the following:

1. Finite Element Analysis (FEA) for all pipe diameters

    a. Production of drawings for remaining sizes: 300mm, 450mm, 750mm, 1050mm, 1220mm
    b. FEA on sizes 300mm, 450mm, 750mm, 1050mm, 1220mm

2. G/19 (Procedure for application of model design appraisals)

    a. Production of G/19 application, including supporting documents
    b. Response to appraisal comments
    c. Completed and approved G/19 dossier

3. Prototype manufacture

    a. Finalise production methodology
    b. Produce three (3) prototypes for installation and evaluation (450mm, 600mm, 900mm)

Phase five – Installation and evaluation of composite support design in a working environment (not currently costed)

4. FEA testing

5. During phase four it was identified that the installation and evaluation of composite support design in a working environment will not provide crucial point of failure evidence. Therefore phase 5 has been re-scoped to include: ?

- Review of Phase four destructive testing results and application in FEA
- Fabrication and testing of up to two rounds of destructive sample testing to validate FEA models
- Fabrication and load testing of up to two DN600 pipe supports, in accordance with Exova Method Document E-E-OP-EE-ME-DA-MD-M11: Static Strength Testing of Components & Structures
- Confirmation of G19 Design drawings and Performance specification, for review and adoption
- Provision of Project Close Out Report

Scope

The proposed project will review of the existing styles of pipe supports in use across the UK gas National Transmission System (NTS) and determine concepts for trial to remove the existing manual handling issues and allow for inspection without the need to damage/break out the associated concrete plinths. The subsequent design would also eliminate the inherent corrosion risk with existing materials.

Objective(s)

The project objective is to develop a suitable alternative design of pipe support for use on the NTS.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project should identify options for alternative designs and materials for trial on a suitable NTS site.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The trial will be on a NTS site in order to fully assess the operational performance in the field environment.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

The project output will be suitable for use across the NTS asset base.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

IFI - £26k

NIA - £48k + £76k = £150k

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)

£400k by reducing the maintenance cost associated with pipe supports by removing the need to revisit sites or break out and replace the concrete plinths.

Please provide a calculation of the expected benefits the Solution

N/A – research project

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

The project is looking to identify solutions suitable for the range of pipe supports on the NTS.

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

The cost to manufacture a single composite pipe support unit is estimated at £4k. A minimum of two to three units required for each 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

Pipe supports are part of the NTS asset base but learning may be of use to gas distribution networks with similar assets.

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

This project fits within Optimising Asset Management under the Reliability 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