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 2015

### Project Reference Number

NIA_SSEPD_0005

## Project Registration

### Project Title

33kV Hot Glove Working

### Project Reference Number

NIA_SSEPD_0005

### Project Licensee(s)

Scottish and Southern Electricity Networks Distribution

### Project Start

May 2014

### Project Duration

2 years and 9 months

### Nominated Project Contact(s)

SSEN Future Networks Team

### Project Budget

£35,000.00

### Summary

The purpose of this project is to determine whether we can or can not safely carry out live line work on 33kV overhead lines. If it is found that 33kV hot glove working can be carried out in a safe manner, we will then provide the justification required to the HSE to get dispensation to be able to perform this task and produce the relevant technical, safety and procedural documents associated.

There is a project plan in place to cover the following steps;

A business case has been created to determine the benefits associated with this and to prove that all funding through NIA is justified and will lead to a significant reduction in customer interruptions, customer minutes lost and also a reduction in customer costs.

The next step is to create a risk assessment tailored to the task and the issues associated. The risk assessment will be created using the information and reports provided by external consultants. ERA Technology will review the current risk assessment for 11kV hot glove working as a guide and use this to identify issues at 33kV. The next step will be to resolve the issues by discussion with operational and policy staff. Once these issues have been resolved a full risk assessment report will be produced.

The risk assessment will provide the basis of the safety case to be reviewed by the HSE. The safety case will also include electro magnetic frequency (EMF) surveys which we will use to show that the potential exposure to EMF in these circumstances will or will not cause any detrimental effect to the operatives.The safety case will be produced by our engineering policy department with the input of experienced operational staff.

Once the safety case for 33kV hot glove has been submitted after completion to the HSE they will review and we will engage with them as per their questions or issues. Further investigations or surveys may be required to ensure that all potential safety issues have been raised and resolved.

If there is an agreement with the HSE that it is possible to carry out 33kV hot glove working in a safe manner we will then undertake the exercise of defining all training required for SSEPD staff. This will require an external training source to provide the required training to our current operational training staff.Part of the training process will also require SSEPD to purchase the required equipment rated for safe work at 33kV.

Work instructions, procedures and policy documents will be drafted and approved by the engineering policy team within SSEPD as required.

The business case will be continually examined to prove that the justification is still valid.

## Third Party Collaborators

EMF

Energy Research Accelerator

AUS Ltd

## Nominated Contact Email Address(es)

fnp.pmo@sse.com

## Problem Being Solved

In 1998, SSEPD received approval from the HSE that mitigation actions proposed, whilst using hotglove techniques, allowed the requirements of Section 14 of the Health & Safety Act 1974 to be adhered to whilst performing live line work at 11kV. This was received following submission of a case detailing the justification as well as the mitigation measures that would be employed. Approval of 33kV live line working was not requested as the justification was not sufficient at the time.

Under current procedures any refurbishment works on 33kV overhead lines is required to be done 'dead' i.e. supply is cut off to the respective circuits. In certain areas of the SHEPD and SEPD networks we have a number of circuits which do not have the relevant backfeeds necessary for a continuous supply due to the costs involved being seen as un-justifiable.

This means that customers will be affected by interruptions and minutes lost because of the requirement to have an outage before connecting diesel generation. The need for diesel generation in some circumstances can cause the works carried out to be seen as inefficient. Not only will this have an extra cost to the customer but it also may carry a significant carbon footprint.

If the project is successful we will have the ability to carry out required works on these circuits 'live' i.e. electrically charged. This will show a large benefit not only on supply reliability but also to work efficiencies and environmental issues.

Extensive analysis of our 33kV network, in particular the way, in which we carry out refurbishment works on our 33kV radial feeders, has found there is the potential to realise considerable savings to our customers by eliminating the need for costly mobile diesel generation and reducing labour costs through carrying out 33KV refurbishment works live. Improved customer service will be achieved through reducing interruptions.

There is the potential for DNO's to make further savings by reducing customer interruptions and customer minutes lost and eliminating Interruptions Incentive Scheme (IIS) costs

## Method(s)

The innovative activity that this project will trial is the ability to carry out live line working on 33kV (EHV – Extra High Voltage) overhead lines. This would be an advancement on the current practice of 11kV (HV -High Voltage) Live Line Working.

