

Information for users

The attached standard:

RT/E/P/24000

Issue 3

has essential supplementary information within the catalogue of supplements (RT/LS/CAT/007):

Instructions for use

It is essential that you first read and understand the supplement pertaining to the standard before proceeding to the standard. You must then apply the requirements of the supplement to the standard.

Proceed to supplement ►

**I have read & understand the supplement.
Proceed to standard ►**

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Ref	NR/SP/ELP/24000
Issue	3
Date	December 2002

Content & Preparation of Electrical Control Room Instructions (formerly RT/E/P/24000)

This temporary front sheet facilitates change to the new Network Rail Standards referencing nomenclature.

The Ref above will be formally allocated to this standard when it is next changed in the meantime the contents, date and issue number of this Network Rail Standard are UNCHANGED and with immediate effect it should be referred to as “(new ref) formerly (old ref)”.

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Railtrack Company Procedure

Content and Preparation of Control Room Instructions

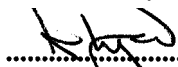
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RAILTRACK COMPANY STANDARD

ISSUE RECORD

ISSUE	DATE	COMMENTS
1	December 1998	New Procedure
2	August 2002	Addition of DC Protected Circuit Breaker Procedure, amendment of message numbering to 4 digits, additional requirements for complete loss of supervisory control and minor editorial changes
3	December 2002	Re-instatement of eight-figure message numbering

IMPLEMENTATION

The requirements of this procedure are mandatory and shall be enforced from the issue date shown above unless express written permission has been obtained for any deviation from Head of Business Process Documentation..

COMPLIANCE

Compliance with this amended procedure shall be immediate from the issue date shown above. This procedure is mandatory upon Railtrack Company.

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1. Purpose

This procedure states the mandatory requirements for the content and preparation of Electrical Control Room Instructions by Railtrack Zones for use at Electrical Control Rooms by Electrical Control Operators to ensure that adequate and correct control procedures are followed in the control and operation of the Electrification and Plant equipment under their jurisdiction.

2. Scope

This procedure applies to the preparation, distribution and updating of Electrical Control Room Instructions for all Electrical Control Rooms on A.C. and D.C. Electrified Lines.

3. General Clauses

3.1 Safety, Legislation, Regulations and Standards etc.

The ECR Instructions shall be written, issued and maintained in a condition such that, when followed, at all times the safety of persons and protection of electrical equipment is ensured.

The ECR Instructions shall comply with the requirements of all relevant statutory acts, rules, regulations or orders, including:

- a) Health and Safety at Work Act, 1974;
- b) Electricity at Work Regulations, 1989;
- c) Railways (Safety Case) Regulations, 1994;
- d) Railtrack Group Standards, where they are applicable;
- e) Railtrack Company Standards, where they are applicable.

This information is not necessarily exhaustive and does not modify the legal obligations of the writer of the ECR Instructions.

The ECR Instructions shall be fit for their intended purpose, and they shall be complete with all necessary information and directions to enable the ECO to control and operate the electric traction and plant equipment in the ECR area safely and efficiently.

3.2 Preparation of ECR Instructions

The ECR Instructions shall be written, distributed and maintained in accordance with best practice, taking cognisance of the systems to which they will apply. The ECR Instructions shall be of the quality and of the type most suitable for working under the conditions to be found at the relevant ECR's.

The ZEPE shall be responsible for ensuring that the preparation, distribution and maintenance of ECR Instructions for the ECR's in their Zone is carried out in accordance with the requirements of this procedure.

3.3 Quality Assurance

The production, distribution and maintenance of the ECR Instructions shall be carried out in accordance with the relevant Zone quality system.

Distribution of the ECR Instructions shall be in accordance with Zone document control procedures and shall ensure that controlled copies of ECR Instructions are made available to ECO's in good time before the date and/or time of implementation.

Each ECO in receipt of an ECR Instruction or amendment thereto shall be required to sign a receipt to be returned to the document control system and also to maintain a personal record of amendments.

A control system for the distribution, receipt and recording of any urgent instructions issued shall be available for use in emergency when the normal procedures cannot be followed. A subsequent formal issue of amendments to the ECR instructions shall be carried out in all cases where emergency system has been used, to ensure that all users of the ECR Instructions are in possession of an up to date copy of the ECR Instructions.

A procedure shall be operated which ensures that any identified error or omission in the ECR instructions is promptly dealt with and any necessary corrective action taken.

The ECR Instructions and their distribution and records thereof shall be subject to a periodic quality review.

4. Format and Content of Instructions

4.1 General

The instructions shall be in loose-leaf format to enable easy modification and updating of individual sections or pages as required.

Individual instructions shall be uniquely numbered to avoid confusion.

