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NR/L3/ELP/29987

Module 12

Management of Local Isolation Instructions for Overhead Line Equipment

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1 Purpose

This module provides a consistent approach to the production, approval, distribution and auditing of local isolation instructions on 25 kV a.c. electrified lines.

NOTE: Further requirements for working on or about the electrified lines are contained in the Rule Book Module AC (GE/RT8000/AC) and Handbook HB16 (GE/RT8000/HB16).

2 Scope

This module states the requirements for the management of local isolation instructions for the isolation and earthing of overhead line equipment where local isolation is allowed, in accordance with Module 8, on 25 kV a.c. electrified lines.

It is applicable to Network Rail personnel and to Network Rail's contractors.

It is also applicable to Train Operating Companies having locally controlled 25 kV a.c. overhead lines which abut those controlled by Network Rail.

To provide a consistent approach to working on or about 25 kV a.c. electrified lines, Train Operating Companies may, as best practice, apply this standard on all infrastructure they control.

This Standard also includes:

- Work on or about any future sections of electrification on Network Rail controlled infrastructure and areas required to adopt a process for securing points of disconnection to form points of isolation to use the Supplementary Isolation Process (Module X).
- Planning of isolations, testing and earthing of overhead line equipment on Network Rail controlled infrastructure equipped with 750V d.c. overhead line system (Sheffield Tram Train - Module Y).
- Planning of isolations, testing and earthing of overhead line equipment on Network Rail controlled infrastructure equipped with 1500V d.c. overhead line system (Sunderland Metro Systems Operating Area – Module Z).

3 Management of Staff Training and Competence

3.1 Network Rail Controlled Infrastructure

The production, procurement or approval of local isolation instructions for the locations on Network Rail controlled infrastructure shall be the responsibility of the DUE&PME.

The local isolation and earthing of the electrical subsections in sidings shall be undertaken only by a Nominated Person trained in, and certificated to carry out, the isolation and earthing procedure in accordance with the prescribed local isolation instructions prepared in accordance with this module.

A list of Nominated Persons is held by each electrical control appropriate to its operational area.

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Certain circumstances could dictate that the isolation and earthing of the electrical subsections in sidings is undertaken by a method other than the specified local isolation instructions as stated in Module 8.

In this case an overhead line permit shall be issued by a Nominated Person in accordance with Module 7.

3.2 Electric Traction Depots, Electric Inspection and Cleaning Sheds, etc.

At electric traction depots, electric inspection and cleaning sheds, etc. leased or owned by a Train or Freight Operating Company holding an approved Railway Safety Case, the Operator is responsible for the isolation and earthing of certain electrical subsections specified in the isolation instructions.

The production or procurement of local isolation instructions for the locations concerned is the responsibility of the Train or Freight Operating Company.

Where such local isolation instructions interface with, or affect, Network Rail controlled infrastructure, the local isolation instructions shall be approved by the DUE&PME.

4 Local Isolations in Sidings

At certain sidings, an isolation can be undertaken by the adoption of the requirements stated in Module 8. In this case, a blockage of the line to electric trains and isolation and earthing of the overhead line equipment may be performed locally by a person having local control over train movements and implemented by means of locking-off instead of the issue of an overhead line permit.

The electrical subsections where local isolations are permitted, these are specified in the isolation instructions.

Where such a local isolation is required on Network Rail controlled infrastructure, the written local isolation instructions shall be in accordance with this module.

5 Content of Local Isolation Instructions

5.1 Sample Local Isolation Instruction

Appendix A contains a typical local isolation instruction that may be used for guidance in preparing local isolation instructions.

This instruction shall state the detailed requirements enabling isolations to be carried out in accordance with Module 8.

5.2 General Instructions

5.2.1 Safety Information

The local isolation instructions shall specify the general or location-specific safety information, or amendments to the safety information. This shall include, but not be specifically limited to:

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- a) a description of the siding(s) and the corresponding electrical subsection(s);
- b) the means of protection against the movement of vehicles;
- c) the method of blocking to electric trains in accordance with specified operating instructions;
- d) the presence of any other electrical hazards that must be taken into account, e.g. an adjacent autotransformer feeding system having autotransformer feeders;
- e) the use of portable earthing equipment;
- f) carrying out the isolation and earthing procedure in accordance with the local isolation instructions and Module 8;
- g) the custody of keys, personal padlocks, etc;
- h) operating and maintaining a record of isolations undertaken in the siding(s); and
- i) where applicable, operating and maintaining a record of ladders permitted in the siding(s).

