

**Grid Code Review Panel – Issue Assessment Proforma**  
**Safety Management of 3 Position Gas Insulated Switchgear Isolators and Earth Switches**

**PP 11/58**

A Panel Paper by Owen Lloyd (National Grid)

**Summary**

Under the current requirements of OC8A.5, the management of safety precautions across a control boundary currently requires coordination of Isolation and Earthing such that Points of Isolation are established before Earthing commences. The original purpose of OC8.5 to establish Points of Isolation before agreeing to Earth was to prevent the possible earthing of another Users System through an Isolator which could be or become closed. Thus OC8.5 was designed to coordinate those activities in a safe manner and it is suggested that this remains for all Air Insulated Switchgear, and some Gas Insulated Switchgear, where isolators and earth switches consist of two separate mechanisms,

However, some 3 Position Gas Insulated Switchgear Isolators and Earth Switches are specifically designed to provide a combined Isolator and Earthing function via a single mechanism. It is therefore possible to disconnect and earth a circuit in a single operation before Points of Isolation have been established.

Given the increase of Gas Insulated Switchgear installations on the HV System and subsequent increases in the numbers of these types of devices with dual functionality, it is requested that the GCRP considers a modification of OC8A to permit *the option* of Earthing before Points of Isolation have been established to reflect the design changes in this type of switchgear only.

**Users Impacted**

**Medium**

A proportion of Directly Connected Generators, Non- Embedded Customers and DNOs.

This Modification will only effect Users who have this type of switchgear installed at their connection sub station and therefore there is no impact of those that do not.. When this change to OC8A is implemented and where these types of devices are installed, each User may be required to modify their existing Safety Rules to permit Earthing before Points of Isolation are established.

However, agreement between Safety Coordinators to conduct this activity will still be required as per OC8A.5. Therefore, if a User does not wish to change their practices or Safety Rules or where there may be disagreements between Safety Coordinators, the current method of providing Isolation and Earthing across a control boundary will be the default position.

**Description and Background**

The 3 position GIS Isolators and Earth Switches have several designs, but essentially they all operate in the same way. It is important to note that these devices operate from a single mechanism and therefore cannot be selected to more than one position, i.e. it can only be in the Disconnecter closed, Disconnecter open or Disconnecter open and closed to the Earth position.

For some years, National Grid and other Users have co-ordinated the Isolation and Earthing in an operational switching capacity across control boundaries for the dissipation

of trapped charge. Although this is not solely restricted to 3 position Isolators and Earth Switches, a precedent has been set, but for National Grid, this has not been permitted for safety switching activities due to the nature of the National Grid Safety Rules which require Points of Isolation to be established before Earthing commences.

For National Grid, having to establish a Point of Isolation before the device can be driven into the Earth position means that the supplies to the motor fuses are withdrawn and the device cannot therefore be used as designed. Driving the device into the earth position is achieved in one of two ways dependant on the type registered device:

- 1) the Authorised Person uses a winding handle to operate the device which can require up to 300 turns per phase per device; or
- 2) the National Grid requires significant modification to the mechanical and electrical interlocking arrangements between the Isolator and Earth Switch functions to allow it to be driven to the Earth position. This has a considerable cost implication to change the original specified design.

After a recent meeting to review the National Grid Safety Rules and National Safety Instructions, an amendment will now be included to permit National Grid Safety Coordinators to give an instruction to close the device to the Earth position before Points of Isolation are established. Although this addresses the issue where National Grid has safety control on both sides of a 3 position Isolator and Earth Switch, a change to OC8 is required to allow all Users to undertake this safety activity where a control boundary exists between Users.

By introducing this change for this type of device only, it will give Safety Coordinators the option to Earth their circuits before Points of Isolation are established where control boundaries exist in accordance with OC8A.5.1. Due to the design of the device, there is no opportunity to inadvertently Earth another User's system. Therefore Earthing before establishing Points of Isolation across a control boundary would still be done in a safe and controlled manner as these devices are designed specifically to provide this function.

## Proposed Solution/Next Steps

It is suggested that an additional paragraph (or new subsection) is added to OC8A.5.3:

OC8A.5.3.4. Some items of HV Apparatus are specifically designed to provide a combined Isolation and Earthing function using a single mechanism contained within a single integral unit. Where Safety Precautions are required across control boundaries and subject to the requirements of OC8A.5.1., it is permissible to Earth before Points of Isolation have been established.

The current drafting for section OC8A.5.3 (Implementation of Earth) is shown in Annex 1.

## Impact and Assessment

If changes to the Grid Code are being proposed, please provide the below information.

### Impact on the National Electricity Transmission System (NETS)

None. The changes are procedural only.

### Impact on Greenhouse Gas Emissions<sup>1</sup>

None. The changes are procedural only.