Each page shall clearly show the following:

- a) number and title of the instructions;
- b) issue number;
- c) date;
- d) page number and total number of pages of section or appendix.

4.2 Title and Initial Pages

4.2.1 Title Page

Each set of ECR Instructions prepared for an individual or group of ECR's, shall have a title page and/or cover which clearly indicates the number and title of the ECR Instructions, the issue number and date, and the issuing Zone.

4.2.2 Publication Details

The items below shall be included on the title page or that immediately following:

- a) copyright details;
- b) details of the publisher and issuer of the document;
- c) signature(s) and title(s) of the person(s) authorising publication of the document.

4.2.3 Preface

A preface shall be provided which includes the following information:

- a) a summary containing a brief description of the document;
- b) details of the Issue/revision number/date of the document;
- c) date of implementation;
- d) statement concerning error correction;
- e) details of supply of document;
- f) safety reminder;
- g) table of contents;
- h) definitions;
- i) abbreviations;
- j) a list of relevant legislation and standards.

A typical format of a title page and part of a preface is shown in Appendix "A"

4.3 Main Body of Document

4.3.1 Structure

The main body of the document shall be divided into sections or modules as necessary, each containing groups of related instructions to assist easy identification of the appropriate instruction under given circumstances.

Each section or module shall be preceded by a list of contents which may be more detailed than that list appearing in the preface.

The Module numbering scheme adopted in Appendices “B” and “C” is advisory and may be altered to suit the content of each set of Instructions.

4.3.2 Operating Principles

Instructions shall be included which satisfy the Operating Principles set out in Appendix “B”.

Instructions may be written to embrace other principles not listed in Appendix “B”.

Any instruction which alters or adds to the Operating Principles or may be construed as doing so shall be referred to Railtrack HQ for acceptance.

4.3.3 Instruction Content

Model Clauses which satisfy the Operating Principles listed in Appendix “B” are set out in Appendix “C”.

Alternative wording may be used but it shall nonetheless satisfy the Operating Principles set out in Appendix “B” subject to the criteria stated in the previous section.

Additional wording may also be used to cover principles or subjects not included in the sample wording of Appendix “C”. Any additional wording shall also be subject to the criteria stated in the previous section.

5. Definitions

For the purpose of this procedure the following definitions shall apply:

British Standard	A standard published by the British Standards Institution. Its alphanumeric identity is prefixed by BS.
Electrical Control Operator	The person having control of the power supply to the electric traction system and who is responsible for all switching operations and isolations of electrical equipment thereon, and is certificated as competent in these duties.

Electrical Control Room	The location of the apparatus for the remote control of the equipment associated with the electric traction system, and the staff who operate it.
Equipment	Equipment including all component parts and accessories.
European Standard	A standard published by the European Committee for Standardisation or by the European Committee for Electrotechnical Standardisation. Its alphanumeric identity is prefixed by EN.
International Standard	A standard published by the International Electrotechnical Commission. Its alphanumeric identity is prefixed by IEC.
Model Clause	Standard wording for ECR Instructions complying with an Operating Principle
Operating Principle	A statement which mandates the content of a section of the ECR Instructions
Railtrack Company Standard	A collective term for a Railtrack Company Specification, Railtrack Company Procedure or a Railtrack Company Code of Practice, published by a directorate of Railtrack plc .

5.1 Abbreviations

CTI	Controlled Track Isolator
CTS	Controlled Track Switch
DCM	Duty Contracts Manager
ECO	Electrical Control Operator
ECR	Electrical Control Room
ESI	Electricity Supply Industry
ETE	Electric Track Equipment
IFC	Infrastructure Fault Control
SCADA	Supervisory Control and Data Acquisition.
SMOS	Structure Mounted Outdoor Switchgear
TSC	Track Sectioning Cabin
TSL	Track Sectioning Location
ZEPE	Zone Electrification & Plant Engineer

6. Appendices

APPENDIX A: TYPICAL FORMAT OF TITLE PAGE AND PREFACE

Typical Title Page

RAILTRACK <i>Great Western</i> Electrical Control Room Instructions SLOUGH

This publication, including the data and information relating thereto, is to be disseminated, stored in a retrieval system, reproduced or copied only in accordance with the issuing Zone Document Control Procedures.

Endorsed by:

.....

Area Production Manager
RAILTRACK GREAT WESTERN

Authorised by:

.....

Zone Electrical & Plant Engineer
RAILTRACK GREAT WESTERN

Controlled Document No

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Typical Preface (part only)

Summary

The requirements of this Procedure Manual are mandatory for Control Room Operators managing the control room at Slough.

