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

May 2014

Project Reference Number

NIA_WWU_016

Project Registration

Project Title

Treatment & Re-use of Gasholder Sludge

Project Reference Number

NIA_WWU_016

Project Licensee(s)

Wales & West Utilities

Project Start

May 2014

Project Duration

1 year and 7 months

Nominated Project Contact(s)

Oliver Lancaster

Project Budget

£248,973.00

Summary

Having proved the viability of the project in a small scale site trial and bench scale laboratory testing, the innovative step to full-scale application is now possible. The full scale project will involve:

1. Centrifuging of sludges at one site.
2. Alkali leaching of the sludge.
3. Construction of bioremediation piles.
4. Treatment of the biopiles using additives proven through the treatment trial, aeration, moisture content control and atmospheric monitoring within the sludge material.
5. Stabilisation and solidification of bio-treated sludge.
6. Validation/verification of material placed in the annulus/base of the receiving tank to ensure it meets the requirements of the environmental regulators.

Nominated Contact Email Address(es)

innovation@wwutilities.co.uk

Problem Being Solved

Wales & West Utilities have undertaken extensive gasholder demolition throughout the period 2008-2013, with a further programme of 8 gasholders to be demolished in the next 2 years. Every time a gasholder is demolished, hazardous sludge from the base of the tank that has built up over the life of the storage asset (up to 130 years old) has to be collected and sent off-site for disposal, or more commonly to an incineration facility, due to the significant concentration of contaminants. This traditional approach to managing gasholder sludge is both disproportionately expensive and carbon intensive.

Method(s)

A development trial was undertaken on sludge from gasholder demolition undertaken in the previous price control period. The first treatment stage involved the centrifuging of sludge to remove the water content. The second stage involved setting up of bioremediation piles using the caked sludge to test a variety of additives to reduce the hydrocarbon content. The final stage of treatment involved the chemical stabilisation and solidification of the bio-treated sludge to reduce the leachability of residual contaminant constituents.

The trial scale project has been completed and paves the way for a full-scale innovation demonstration project to treat sludge from multiple gasholder sites. The treated sludge from the demonstration project is to be re-used as backfill within the least environmentally sensitive below ground tank. The re-use of sludge avoids disposal/incineration and reduces the required volume of imported aggregate backfill.

The full scale demonstration project will be undertaken using the CL:AIRE (Contaminated Land: Applications in Real Environments) 'Definition of Waste: Development Industry Code of Practice' to demonstrate that the sludge is not a waste and that there is both a certainty of reuse (gasholder tank backfill requirements) and suitability for use (chemically and physically). The project is supported by UK leading representatives on behalf of industry (the author of the Code of Practice) and the Environment Agency that this project can be carried out as a hub and cluster of receiving, treatment and donor sites.

Scope

Having proved the viability of the project in a small scale site trial and bench scale laboratory testing, the innovative step to full-scale application is now possible. The full scale project will involve:

1- Centrifuging of sludges at one site.

2- Alkali leaching of the sludge.

3- Construction of bioremediation piles.

4- Treatment of the biopiles using additives proven through the treatment trial, aeration, moisture content control and atmospheric monitoring within the sludge material.

5- Stabilisation and solidification of bio-treated sludge.

6- Validation/verification of material placed in the annulus/base of the receiving tank to ensure it meets the requirements of the environmental regulators.

Objective(s)

To have a cost efficient, sustainable solution for the management of gasholder sludge.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Demonstration that the technologies used within the scope of the project, work effectively both from the perspective of cost reduction and that they meet the regulatory requirements of the Environment Agency and the principals of the CL:AIRE Code of Practice to deliver a sustainable solution.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

This project will involve the treatment and reuse of sludge from 5 gasholders undergoing demolition across 3 sites within one of the gasholder tanks.

Technology Readiness at Start

TRL6 Large Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

South West of England (Exeter, Bath, Weston-Super-Mare and Cheltenham)

Revenue Allowed for the RIIO Settlement

Revenue was not allowed for the treatment and reuse of gasholder sludge in the RIIO settlement

Indicative Total NIA Project Expenditure

£186,729.81 External NIA expenditure of which 90% will be eligible for NIA funding

£62,243.27 Internal Expenditure

Total cost is £248,973.08

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)

This project is anticipated to deliver an approximate saving of 28% on cost and 55% on carbon emissions compared to the traditional approach to incinerate. The reuse of material as backfill will also provide a saving from importing an equivalent volume of aggregate.

Please provide a calculation of the expected benefits the Solution

Costs were obtained for both the traditional disposal costs and for the innovative method costs from the contractor and these are detailed below

Traditional costs to undertake drying and incineration at the nearest suitably licensed facility would be £213,968.50

The innovative approach to treat and reuse the sludge (centrifuge preliminaries, centrifuge operation, centrate plant preliminaries, centrate plant operation, alkali leaching, bioremediation, stabilization and other office-based activities, such as design, validation, environmental regulatory negotiations and reporting) costs £186,729.81.

The total cost saving therefore is £213,968.50 (base cost) – £186,729.81 (method cost) = £27,238.70 (13%)

The following costs have been excluded from this submission: final dewatering; sludge removal and transportation. These aspects would take place regardless.

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

The use of these technologies have never before been applied (aside from centrifuge on its own) to gasholder sludge and such a multi-site approach using the CL:AIRE Code of Practice has never before been delivered in such a manner. It is envisaged that WWU will share this approach with other networks to further compound the benefits to both the consumer and the environment and help to deliver a more sustainable energy sector.

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

We envisage that the roll out costs will be minimal and that interested parties would simply specify the requirement to treat gasholder

sludge within the Works Information of the contract tender documents.

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 demonstration project will allow other GDNs to undertake sludge treatment and reuse across their population of gasholders, providing scaled up benefit to the consumer.

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

We have identified that sustainability is important to our stakeholders. This demonstration project will reduce our hazardous waste generation and improve our recycling of excavated materials to reduce the use of virgin aggregates and the amount of waste being taken to landfill.

☑ 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