NOTE: A site layout diagram may be included in the local isolation instructions where this will assist.

5.2.2 Protection Against Movement of Vehicles

The local isolation instructions shall require that before commencing work on a traction unit or rail vehicle in a siding, protection against the movement of vehicles shall be provided as required by Rule Book GE/RT8000.

Local operating instructions or the local isolation instructions, as appropriate to the specific location, shall specify the procedure for preventing the movement of electric trains towards any line or siding where the electrical subsection(s) in the siding(s) concerned is to be isolated under the local isolation instructions.

The local isolation instructions shall require that the protection arrangements shall be positioned on the approach side of each section insulator for the electrical subsection(s) in the siding(s) which are to be isolated.

5.2.3 Use of Portable Earthing Equipment

The local isolation instructions shall specify that portable earths and earthing poles shall conform to the relevant Network Rail standards, be of suitable current rating and shall be used only by persons who have been specially trained, are competent and have been authorised in their use in accordance with Modules 8 and 10.

The local isolation instructions shall specify that it is the responsibility of the user to arrange that adequate systems are in place for the inspection and maintenance of portable earthing equipment in accordance with Network Rail standard NR/L3/ELP/27237.

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5.3 Carrying Out the Local Isolation

5.3.1 Additional Location-Specific Information and/or Amendments

The local isolation instructions shall specify additional location-specific information, or amendments, as appropriate to the requirements of Module 8. This shall include, but not be specifically limited to:

- a) the identity of and the safe working limits of the electrical subsection(s);
- b) the identity of the siding disconnector(s) to be operated;
- c) the location of the siding disconnector(s) to be operated, and if appropriate the location of the disconnector key box(es);
- d) the locations of the portable earth(s) to be applied and whether Circuit Main Earths (CME) or additional earths.
- e) the requirements for the use or issue of personal padlocks or the issue of keys, as appropriate; and
- f) the procedure in the case of an isolation of an abutting electrical subsection where local isolation is not allowed.

5.3.2 Electrical Subsection(s) Isolated

The local isolation instructions shall specify the electrical subsection(s) in the siding(s) that are permitted to be isolated locally in accordance with the prescribed isolation instructions.

Where an autotransformer feeding system is adjacent to the siding(s), any subsections of autotransformer feeder which must be isolated to provide a safe working distance shall be included within the local isolation instructions.

5.3.3 Facilities to Enable Local Isolations

For local isolations to be implemented, the following overhead line facilities are provided in accordance with Network Rail standard NR/SP/ELP/27203:

- a) a section insulator is provided in the overhead line equipment of each siding or group of sidings concerned at the electrical feeding end (for terminal sidings) or both ends (for through wired sidings) to isolate the electrical subsection(s) from any abutting electrical subsection(s) that could be live;
- b) siding disconnector(s) are provided at one end of each electrical subsection(s) of OLE concerned for the purpose of feeding the siding(s). In the case of through wired sidings, disconnector(s) might be provided at both ends;
- c) the section insulator(s) and any associated siding disconnector(s) are positioned so that no part of the equipment which could remain live while the electrical subsection(s) in the siding(s) concerned is isolated is within 2.75 metres (9 feet) of the safe working limits of the electrical subsection(s) in the siding(s) isolated;
- d) the siding disconnector(s) have 'closed', 'open' and, generally, 'earthed' positions. The connections are arranged so that when the disconnector is in

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the 'earthed' position the electrical subsection(s) subject to the local isolation procedure is connected to earth; and

- e) designated earthing points are provided appropriate to the safe working limits of the siding(s) concerned.

5.3.4 Disconnectors to be Operated and Their Location

The local isolation instructions shall specify the siding disconnector or sequence of siding disconnectors to be operated, the structure number(s) of the siding disconnector(s) and whether the specific siding(s) employs disconnector(s) with an 'earth' position or whether other arrangements are installed, in accordance with the prescribed isolation instructions.

