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

Dec 2013

### Project Reference Number

NIA_NGET0116

## Project Registration

### Project Title

Combustible Gases in Redundant Oil Filled Cables

### Project Reference Number

NIA_NGET0116

### Project Licensee(s)

National Grid Electricity Transmission

### Project Start

December 2013

### Project Duration

0 years and 7 months

### Nominated Project Contact(s)

Richard Attwell

### Project Budget

£110,000.00

### Summary

The scope of the project covers a decommissioned oil filled cable in London. We will take samples from the cable and return them to a laboratory in the midlands, for further testing. When a methodology has been identified, we will produce a policy recommendation to ensure this incident does not happen again.

### Nominated Contact Email Address(es)

box.NG.ETInnovation@nationalgrid.com

### Problem Being Solved

National Grid decommissions cable systems in line with the National Grid current cable decommissioning policy. This policy document defines the requirements and specifies considerations that should be made when assessing options for oil filled cable systems that have reached end of life.

For each individual case, a thorough survey and risk assessment is carried out identifying the best solution. Until recently almost all cables that have been decommissioned and left in situ are flushed with a water based solution to remove as much of the oil from the cable as reasonably practicable.

A contract was awarded to a specialist cable contractor to decommission a 400kV circuit which ran parallel with an already decommissioned circuit existing circuit. As part of the scope of works earthing of the already decommissioned circuit was required to comply with the NSI 5 regulations.

In preparation for plumbing the earth braids onto the mechanical caps on the ends of the cables, the Jointer was in the process of venting the cable, this is common practice when plumbing on oil filled cable. After the cable had been venting for about half an hour the jointer commenced plumbing operation the Unaware and never having experienced this phenemonon he lit his gas torch to start his plumbing process. The gas torch he was using  ignited gases coming out of the cable causing a long yellow coloured flame about 1

metre in length to come from the cable. Fortunately no one was injured.

We are unaware of either the gas that has caused this effect, or the underlying mechanism that has caused the build up of the gas in the cable. This work is to undertake analysis of the cable to ensure future work does not experience the same problem.

## Method(s)

**Research**

Following this incident, an initial investigation has already taken place to identify the root cause. Unfortunately the results have been inconclusive as there is not enough understanding of the chemical processes taking place within the cable to cause a gas to generate. Numerous samples of the gases have been taken but we are unable to understand how these were generated.

The work we are going to undertake involves taking samples from the cable affected, and then completing forensic analysis on the samples in a laboratory. When the analysis is complete, we will look to replicate the mechanism in a controlled environment, and then identify mitigation methods for this effect.

## Scope

The scope of the project covers a decommisioned oil filled cable in London. We will take samples from the cable and return them to a laboratory in the midlands, for furthe testing. When a methodology has been identified, we will produce a policy reccomendation to ensure this incident does not happen again.

## Objective(s)

The objectives are:

- To identify the root cause of the gas
- To identify an appropriate mitigation method
- To provide a business implimentation methodology

## Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

## Success Criteria

This project will be successful if we:

- Identify the root cause of the gas
- Identify a potential mitigation method
- Provide a business implimetation methodology

## Project Partners and External Funding

n/a

## Potential for New Learning

n/a

## Scale of Project

This project will be completed on a laboratory scale, with samples taken from a problematic circuit. We cannot reduce the scale any further and provide the required level of benefit to the customer.

## Technology Readiness at Start

TRL2 Invention and Research

## Technology Readiness at End

TRL4 Bench Scale Research

## Geographical Area

This project will affect any area where a cable system has been decomissioned, and will be conducted in the midlands area.

## Revenue Allowed for the RIIO Settlement

Zero.

## Indicative Total NIA Project Expenditure

£110,000

# 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 saving is largely the development of a safe system of works to mitigate any future reoccurances of this problem.

## Please provide a calculation of the expected benefits the Solution

Research Project - Not applicable

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

In theory, this could be applicable to any area where there have been decommisioned cables in the UK, however, we have never experienced a problem like this before so we cannot comment on the extent of the issue.

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

This is unknown as we do not know the extent of the problem.

## 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

n/a

### 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 is primarily focusing on the Safety aspect of the Innovation Strategy, however it will also address part of the environmental aspect, and also strategic.

☑ 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