

1. SCOPE

This document details the procedures to be adopted for the application, removal, storage and inspection of **Portable Earths**, *Field Equipment Earths* and **LV Portable Shorts** and shall be implemented in conjunction with OPSAF-04-024 and OPSAF-11-008 (MSP 1.6).


2. ISSUE RECORD

This is a **Reference** document. The current version is held on the Energy Networks Intranet Document Library.

It is your responsibility to ensure you work to the current version.

Issue Date	Issue No	Author	Amendment Details
March 2012	3	Des Thomson	Update to Section 9.1: Minor corrections – use of MEWP. Update to Section 9.6: 11kV and 33kV versus 132kV.
Sept 2015	4	Rob Edwards	Clarification earth connections for 132kV wood pole drain earths. Revision to Field Equipment Earth connections to align with new PSSI 8. Changes to application of LV portable shorts to align with new PSSI 12. Earthing Schedule modified to allow recording of return of Drain Earths.

3. ISSUE AUTHORITY

Author	Owner	Issue Authority
Rob Edwards Operational Safety Engineer	Phil Currie Operational Compliance Manager	Bill Cuthbert Health & Safety Director  Date4/11/2015.....

4. REVIEW

This is a **Reference** document which has a 5 year retention period after which a reminder will be issued to review and extend retention or archive.



DISTRIBUTION

This document is part of the Management Safety Procedures Manual but does not have a maintained distribution list.

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6. REFERENCES

This document makes reference to the documents listed below, it is important that users are in possession of the latest editions together with any amendments.

- OHL-25-003 HV Portable Earths for Wood Pole Overhead Lines.
- OHL-25-004 LV Portable Shorts.
- OPSAF-04-024 Identification, Register, Issue, Control and Inspection of HV Test Prods, HV Earthing Devices and Ancillary Equipment.
- OPSAF-11-008 Portable Primary Earths, Drain Earths, Field Equipment Earths and LV Portable Shorts for use in Substations, Power Stations and on Overhead Lines (MSP 1.6).
- ScottishPower Safety Rules (Electrical & Mechanical) 4th Edition.

7. DEFINITIONS

Terms printed in bold type are as defined in the ScottishPower Safety Rules (Electrical and Mechanical) 4th Edition.

Terms printed in italics are as defined in the Definitions document (OPSAF-11-002) of the Management Safety Procedures.

8. STORAGE AND INSPECTION

8.1 Earths

Portable Earths and *Field Equipment Earths* and **LV** Portable Shorts shall be:

- (i) Issued, stored, transported and returned in accordance with OPSAF-04-024.
- (ii) Fit for the purpose for which they are to be used.
- (iii) In addition to any inspection carried out in compliance with OPSAF-04-024, examined immediately before and after use by the **Person** responsible for their application, who shall visually inspect the earthing lead, its connections and clamps. Clamps shall operate freely and there shall be no visible damage to cable strands or to the PVC sheath. The joint between the cable and termination shall be secure and the components in good condition. Any defective earthing equipment shall not be used and shall be withdrawn from service immediately.
- (iv) Uniquely identified by means of an appropriate identification mark in accordance with OPSAF-04-024.
- (v) Taken from their place of storage for use, only under the control of an appropriately **Authorised Person**.
- (vi) Marked with a "Do Not Use After" label corresponding to the current inspection period in accordance with OPSAF-04-024.

8.2 Earthing/Operating Rods

Rods for **Portable Earths** shall be stored, registered, issued, inspected and returned in accordance with OPSAF-04-024. The rods shall be:

- (i) Fit for the purpose for which they are to be used.
- (ii) In addition to any inspection carried out in compliance with OPSAF-04-024, examined immediately before and after use by the **Person** responsible for their application, who shall visually inspect the rod for signs of damage or deterioration. Any defective equipment shall not be used and shall be withdrawn from service immediately.
- (iii) Uniquely identified by means of an appropriate identification mark in accordance with OPSAF-04-024.
- (iv) Taken from their place of storage for use, only under the control of an appropriately **Authorised Person**.
- (v) Marked with a "Do Not Use After" label corresponding to the current inspection period in accordance with OPSAF-04-024.

9. APPLICATION AND REMOVAL OF PORTABLE EARTHS

9.1 Mobile Elevating Work Platforms (MEWPs) may be utilised to provide safe access for testing and applying / removing **Portable Earths** to overhead conductors or busbars. In order to reduce the risk of inadvertently raising the MEWP bucket into the **Safety Distance**, the MEWP shall, where reasonably practicable, be positioned so the bucket is raised to one side of the **Apparatus** rather than from directly beneath it.

Testing using an **Approved** voltage indicator of either capacitive or moving coil type shall be carried out in accordance with OPSAF-12-005 (LWM 2.3).

To ensure **Safety Distance** is not compromised, a minimum of two sections of rods shall be used when testing with a capacitive type **Approved** voltage indicator and when applying / removing **Portable Earths** to the overhead conductors or busbars.

9.2 A minimum of two **Persons** shall be present during the application/removal of **Portable Earths** to **HV Apparatus**.

9.3 The application of **Portable Earths** shall be the responsibility of one **Authorised Person** only. He may receive assistance but shall retain overall responsibility.

9.4 **Portable Earths** shall be connected to earth before they are connected to **Isolated HV** conductors.

9.5 The application of the first **Portable Primary Earth** to any **HV Apparatus** in a substation shall be made by the **Authorised Person** who has received the **Switching** instruction; the remaining **Portable Primary Earths** may be applied under his **Personal Supervision**.

9.6 On wood pole overhead lines, 11kV to 33kV inclusive, the down lead of **Portable Primary Earths** shall be connected to a cluster of four earth rods in accordance with OHL-25-003.

