NIA Project Registration and PEA Document

Date of Submission

Dec 2013

Project Reference Number

NIA_NGGT0040

Project Registration

Project Title

Metering and Gas Quality Training Simulator

Project Reference Number

NIA_NGGT0040

Project Licensee(s)

National Gas Transmission PLC

Project Start

November 2013

Project Duration

1 year and 5 months

Nominated Project Contact(s)

John D Wilson, Alex Ferguson,
box.GT.innovation@nationalgrid.com

Project Budget

£84,000.00

Summary

The development of this novel simulator tool is designed to assist with a skills shortage of qualified natural gas measurement engineers and improve the skill base across an industry with an aging workforce. Reliance on external consultancies is a risk. Training of employees in this specialised area both reduces the risk and cost associated with management of the gas measurement assets.

National Grid has developed a Training AGI at Eakring which is available to both National Grid and other operators. The AGI has been designed and built to be representative of equipment typically found on National Grid Gas and other operators' systems. It has been designed so that it will be run on air, which as a result the potential for realistic gas quality and metering training is limited.

This has led to the idea of developing various scenarios that are representative of gas quality and metering issues. This will include three stages of development:

1st Stage: A feasibility study for the development of scenarios

2nd Stage: Design, development, installation, presentation and training for course trainers

3rd Stage: Operational Acceptance by National Grid.

Third Party Collaborators

DNV

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

Currently the tools and facilities available for training in realistic gas quality and metering are very limited. Experienced specialist engineers in this field are in short supply and as such National Grid are in the position of contracting specialists to attend site in the event of metering or gas quality alarms.

National Grid Gas has developed a state of the art training facility for natural gas at Eakring and although training for the Above Ground Installation (AGI) has been designed and built to be representative of equipment typically found on National Grid Gas and other operators' systems, the AGI operates on compressed air due to the absence of a local natural gas supply. Hence the opportunity for training in gas quality and metering issues is very limited.

The development of a novel simulator tool to mimic various Meter Suspect and gas quality alarm scenarios would allow for in depth training programmes to be developed, enhancing the skills of engineers in this specialist field.

Method(s)

Stage Gate 1

1) Feasibility study of development of up to 30 scenarios representative of a range of realistic metering and gas quality issues including:

Orifice plate, turbine, ultrasonic, secondary instrumentation and flow computer issues that generate Meter Suspect and gas quality alarms which require investigation and fault rectification.

Stage Gate 2

2) Functional and detailed design document in accordance with T/PM/G/35

3) Design and develop tool for simulation of changes in metering analogue inputs and gas quality data.

4) Development of up to 20 scenarios representative of a range of realistic metering and gas quality issues selected by National Grid Gas from phase 1.

5) User documentation and presentation of tool.

6) Installation of tool at Eakring Training Facility in accordance with T/PM/RE/18 to include documentation and marked up red line drawings.

During this stage of work the project team encountered resource constraints which led to delays in installation of the metering simulator tool at National Grid's training facility. Therefore an extension to the end date is required to allow time for Stage Gate 2 items 6 & 7 to be undertaken prior to completion of Stage Gate 3 below.

7) One-day training course for trainers at Eakring Training Facility.

Stage Gate 3

1) Operational acceptance by National Grid under T/PM/RE/18. To include submission of one draft version for comment and the final drawings for submission on National Grid System. If further changes are required to the drawings then further changes will be applicable and subject to a change control.

Scope

The development of this novel simulator tool is designed to assist with a skills shortage of qualified natural gas measurement engineers and improve the skill base across an industry with an aging workforce. Reliance on external consultancies is a risk. Training of employees in this specialised area both reduces the risk and cost associated with management of the gas measurement assets

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Objective(s)

This project is intended to utilise software simulation techniques to generate realistic gas quality and metering scenarios to reinforce and test understanding of principles of the training being delivered.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Scenarios are developed, integrated and implemented into the training equipment on site.

Training programmes are developed incorporating the new tool and delivered.

Training becomes realistic for gas quality and metering issues that builds understanding and learning by reinforcing the training undertaken.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The project could not be done on a smaller scale. The project is designed for implementation at the Eakring Training AGI, the training will take place in a safe environment but with realistic operational scenarios, so when they go and work on live operational equipment they will know what they are doing and be fully competent to deal with any issues that arise.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

National Grid, Eakring AGI Training Facility

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£84,000

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)

The current situation involves National Grid contracting specialists to attend site in the event of metering or gas quality alarms when Network or GTAM staff cannot resolve the issue. Qualified natural gas measurement engineers are specialist engineers and not widely available Reliance on external consultancies is a risk. Training of employees in the specialised area both reduces the risk and cost associated with management of the gas measurement assets.

Average savings per fault are estimated at £1,900. Based on 1 fault a year at each site (~48 sites; 23 Power stations, 25 Compressors). Therefore estimate of savings per year = £92,450.

Please provide a calculation of the expected benefits the Solution

Assumption of 1 fault per year per site - 23 Power Stations and 25 Compressor Sites

Base cost - Based on contractor rate of £1,000/day, £300 travel (hotel and fuel expenses), need 2 days to include travel per fault.

Method cost - NG technician attends site and resolves the problem, needs on average one day at £350/day +£50 (fuel) for Power Stations. For Compressor sites there is no need for travel so NG technician costs £350/day

Power Station Saving per fault(£)=(2,300-400)=1,900, Overall savings per year= £43,700

Compressor Saving per fault (£)= (2,300-350)= 1,950, Overall savings per year= £48,750

Therefore overall savings= £92,450 per annum.

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

It will be rolled out at Eakring training AGI but the output of the training can be used at 23 Powers Station sites as well as the 25 Compressor sites on the NTS.

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

There are no further costs for rolling out the Method across GB for National Grid. There however could be further cost if more scenarios were to be developed. The tool will be dependant on having a license for the pre-existing Gas VLe software, licenses for which can be

obtained from GL Noble Denton.

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 training facility where this is being implemented can be used by other networks to train their employees as the scenarios and equipment is very similar and the scenarios that will be developed could be adapted and changed to suit different networks depending on their set-up.

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