5.3.5 Earthing the Overhead Line Equipment

The electrical subsection(s) in the siding(s) concerned shall be earthed by means of portable earths applied at designated earthing points specified in the local isolation instructions.

The local isolation instructions shall specify:

- a) that portable earths shall be applied using approved earthing poles in accordance with Module 10;
- b) that the portable earths shall be CMEs and applied as necessary in accordance with the requirements of Module 7. Where required, CMEs shall also be provided at the terminal end of the siding(s);
- c) that in the case of through wired sidings, CMEs shall be provided at both ends of the siding(s). If the distance between earths exceeds the requirements of Module 7, additional earths shall also be provided;
- d) where an Additional Earth is required in addition to the earth position of a disconnector; and
- e) that provision shall be made for the secure storage of portable earths and earthing poles in accordance with Network Rail standards.

5.3.6 Personal Electrical Protection

The local isolation instructions shall specify the method of personal electrical protection in accordance with the two options stated in Module 8, i.e.:

- a) the retention of the disconnector keys by the person directing the work; **or**
- b) the issue of personal safety padlocks applied to a multilock bar preventing the operation of the disconnector handle(s) securing the isolation.

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5.3.7 Combined Isolation of Electrical Subsection(s) in Sidings and an Abutting Subsection(s)

Module 8 states the requirements for the case where a pre-planned isolation requires that electrical subsection(s) in sidings are combined with an isolation of abutting electrical subsection(s) where local isolation is not allowed.

5.4 Cancelling the Isolation

The local isolation instructions shall specify additional location-specific information, or amendments, as appropriate to the requirements of Module 8 to make the overhead line equipment live.

5.5 Isolation Records

A record of all isolations carried out under any local isolations shall be retained and documented. They shall show, with signatures, the siding(s) isolated, person requesting the isolation and earthing, the Nominated Person carrying out the isolation, the time the isolation was carried out and withdrawn and the Nominated Person carrying out the withdrawal of the isolation.

5.6 Ladder Control Measures

Where appropriate, in accordance with Module 3 and Rule Book GE/RT8000 (Module AC), ladder control measures shall be established in relation to the danger from any live parts of the OLE.

The local isolation instructions shall specify that all ladders shall be stored and secured so that access above cant rail level on the wired sidings is controlled.

A record of all ladder keys issued under the local isolation of the siding(s) shall be kept in a ladder record book. This shall show, with signatures, receipt of the ladder key by the person requesting the ladder and the removal and return of the ladder and ladder key during the isolation of the siding.

5.7 Change of Nominated Person

The local isolation instructions shall specify the procedure for the change of Nominated Person, as appropriate to the requirements of Module 8 or local operating instructions.

6 Approval of Local Isolation Instructions

The approval of local isolation instructions for the siding(s) concerned on Network Rail controlled infrastructure shall be the responsibility of the DUE&PME.

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7 Distribution of Local Isolation Instructions

The distribution of local isolation instructions for the siding(s) concerned shall be in accordance with Network Rail policy.

8 Auditing of Local Isolation Instructions

The auditing of the local isolation and earthing procedures for the siding(s) concerned shall be in accordance with Network Rail policy.

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Appendix A
Sample Local Isolation Instruction

**LOCAL ISOLATION AND EARTHING OF 25 kV OVERHEAD LINE EQUIPMENT:
PLATFORM No. (1) LINE AND (EAST) SIDING No. (1) INCLUSIVE AT
(A) STATION**

LOCAL WORKING INSTRUCTION No. (1)

**ALL PERSONS ARE REMINDED THAT ALL APPROPRIATE SAFETY
PRECAUTIONS SHALL BE OBSERVED WHEN UNDERTAKING THE WORK
COVERED BY THIS INSTRUCTION**

Prepared by:

Authorised by:

Distributed by:

Issue no.:

Date:

Implementation date:

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A1. Purpose

The purpose of this document is to detail the local procedure used by the (A) Station Supervisor to carry out the isolation, earthing and re-energisation of 25 kV a.c. overhead line equipment in accordance with Network Rail standard NR/L3/ELP/29987/08.