On wood pole lines of 132kV construction, the **Portable Primary Earths** shall be connected to a four rod cluster in accordance with OHL-25-003 or a dedicated earth point provided as part of the construction.

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- 9.7 **Portable Earths** shall be disconnected from the **HV** conductors before being disconnected from earth.
- 9.8 Under the terms of a **Sanction for Test** the recipient of the **Sanction for Test** may remove or replace those earths defined in Section 2 (ii) of the **Sanction for Test**.
- 9.9 The **Authorised Person** clearing the **Safety Document** or confirming completion of the **Switching** instruction shall be responsible for ensuring the return of all **Portable Earths** removed during the course of the work or testing, or removed during the **Switching**, and associated operating rods to their place of storage. Any **Portable Primary Earths** disconnected and removed shall be clearly identified in the clearance section of the **Sanction for Test**. Any **Portable Drain Earths** not disconnected and removed shall be clearly identified in the clearance section of the **Safety Document**.

10. PORTABLE DRAIN EARTHS

When **Danger** may be caused by induced voltage, impressed voltage or inadvertent back feed, use shall be made of **Drain Earths** to ensure **Safety from the System**.

10.1 Substations

- 10.1.1 When **Drain Earths** are to be applied in any **HV** substation or compound, in addition to the procedures in Section 8.1 & 8.2 above, where appropriate, use shall be made of an **Earthing Schedule** (see Appendix 1) to record the number of earths issued, points of application and where appropriate the sequence or scheme of application.
- 10.1.2 The details in Section 1 of the **Earthing Schedule** and Section 1 of the **Safety Document** shall be identical. The number of the **Earthing Schedule** shall be the next in sequence on the **Earthing Schedule** pad.

10.2 Overhead Lines

- 10.2.1 On overhead lines, **Drain Earths** shall be applied in accordance with PSSI 4.
- 10.2.2 The **Senior Authorised Person** responsible for issuing the **Safety Document** shall ensure that the correct number of **Drain Earths** are issued/available and shall enter this number on the **Safety Document**.
- 10.2.3 Where appropriate, **Drain Earths** shall be applied in accordance with the appropriate scheme for the placing of **Drain Earths**. The various schemes are those detailed in the attachment A to PSSI 4.
- 10.2.4 Where none of the schemes within the attachment A to PSSI 4 are appropriate, use shall be made of an **Earthing Schedule** to specify the number and positioning of **Drain Earths** for the work.
- 10.2.5 The details in Section 1 of the **Earthing Schedule** and Section 1 of the **Safety Document** shall be identical. The number of the **Earthing Schedule** shall be the next in sequence on the **Earthing Schedule** pad.
- 10.2.6 On wood pole lines, 11kV to 33kV inclusive, the down lead of **Portable Drain Earths** shall be connected to a minimum of a single earth rod, in accordance with OHL-25-003. On 132kV wood pole lines, the down lead of **Portable Drain Earths** shall be connected to either a dedicated earth point provided as part of the construction or a minimum of a single earth rod

(in accordance with OHL-25-003).

- 10.2.7 The **Senior Authorised Person** responsible for cancellation of the **Safety Document** shall so far as reasonably practicable ensure that all **Drain Earths** have been returned or accounted for.

11. APPLICATION AND REMOVAL OF FIELD EQUIPMENT EARTHS

- 11.1 The application and removal of *Field Equipment Earths* during work or testing on **HV Apparatus** shall be carried out under the **Personal Supervision** of the recipient of the **Safety Document** for the work or testing in question.
- 11.2 *Field Equipment Earths* shall be connected to earth before they are connected to any equipment.
- 11.3 *Field Equipment Earths* shall be disconnected from the equipment before they are disconnected from earth.

12. LV PORTABLE SHORTS

When **Danger** may be caused by induced voltage, impressed voltage or inadvertent back-feed, use shall be made of **LV** portable shorts. The positions at which **LV** shorts shall be applied are specified in PSSI 12.

In accordance with the hierarchy for working at height, a MEWP may be utilised for testing and the application of **LV** shorts. The MEWP shall, where reasonably practicable, be positioned so the bucket is raised to one side of the **Apparatus** rather than from directly beneath it.

- 12.1 Prior to the start of work, the **Person** in charge shall count the number of **LV** portable shorts available.
- 12.2 On **LV** open-wire construction lines, **LV** portable shorts shall be connected between all conductors in accordance with PSSI 12.
- 12.3 Where **LV** portable shorts are being applied to ABC or covered, but not-effectively insulated conductors in an open-wire configuration, the shorts shall be applied in accordance with OPSAF-12-033 (LWM 5.1.1) and PSSI 12.
- 12.4 Upon completion of the work, the **Person** in charge shall ensure that all **LV** portable shorts have been returned or accounted for.



**APPLICATION, REMOVAL, STORAGE AND
INSPECTION OF PORTABLE
EARTHS, FIELD EQUIPMENT EARTHS
AND LV PORTABLE SHORTS**

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13. APPENDIX 1 – EARTHING SCHEDULE FOR APPLICATION OF DRAIN EARTHS

SCOTTISHPOWER – ENERGY NETWORKS - EARTHING SCHEDULE FOR THE APPLICATION OF DRAIN EARTHS

ES No. Sheet of

Part 1

This is **NOT** a Safety Document

(i)	Location	
(ii)	Plant/Apparatus Identification	
(iii)	Work or Testing to be Done	
(iv)	Permit for Work/Sanction for Test Number	

Part 2

Sequence or Scheme of Application	Points of Application	Number of Earths	Remarks
Total Required			Total Issued

Senior Authorised Person Issuing Safety Document

Signature Print Name

Time Date

Part 3 Drain Earths

Total Issued	Total Returned/Accounted for	

Senior Authorised Person Cancelling Safety Document

Signature Print Name

Time Date