### Impact on core industry documents

None. It is believed the only change required will be to OC8A as identified in this paper

### Impact on other industry documents

Yes. Although an update to the National Grid Safety Rules is required, this has already been agreed and approved by the Safety Rules and National Safety Instructions Review Group. The anticipated go live date to permit Earthing before Points of Isolation are established under National Grid Safety Rules will be the 2<sup>nd</sup> April 2012. The instructions to operate these devices have already been in place for some years within National Safety Instruction 1 Operational and Safety Switching. The intention of the proposed changes to allow the application of earths prior to establishing points of isolation may also require inclusion or updates to other Users Safety Rules or supporting documentation.

### Assessment against Grid Code Objectives

The proposed changes to the Grid Code better facilitate the Grid Code objectives overall:

- (i) to permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity;

The proposal allows a more efficient operation of the transmission system and removes the requirement for request additional specification over and above the standard three position earth switches available from global suppliers.

- (ii) to facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system

<sup>1</sup> The most recent guidance on the treatment of carbon costs under the current industry code objectives can be found on the Ofgem website at: <http://www.ofgem.gov.uk/Licensing/IndCodes/Governance/Pages/Governance.aspx>

being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity) ;

No Impact.

- (iii) subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole.

Increases the efficiency for the operation of electricity transmission system operation.

### **Supporting Documentation**

Have you attached any supporting documentation **YES**

If Yes, please provide the title of the attachment: Example OC8A Diagram (**Annex 2**)

### **Recommendation**

The Grid Code Review Panel is invited to:

**Approve this issue for progression to an Industry Consultation**

**GCRP Decision** (to be completed by the Committee Secretary following the GCRP)

The Grid Code Review Panel determined that this issue should:

**INSERT GCRP DECISION**

### **Document Guidance**

This document is used to raise an issue at the Grid Code Review Panel, as well as providing an initial assessment. An issue can be anything that a party would like to raise and does not have to result in a modification to the Grid Code or creation of a Working Group.

The Grid Code Administrator, National Grid, is available to help any party complete this proforma. Please contact [grid.code@uk.ngrid.com](mailto:grid.code@uk.ngrid.com) if you have any queries.

## Annex 1

### OC8A.5.3 Implementation of Earthing

OC8A.5.3.1 The **Implementing Safety Co-ordinator** shall then establish the agreed **Earthing**.

OC8A.5.3.2 The **Implementing Safety Co-ordinator** shall confirm to the **Requesting Safety Co-ordinator** that the agreed **Earthing** has been established, and identify the **Requesting Safety Co-ordinator's HV Apparatus** up to the **Connection Point**, for which the **Earthing** has been provided. The confirmation shall specify:

- (a) for each **Location**, the identity (by means of **HV Apparatus** name, nomenclature and numbering or position, as is applicable) of each point of **Earthing**; and
- (b) in respect of the **Earthing Device** used, whether it is:
  - (i) immobilised and **Locked** in the earthing position. Where the **Earthing Device** has been **Locked** with a **Safety Key**, that the **Safety Key** has been secured in a **Key Safe** and the **Key Safe Key** has been given to the authorised site representative of the **Requesting Safety Co-ordinator** where reasonably practicable and is to be retained in safe custody. Where not reasonably practicable, that the **Key Safe Key** will be retained by the authorised site representative of the **Implementing Safety Co-ordinator** in safe custody; or
  - (ii) maintained and/or secured in position by such other method which is in accordance with the **Local Safety Instructions** of the **Relevant E&W Transmission Licensee** or the **Relevant Transmission Licensee** or that **E&W User**, as the case may be.

The confirmation of **Earthing** shall be recorded in the respective **Safety Logs**.

OC8A.5.3.3. The **Implementing Safety Co-ordinator** shall ensure that the established **Safety Precautions** are maintained until requested to be removed by the relevant **Requesting Safety Co-ordinator**.

OC8A.5.3.4. Some items of HV Apparatus are specifically designed to provide a combined Isolation and Earthing function using a single mechanism contained within a single integral unit. Where Safety Precautions are required across control boundaries and subject to the requirements of OC8A.5.1., it is permissible to Earth before Points of Isolation have been established.

# Example diagram identifying the application of OC8A changes.

184 & 184ED forms part of a combined & integral single unit which is capable of providing a Point of Isolation & a Primary Earth / Circuit Main Earth such that the Isolator can be driven to the Earth position in a single action by a single operating mechanism.

Where a control boundary exists between 2 users, it is proposed that an addition to OC8A will permit this device to be Earthed before Points of Isolation are established, provided that all Isolators are open & all Safety Co-ordinators are in agreement as per OC8A.5.1

In the example below, 184 would be permitted to be driven to the 184ED earth position, but the changes to OC8A would NOT permit 121 or 191A to be closed until the appropriate Points of Isolation have been established.

