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

Mar 2014

Project Reference Number

NIA_SGN0014

Project Registration

Project Title

Tornado Max

Project Reference Number

NIA_SGN0014

Project Licensee(s)

SGN

Project Start

August 2013

Project Duration

2 years and 6 months

Nominated Project Contact(s)

Ryan Smith, Innovation Delivery Manager

Project Budget

£21,798.00

Summary

The scope of this project is to offer a new and improved piece of equipment that improves and extends the design and functionality of the Tornado air powered vacuum device for the removal of small quantities of water from pits and valve chambers, for purging redundant gas pipes, and the removal of residual gas trapped in building voids to aid the re occupation of the occupants.

The outcomes of these improvements are expected to include:

- Reduced interruption times, thus improving the productivity and efficiency across our networks
- In the event of customers being evacuated, greatly improved reoccupation time.

The project has been delayed due to the number of trials conducted. SGNs Engineering Policy team has approved the use of the Tornado Max Adaptor for use under trial conditions on our network. Due to the complexities of the equipment and the specific, unique operating scenarios the project team propose extending the field trial duration. It is important that the project team and Engineering Policy deliver a representative sample of trials in order for the results to be clearly evaluated. Yet, the equipment can only be tested in the event of a gas emergency, on an ad hoc basis, which adds a level of complexity along with additional safety factors to consider. For these reasons, the end date of the overall project will now be extended by a further 10 months, concluding in January 2016. This will allow the project team and Engineering Policy enough time to conclude their field trials and assess the results ahead of the project being completed and the learning shared with other network licensees.

The project title, problem, objectives, success criteria and cost arrangements will remain unchanged, and the change is beneficial as it will allow the project to complete as planned and deliver learning which will benefit all Gas Distribution Networks in their emergency operations across GB.

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

On average across SGN we deal with approximately 44,762 gas escapes per year, excluding interference damage repairs. A problem has been identified when dealing with residual gas in properties following the repair of a leak, when gas often gets trapped in cavities inside of buildings or in concrete floor annuluses due to minimal air movement. Until the amount of gas in these spaces is removed the occupants of the property who have been evacuated can not return to it.

A piece of equipment called the 'Tornado' is currently used widely across the industry to 'suck' residual gas out of the ground when a large area is saturated with gas from a leak to aid pinpointing the origin of the leak. The Tornado is placed on the road surface and compressed air is passed through the body of the unit, causing a vacuum which sucks the trapped gas out of the ground and vents it in to the atmosphere. However, this device cannot be used to extract trapped gas from buildings.

The development of the Tornado Max, an adaptor to be connected to the Tornado, will facilitate the use of compressed air to remove trapped gas from the areas of buildings' structures where the gas is trapped. This will speed up the reoccupation process following an escape and greatly reduce the impact on the customer. The adaptor will also make removing residual gas from abandoned pipes easier and aid operatives in the safe removal of small amounts of water trapped in valve chambers in the ground.

Method(s)

This project aims to tackle such concerns by improving and extending the design functionality of the Tornado air powered vacuum device that is currently utilised throughout the gas industry.

This project is concerned with exploring incremental improvements that can be applied to the Tornado air powered vacuum device by adding to the current tornado design an attachment which will allow it to be connected to a ¾" BSPT (British Standard Pipe Thread) threaded purge hose to focus the suction power provided by the unit in a specific area.

This is a technical project where initial development and production of working drawings will be undertaken prior to designing and manufacturing a working model. Field trials will be carried out using 45 samples of the tornado adaptor provided by Pipetech Ltd to selected field operatives spread across three depots in SGN's Scotland, South and South East England licence areas to ensure testing across a varied demographic of SGN's networks. If the trials covering the use and effectiveness of the new adaptor prove to be a success this equipment will generate benefits for licensees, particularly in reducing the time spent reoccupying customers who have been evacuated from a property.

The methodology will be as follows:

1. Pipetech to research, develop, and produce working drawings.
2. Pipetech to produce a maximum of 2 working models and test. Any required changes to the design will be made following agreement between SGN and Pipetech.
3. Drawings to be submitted to SGN for assessment pre prototype production.
4. If suitable, SGN to provide written approval to Pipetech to proceed with batch manufacture.
5. Production schedule submitted to SGN followed by fortnightly progress reports of project.
6. Production of 45 Tornado Max units for trialling purposes
7. Delivery to sites and provide training to support field trial in 3 depot locations, Scotland, South and South-East.
8. Assessment made on the success and suitability of the product developments by SGN.