A2. Scope

This document applies to the 25 kV a.c. overhead line equipment installed over platform no. (1) line and (east) siding no. (1) at (A) station, electrical subsection (999A).

A3. Definitions

Additional earth	<p>Earthing equipment, of sufficient strength and current-carrying capability to discharge electrical energy to earth, which is applied at a Site of Work and recorded in the relevant process documentation.</p> <p><i>NOTE Portable earths are specifically rated and product accepted for use as a Circuit Main Earth (CME) or Additional Earth. Additional Earths and CMEs are recorded on the EIDF.</i></p>
Circuit Main Earth (CME)	<p>Earthing equipment, of sufficient strength and current-carrying capability to discharge electrical energy to earth at a point where potential inadvertent re-energisation may occur due to the operation of a Point of Disconnection.</p> <p><i>NOTE 1 Portable earths are specifically rated and product accepted for use as a CME or Additional Earth.</i></p> <p><i>NOTE 2 The risk of inadvertent re-energisation at section insulators providing a Point of Isolation may be mitigated through the use of Additional Earths.</i></p>
Earth	<p>The general mass of the earth and any conductor in direct electrical connection with it.</p> <p><i>NOTE 1: 'Earth', for the purpose of overhead line equipment only, is also used to denote the running rail traction return circuit and the overhead line equipment supporting structures which are connected to it.</i></p> <p><i>NOTE 2: The term 'earth' is also used to refer to the cable used to form a connection between overhead line conductors and earth. See 'Portable earth'.</i></p>
Earthed	<p>Connected directly to the traction return running rail or to a structure which is itself connected to the traction return running rail (when used in the context of overhead line equipment which is normally live).</p>
Earthing pole	<p>Device consisting of a bottom handle section, a primary insulator section and a top section, and other attachments, used for the application and removal of portable earths.</p>

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Electrical control operator (ECO)	Person who controls the power supply to the electric traction system, who is responsible for all switching operations and isolations of its electrical equipment, and who holds a certificate to show that they are competent in these duties.
Electrical control (EC)	Secure location accommodating apparatus for the remote control of the electric traction system and the staff who operate it.
Nominated person (NP)	Person certificated as competent to carry out isolation and earthing, to issue and cancel overhead line permits or other authorities to work as defined in local isolation instructions, and nominated as such with electrical control in relation to particular equipment or locations.
Overhead line equipment (OLE)	Arrangement of wires, suspended over the railway line, for supplying electricity to electric trains, together with its associated fittings, insulators and other attachments including risers, feeders, autotransformer feeders, overhead line disconnectors, jumpers and return conductors.
Overhead line disconnector	Non-load-breaking device, mounted on an overhead line structure, for opening or closing an electrical circuit.
Siding Disconnector* (see note) NOTE	Overhead line disconnector which connects the overhead line equipment of a siding or group of sidings to another subsection of overhead line equipment in normal feeding arrangements. <i>Disconnectors marked “*” can also have an ‘earth’ position.</i>
Portable earth	Portable appliance of an approved type consisting of a length of sheathed flexible cable provided with electrical clamps at each end and used to establish electrical connection between overhead line conductors and earth. <i>See Notes under ‘Earth’.</i>

A4. Instructions

A4.1. General

Only staff suitably trained and in possession of a current Nominated Person’s certificate covering platform no. (1) line and (east) siding no. (1) at (A) station shall undertake isolation and earthing in accordance with this instruction.

The following prescribed safety precautions shall be observed by all staff when working on platform no. (1) line and (east) siding no. (1):

- a) work within the line and siding limits above cant rail level shall not proceed without the authority of the Nominated Person for the siding;
- b) ladders shall not be brought onto or used on the line or siding without the authority of the Nominated Person for the siding (EXCEPT short steps to gain access to the inside of rail vehicles);
- c) ladders, scaffolding, zip-up staging or similar items shall not be brought onto or used on the line or siding except as authorised in Rule Book Module AC (GE/RT8000/AC);

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- d) all overhead line equipment shall be regarded as being live at all times until advised otherwise by the Nominated Person for the siding;
- e) roof hatches shall not be opened from inside a rail vehicle without the authority of the Nominated Person for the siding; and
- f) each person is responsible for observing all appropriate safety precautions.

