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NIA Project Registration and PEA Document

Date of Submission

Feb 2020

Project Reference Number

NIA_NGN_252

Project Registration

Project Title

Novel Seal PPE - Phase 2

Project Reference Number

NIA_NGN_252

Project Licensee(s)

Northern Gas Networks

Project Start

February 2020

Project Duration

1 year and 0 months

Nominated Project Contact(s)

Mark Simpson

Project Budget

£169,154.00

Summary

Current breathing apparatus typically uses a hard material interface, which requires the wearer to be clean shaven for an effective protective facial seal. As a result users must be clean shaven for fitting of the apparatus, and remain so even if it is used infrequently. In reality operatives are not always suitably shaven to meet the manufacturers' safety requirement, which negatively affects the fit and sealing capability, causing a health and safety risk. This restricts personal style choices from the user, as well as the potential to impact on religious belief.

The solution is to develop improved breathing apparatus seals that can form a complete seal for users who have beards. This will:
Improve protective sealing between the face and breathing apparatus (full face and half mask)

Accommodate changes in facial hair styles

Accommodate variations in musculoskeletal structure

Improve fit and comfort

Increase safety and compliance

Provide personal styling freedom for operatives (which could potentially improve moral)

Third Party Collaborators

Avon Protection

Frazer-Nash Consultancy

Nominated Contact Email Address(es)

innovation@northerngas.co.uk

Problem Being Solved

Current breathing apparatus (BA) typically uses a hard material interface, which requires the wearer to be clean shaven to establish an effective protective facial seal. As a result, users must be clean shaven for the fitting of the apparatus and remain so even if it is used infrequently. In reality, operatives are not always suitably shaven to meet the manufacturers' safety requirement, which negatively affects the fit and sealing capability, causing a health and safety risk. This restricts personal style choices from the user, as well as the potential to impact on religious belief and medical conditions. All of which, can adversely impact productivity across the operational workforce.

Novel Seal PPE Phase 1 (NIA_NGN_234) produced three concepts from the initial requirements that could be taking forward into Phase 2 for further development into testable prototypes. The concepts could be used on either dust masks, respirators or BA.

Method(s)

The technical and commercial development of this project will include:

Technical development:

- Concept downselection
- Definition of design parameters (e.g. required performance, safety and manufacturing standards)
- Materials documentation
- Concept design development
- Prototype build
- Laboratory (lab) testing
- User testing
- Simulation field trials

Commercial development:

- IP management
- Market analysis
- Economic analysis
- Recommendations for commercial success

Scope

The aim of Phase 2 is to develop one Phase 1 concept into a testable prototype (3 of), whilst considering commercial viability and engaging with key stakeholders.

The outputs will be in the form of:

- Trial results from a proof-of-principle prototype
- Understanding the 'Freedom to Operate'
- A supporting business case

In order to achieve the outputs listed above, this Phase considers both the technical and commercial requirements of arriving at a final design 'state'.

In addition to working in partnership with the Energy Innovation Centre (EIC) and NGN, consultations and workshops with manufacturer Avon Protection (Avon) will inform the development of the product from a manufacturer's perspective.

Objective(s)

1. Initial identification of technical and commercial requirements
2. Prototype production
3. Prototype user fit testing
4. Simulation field trials

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

1. Early-stage manufacturing and commercialisation analysis
2. Design parameters and materials selection technical note
3. Design Review Pack

4. Prototype initial lab test results
5. Manufacturing and commercialisation workshop technical note
6. Prototype further lab tests and user fit test results
7. Business case and commercialisation roadmap
8. Simulation field trials supporting documentation
9. Field trials reporting

Project Partners and External Funding

Northern Gas Networks, Frazer Nash and Avon Protection

Northern Gas Networks- £169,154

Avon Protection - £15,000

Potential for New Learning

The project will answer the questions of whether; BA can be safely worn with facial hair and the products commercial viability profile (cost of supporting it to market and unit cost).

Scale of Project

The project will develop 3 fully functional prototypes for trialing and testing in a 'local' simulated operational environment. Alongside this, the project will prove the commercial viability of the final design specification.

The scale of the project is reflective of the minimum requirements to demonstrate and gain assurance that the final product, if taken forward to implementation would represent customer value for money.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

The project will be constrained to Northern Gas Networks.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

External funding = £ 161,430

Internal cost = £7,724

Total Cost = 169,154

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)

A key objective of this project is to prove the products commercial viability. Until the work has been completed, it is not possible to determine cost saving estimates.

Please provide a calculation of the expected benefits the Solution

Financial benefits will be determined in this phase of the project, once the commercial viability of the product is proven.

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

The challenge being addressed by the solution is applicable to all GDN's and therefore could be readily adopted across the entire GB gas network.

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

Roll out costs are unknown at this stage.

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

No such product currently exists to allow BA to be worn with facial hair. Of which, it is anticipated the development of such a product will improve both safety management practices and workforce productivity across the GDN landscape

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

Safety and Emergency

- 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.

Several checks have been undertaken to ensure no current solution exists to address the outlined challenge.

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

There is currently no existing solution for the accommodation of facial hair with effective sealing. It is believed that by increasing the seal compliance and incorporating a highly conformable or self-amalgamating skin interface, fit to a broader range of face shape, facial hair and protection can be significantly increased.

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 level of uncertainty within the project, namely commercial viability and technical performance presents a risk greater than the networks current risk appetite.

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

This project is novel not only in the development of the BA, but also its route to commercialisation. As such, it faces uncertainty on two fronts; Achievement of performance to satisfy HSE regulations and commercial viability. The level of risk within the outlined areas of uncertainty is beyond the current appetite of the network.

This project has been approved by a senior member of staff

Yes