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

Apr 2013

Project Reference Number

Project Registration

Project Title

Condition and Life Extension of Substation Assets

Project Reference Number

Project Licensee(s)

National Grid Electricity Transmission

Project Start

October 2007

Project Duration

3 years and 7 months

Nominated Project Contact(s)

National Grid TO Innovation Team

Project Budget

£17,800.00

Summary

The project addresses issues related to charge development of GIS spacers, lubrication, grading capacitor condition, bus transfer capability and Frame R maintenance.

Nominated Contact Email Address(es)

box.NG.ETInnovation@nationalgrid.com

Problem Being Solved

Method(s)

Scope

Objective(s)

The following projects address issues relating to the condition and life extension of substation equipment:

Lubrication and maintenance: The study will cover the problems associated with ageing of lubricants, environmental impacts and material / lubricant interference. By using theoretical and practical application and testing, all modern and development products will be considered. It is proposed to use a University to carry out this research as they will provide the level of independence required, will study the latest products available from the major manufacturers and will also be able to consider the latest developments that may not be marketed yet.

Internal examination of circuit-breaker voltage grading capacitors removed from service has revealed incipient faults that would certainly have lead to failure but which were not revealed by existing diagnostic checks. The present work is concerned with applying a range of diagnostic techniques to capacitors that have been in service and correlating the indications obtained with the results of

internal inspections to identify the techniques most effective in detecting incipient fault conditions. The knowledge obtained will be used to decide whether the capacitors of circuit-breakers undergoing refurbishment are fit for a further 20 years service without risk of disruptive failure or whether they require replacing.

The main technical issues with regard to the second refurbishment of Frame r ABCBs are associated with lubrication of the trip latch and trip valves. The operation of the trip valve is critical. A ‘stuck open’ trip valve (which has occurred in service) can cause severe air loss resulting in flash through of the open interrupters. Slow operation and air loss can also result in a severe reduction in Lightning and Switching Impulse Voltage capability. NG staff have expressed concerns about the performance of the current recommended trip valve lubrication (Molycote FS 3451) because it is separating in service and losing its oils. The trip valve design relies heavily on regular lubrication to maintain it functionality and the current maintenance regime is inadequate to achieve reliable performance from the valve. Research into the design of the valve is required to alleviate this problem allowing current maintenance intervals to be achieved or improved upon.

The effects of bus transfer duty on the Committee design of disconnectors and the possibility of designing a retro-fit solution to give Committee designed disconnectors an on-load bus transfer rating to modern standards will be investigated.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

n/a

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

n/a

Geographical Area

Revenue Allowed for the RIIO Settlement

Indicative Total NIA Project Expenditure

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)

n/a

Please provide a calculation of the expected benefits the Solution

n/a

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

n/a

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

n/a

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)

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

Please demonstrate how the learning from the project can be successfully disseminated to Network Licensees and other interested parties.

Please describe how many potential constraints or costs caused, or resulting from the imposed IPR arrangements.<

Please justify why the proposed IPR arrangements provide value for money for customers.

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