The Nominated Person for platform no. (1) line and (east) siding no. (1) is responsible for:

- a) carrying out this isolation and earthing procedure for the overhead line equipment as defined in this instruction;
- b) checking that the line and siding to be isolated have been blocked to electric trains in accordance with local operating instructions and, where necessary, protection against the movement of vehicles has been provided in accordance with Rule Book GE/RT8000;
- c) the safe custody of padlocks and keys used with this procedure;
- d) checking that the earthing poles and portable earths are in good order before use and securely stored when not in use;
- e) making appropriate entries in the isolation record book; and
- f) making appropriate entries in the ladder register.

A4.2. Carrying Out the Local Isolation

Work in accordance with this instruction shall only be carried out along platform no. (1) line and (east) siding no. (1) between the following limits:

overhead line structure AX/100/02

and

platform no. (1) line and (east) siding no. (1) buffer stops

A4.2.1. Isolating and Earthing the Overhead Line Equipment

The Nominated Person for the siding shall, before carrying out the local isolation in accordance with this instruction, arrange that:

- a) all pantographs are lowered on the line and siding concerned;
- b) the line and siding is blocked to electric trains; and
- c) permission to isolate and earth is obtained from the ECO at (an EC).

The Nominated Person for the siding, after receiving permission from the Electrical Control Operator at (an EC), shall:

- d) obtain the key for the overhead line disconnector key box from the Station Supervisor's office;
- e) open the overhead line disconnector key box and remove the overhead line disconnector handle padlock key (see below);

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Line or siding	OLE subsection no.	OLE structure no. (for disconnecter)	OLE disconnecter no.
Platform no. (1) and (east) siding no. (1)	999A	AXI/100/01	999/7

- f) insert the overhead line disconnecter handle padlock key, unlock and operate the overhead line disconnecter into the 'EARTH' position through the central 'OPEN' position and cam arrangement, and observe that the disconnecter blade has moved into the 'EARTH' position;
- g) insert the multilock bar, lock the disconnecter handle, withdraw the padlock key and replace it in the disconnecter key box;
- h) check that the earthing pole and portable earths show no obvious damage and apply the portable earths, in accordance with Network Rail standard NR/L3/ELP/29987 Module 10, as specified in the following table:

Line or siding	OLE structure no. and no. of portable earths
Platform no. (1) and (east) siding no. (1)	AXI/100/02 SINGLE

Application of the above portable earth is mandatory.

The earth end connection of the portable earth shall always be made BEFORE the line end is connected to the overhead line equipment.

Only approved portable earths and earthing poles shall be used. It is the responsibility of the user to arrange that adequate systems are in place for the inspection and maintenance of this equipment.

- i) return the key for the overhead line disconnecter key box to the key cupboard in the Station Supervisor's office;
- j) make the appropriate entry in the isolation record book; this shall show, with signatures, the siding isolated, person requesting the isolation, the Nominated Person carrying out the isolation, and the time the isolation was taken; and
- k) if required, issue ladders through the ladder procedure.

A4.2.2. Issue of Personal Safety Padlocks

Before commencing work, which requires the overhead line equipment to be isolated, each person, or person in charge of other staff, shall:

- a) make an appropriate entry in the isolation record book, and check that the entry is countersigned by the Nominated Person for the siding in token of their agreement;
- b) apply a personal safety padlock to the multilock bar;

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- c) check that each person for whom they are responsible fully understands the extent of the isolation before the person commences any work; and
- d) if the isolation is of longer duration than their turn of duty, hand the key to their relief, who shall accept all the above conditions; both persons shall notify the Nominated Person.

Persons visiting the siding for the purpose of carrying out work on rolling stock which requires the overhead line equipment to be isolated shall consult the Nominated Person for the siding who is responsible for specifying a safe method of work and for the issuing of personal safety padlocks.

A record shall be kept of the recipient of the personal safety padlock, the date and the padlock number. Where applicable, the key to the personal safety padlock shall be retained by the recipient.