Scope

The scope of this project is to offer a new and improved piece of equipment that improves and extends the design and functionality of the Tornado air powered vacuum device for the removal of small quantities of water from pits and valve chambers, for purging redundant gas pipes, and the removal of residual gas trapped in building voids to aid the re occupation of the occupants.

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Objective(s)

The aim of this project is to design, develop and evaluate an attachment to be used with the current Tornado tool, which is light, requires minimal maintenance and user friendly.

To achieve this the key objectives are to:

- Develop, test and review design drawings of the new equipment
- Produce and review at least one Tornado Max adaptor
- Train SGN employees in use of the Tornado Max adaptor
- Evaluate the performance of the sample system through field trials
- Produce a technical report detailing the outcomes of the project

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

In order to determine whether this project has been successful or not it will be reviewed at key milestones set throughout the project listed above, this will ensure value for money is received by the customer, with the avoidance of unnecessary expenditure. Key outcomes of the project will be:

- The development of a piece of equipment which utilises the existing Tornado tooling
- Field trial data clarifying the effectiveness of the equipment to remove build up of gas from confined spaces in property structures and small quantities of water and grit from valve chambers
- An improved reoccupation time for evacuated residents as a result of gas in properties
- Production of a technical report detailing the project outcomes

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The scale of the project reflects the fact it is based on development of an existing product, reducing the amount of time and cost spent at the development stage, and the use of the existing purge hose which is standard equipment for all field teams within SGN.

Once the product has been sufficiently developed, three separate depots across SGN's network will be used for trials to ensure the findings are a fair reflection of the varying types of applications and environments the Tornado Max is designed to work in.

Technology Readiness at Start

TRL7 Inactive Commissioning

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

This project will be trialed in three depot locations, one in each of SGN's regional networks; Scotland, South and South East England.

Revenue Allowed for the RIIO Settlement

During RIIO-GD1 it is estimated that SGN will spend approximately £209.6m on Repair activities. While no direct savings are

expected during project implementation, it is expected that if successful this project could enable Network Licensees to make cost savings with regards to Emergency Repair allowances as a result of improvements made to the existing Tornado technology.

Indicative Total NIA Project Expenditure

The total project expenditure will be £21,798, 90% of which is allowable NIA expenditure (£19,617).

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)

The introduction of this newly developed technology has the potential to deliver financial savings against the original method if successful outputs are achieved.

It is envisaged that this technology has the potential to generate savings of 50% through the reduction in the time taken to remove residual gas in a property once the leak has been fixed. As a result, the forecast annual saving across SGN using the new Tornado device is estimated to be around £1,130,700 per annum if we are to use this technology on 80% of all reported instances of gas in properties.

Please provide a calculation of the expected benefits the Solution

On average across SGN we deal with approximately 44,762 escapes per year, of this total in 2012 there were 6,092 reported instances of gas in property. It is estimated that the Tornado Max could be used in almost all instances where gas has been present in a property following a gas leak.

In the vast majority of instances where gas has entered a property as a result of a leak, the Licensee must have a qualified operative on site to monitor the gas readings until they reach a safe level to reoccupy the property. On average this takes approximately two days with a labor cost of £464.

It is anticipated that where it is possible to use the Tornado Max adaptor, the time will be reduced by 50% resulting in a saving of £232 per job.

Taking the 2012 figure above as a baseline for annual number of instances of gas in property, the total estimated annual saving if the technology is used at 80% of 6,092 sites would be approximately £1,130,700.

It is also possible to incur additional costs to rectify damage to a property as a result of trying to vent gas from the property, for example lifting flooring to access trapped gas which has not been included in the calculation above. These figures are hard to quantify with each instance being different.

Once the product has been trialed, an accurate cost analysis will be carried out using the field trial findings.

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

Based on the quantity of sites at which we expect SGN will be able to use this technology (as above), and a 4:2:1:1 split with reference to the size of each network, it is assumed that National Grid have approximately 9,748 sites, and Wales & West and Northern Gas have 2,437 each, gives an estimated total of 19,496 sites across Great Britain (GB) where this technology could be applied.

It must be noted that these figures are based on averages and estimates rather than real network data and the complexity will vary from site to site. The main focus of this project is to test the technology and understand the potential benefits.

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

Until the product is developed fully, it is difficult to determine an accurate price for the roll out of the equipment and the quantity required. This project will enable an informed estimate of the costs of roll out.

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 learning from this project will benefit Network Licensees as it will provide them with a clear evaluation of the existing Tornado equipment that they are currently using against the new technology to be trialed. The results from the field trial and comparisons will be shared. If successful this new equipment will allow network licenses to introduce this equipment into their operational activities and allow them to pin point gas escapes more efficiently and purge where necessary.

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