The term High Voltage Live Line Working is used to denote approved working techniques on apparatus or conductors through a high voltage overhead line, where the conductors or apparatus are electrically charged.
After a successful completion of this project we will have the appropriate authorisation and agreement from HSE along with required training through external consultants and we will be able to undertake 33kV Live Line Working.

## Scope

The purpose of this project is to determine whether we can or can not safely carry out live line work on 33kV overhead lines. If it is found that 33kV hot glove working can be carried out in a safe manner, we will then provide the justification required to the HSE to get dispensation to be able to perform this task and produce the relevant technical, safety and procedural documents associated.

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## Objective(s)

- Define business case for 33kV hot glove working
- Define risk assessment for 33kV hot glove working
- Define the safety case for 33kV hot glove working
- Evaluate the safety case with HSE
- Produce the required policies and procedures.
- Define training required for SSEPD staff
- Identify and purchase relevant equipment
- Carry out the training required
- Review the justification and determine the viability

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

n/a

## Success Criteria

The success of this project will be defined by being able to demonstrate that 33kV hot glove work can be completed safely and with appropriate justification.

## Project Partners and External Funding

n/a

## Potential for New Learning

n/a

## Scale of Project

The scale of this project is considered appropriate to the scale of potential benefits.

## Technology Readiness at Start

TRL6 Large Scale

## Technology Readiness at End

TRL9 Operations

## Geographical Area

EMF surveys to be carried out at Kinlochleven, Killin and Port Ann in the SHEPD area with further surveys around Reading in the SEPD area.

## Revenue Allowed for the RIIO Settlement

No saving on expenditure is expected during project implementation

## Indicative Total NIA Project Expenditure

The indicative Total NIA Project Expenditure is £35,000, 90% of which £31,500 is Allowable NIA 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)

SSEPD estimate that rolling out 33kV Hot Glove working over both network licence areas has the potential to provide a benefit of approximately £2.83m in savings to the customer. This is based on savings from;
• Labour (£0.18m)
• Mobile Diesel Generation (£2.65m)

This will also lead to quicker connection times for customers and reduced pollution from mobile diesel generation.

Although this procedure can be rolled out on all 33kV circuits, SSEPD would deem 33kV radial feeders as the most cost effective to target. In the SHEPD area a large number of these are inaccessible by conventional Mobile Elevated Work Platform MEWP vehicles. Therefore we have an agreement in place that once this procedure becomes 'business as usual' the networks business will purchase a new tracked MEWP allowing access to a much larger number of radial feeders.

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

The following is an example where this procedure can be used;

The binding wires which are used to fasten the conductors to the insulators between Ullapool and Lochinver were constructed in steel core rather than solid brass preforms. As a result severe decay has set in causing them to fail and trigger faults throughout the circuit. The costs of these faults and the interruption to customers mean that the rebinding of this conductor has become a critical project. 33kV hot glove working would reduce costs by the approximate amounts:

• Labour (£54k-£39k=£15k)
• Mobile generation (£56k-£0k=£56k)
• Customer Interruptions (£15k-£0k=£15k)
• Customer Minutes Lost (£3k-£0k=£3k)

Using 33kV Hot Glove to do the work required on this circuit we will see an approximate saving of £128k-£39k=£89k.

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

The procedures and work practices developed within this project will be available for use across all 33kV overhead line networks

reducing the requirements for mobile diesel generation and a reduction on customer interruptions and minutes lost.

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

Assuming that all DNO's follow the same initial roll out programme as SSEPD in terms of training and class 4 insulated equipment (which allows for working on live systems up to 36KV), each DNO would require the approximate costs;

Training – £195k for a 4 man team of overhead linesmen and 1 trainer to be trained.
Class 4insulated equipment - £25k

Further costs in regards to the tracked MEWP would be at the discretion of the DNO.

### 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

All of GBs distribution networks consist of 33kV overhead lines and these operational procedures, if successful, can be applied to all. All findings, procedures and safe method work statements will be shared amongst all DNO's.

### 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