The personal safety padlock shall not be removed until the work requiring the overhead line to be isolated is complete.

Each person, or person in charge of other staff, shall check before the personal safety padlock is removed that all staff and materials for whom they are responsible are removed to a safe position, and that all are aware the isolation is no longer protected by a safety padlock.

The appropriate entry shall be made in the isolation record book, and the personal safety padlock returned to the Nominated Person and booked in.

A4.2.3. Combined Isolation of Siding and an Abutting Subsection

When an isolation of platform no. (1) line and (east) siding no. (1) is required in combination with the abutting electrical subsection(s), the local isolation procedure shall be suspended and the requirements stated in Network Rail standard NR/L3/ELP/29987/07 shall be implemented.

A4.3. Cancelling the Isolation

The Nominated Person for the siding shall, before cancelling the isolation in accordance with this instruction, check that:

- a) all ladders issued under the isolation procedure have been returned and secured;
- b) all persons have removed their personal safety padlocks;
- c) an appropriate entry is made in the isolation record book; this shall show, with signatures, the time the isolation was withdrawn and the name of the Nominated Person; and
- d) permission to make the overhead line equipment live is obtained from the ECO at (an EC).

The Nominated Person for the siding, after receiving permission from the Electrical Control Operator at (an EC), shall:

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- e) obtain the key for the overhead line disconnector key box from the Station Supervisor's office;
- f) remove the portable earths from the overhead line equipment in such a way that **the line end connection is always removed from the overhead line equipment BEFORE the earth end connection is removed**;
- g) open the overhead line disconnector key box and remove the overhead line disconnector handle padlock key;
- h) insert the overhead line disconnector handle padlock key, unlock and remove the overhead line disconnector padlock and multilock bar;
- i) operate the overhead line disconnector to the 'CLOSED' position through the central 'OPEN' position and cam arrangement, observe that the disconnector blade has moved into the 'CLOSED' position, and lock the disconnector handle;
- j) withdraw the overhead line disconnector padlock key and replace it in the disconnector key box, padlock the key box and return the key to the Station Supervisor's office;
- k) advise the ECO at (*an EC*) that the OLE is live; and
- l) cancel the block to electric trains in accordance with local operating instructions.

A4.4. Ladder Procedure

All ladders shall be individually padlocked so that access above cant rail level on the wired lines is controlled.

The use of ladders is permitted **only when their construction is of wood or other approved non-conducting material and not reinforced by metal attachments running along the sides of the ladders.**

In accordance with Rule Book Module AC (GE/RT8000/AC) the Nominated Person for the siding shall:

- a) instruct that the ladders are carried to the site of work in a horizontal position using two or more persons as necessary;
- b) check that the person requiring a ladder understands the safe limits of work;
- c) proceed with any necessary isolation before issuing any associated ladder key; and
- d) instruct the person of the time the ladder has to be returned, issue the ladder key, obtain the person's signature and countersign the ladder register.

On return of the ladder key, the Nominated Person for the siding shall obtain assurance that the ladder is secure in its store, obtain the person's signature and countersign the ladder register.

A4.5. Relief of the Nominated Person

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If, while an isolation under this instruction is in force, the Nominated Person for the siding is relieved, then both the Nominated Person relieved and the relief shall make an entry in the isolation record book to the effect that the Nominated Person has been relieved and each shall countersign the entries.

In addition, the relief shall contact the Operating Supervisor and inform them of their name and the detail of the isolation and block to traffic which they are taking over.

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Appendix A1 Reference Documents

GE/RT8000	Railway Group Standard – Rule Book
NR/L3/ELP/29987/07	Network Rail standard – Isolation and Earthing of Overhead Line Equipment on 25 kV A.C. Electrified Lines
NR/L3/ELP/29987/08	Network Rail standard – Local Isolation and Earthing of Overhead Line Equipment on 25 kV A.C. Electrified Lines
NR/L3/ELP/29987/10	Network Rail standard – Use of Voltage Testing Devices, Portable Earthing Equipment and Temporary Continuity Jumpers on 25 kV A.C. Electrified Lines