Revision Letters and Up Dates for this Procedure Manual

This Procedure Manual will be updated when necessary by the distribution of Revision Letters accompanied by New Contents Sheets, New Modules or Amended Pages. Amendments will be marked by vertical black line in the adjacent right hand margin. The Revision Letter instructions shall be followed and the latest Revision Letter shall be placed in the manual after this page.

Implementation Date: 23 Oct 1996

The requirements of this Procedure Manual are mandatory and shall be enforced from the implementation date above, unless express written permission is obtained for any deviation from the Zone Electrical & Plant Engineer.

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Supply

Persons requiring copies of this document shall obtain them from the Document Controller Great Western.

Safety

All persons are reminded that all prescribed safety precautions must be observed when undertaking the work covered by this document.

APPENDIX B: OPERATING PRINCIPLES

The principles which follow have been written to ensure compliance with relevant legislation and to optimise the performance of Railtrack's electrified railway systems.

I MODULE I – GENERAL

I.1 Introduction

The purpose and scope of the document shall be stated.

I.2 Document Control

A document control system shall be used which ensures that ECO's are made aware of new instructions, and the modification or withdrawal of existing instructions. Provision shall be made for the urgent issue of temporary instructions to cover unplanned system changes.

A controlled copy of all Zone Electrical Control Room Instructions and amendments or additions thereto shall be sent to the relevant section at Railtrack HQ.

Other publications which affect the operation of the ECR and are required to be available shall be listed. The Zone preparing the instructions shall provide those documents deemed to be appropriate for the ECR(s) concerned but shall always make a copy of this procedure available to the ECO's.

I.3 Responsibilities of Electrical Control Room Staff

The responsibilities of the ECO's shall be stated.

I.4 Maintenance of Logs and Records

The procedure for keeping the ECR log and any other records shall be stated.

I.5 Unusual Incidents and Malfunction Reports

Reporting procedures shall be included which ensure that details of any unusual equipment malfunctions or incidents that may require further investigation are brought to the attention of the appropriate engineer or operating manager.

1.6 Recording of Telephone Calls

The ECO shall be required to keep a record of all telephone or radio calls involving operation of the Traction Power Supply System including detailed records of significant calls involving safety, incidents and emergencies.

2 MODULE 2 – COMMUNICATIONS

2.1 Direct Lines

A requirement to carry out a daily test of all direct telephone lines to important control locations and record the results of the test shall be included.

2.2 Attention to Calls

A requirement to deal with all incoming calls promptly shall be included.

2.3 Communication Flow Diagrams

Flow diagrams shall be included which illustrate typical reporting and communication flows.

2.4 Emergency Usage of Telephones and Radios

Where available, the emergency interrupt facility shall be used to facilitate communications in an emergency.

2.5 NUMBERING OF MESSAGES

Where numbering of messages is called for in accordance with these instructions, Rulebook Section Z (part i) or Railtrack Line Specification RT/E/S/29987, the number shall be formed as an 8 figure number comprising the time (24 hr clock), date and month as follows:

0	9	4	5	1	6	0	2
{ time }				{ date }		{ month }	

3 MODULE 3 - INCOMING ELECTRICITY SUPPLY

3.1 Introduction

The incoming electricity supplies to which this instruction applies shall be described.

3.2 Responsibilities

The division of responsibilities between the ECO and the ESI Control Engineers shall be clearly stated.

3.3 Agreed Procedures Applying to Electricity Company Supply Points

The attention of the ECO shall be drawn to the contents of Engineering Recommendation G38/I "Operational procedures associated with supplies to Railtrack for traction purposes"

3.4 Switching Arrangements

The agreed arrangements for normal and emergency switching shall be clearly stated together with a requirement that the ECO keeps the ESI Control Engineer advised of all events including switching which may affect the ESI system.

3.5 Protection Limits

Limits of safe feeding from ESI supplies, which are determined by the settings applied to protection equipment at the ESI substation or Railtrack feeder station, switching station or substation, shall not be exceeded. Information on safe feeding limits shall be readily available to the ECO.

3.6 Paralleling of Supply Points

The procedures and any special conditions to be applied when connecting together two different supply points shall be stated. Those cases where paralleling of supplies is not allowed, shall also be stated.

3.7 Loading

The agreed loads which may be taken from each ESI supply point under normal and emergency conditions shall be stated.

3.8 Outages

The method to be used for pre-arranging outages for maintenance or other purposes which affect the ESI supply points shall be stated.

All outages affecting ESI supply points shall be recorded locally and reported on form TSPR2.

3.9 Supply Authority Warnings

The procedures to be carried out upon receipt of warnings from the ESI giving notice of possible disturbance to supplies shall be clearly stated.

3.10 Telephone Numbers

Contact telephone numbers for ESI Control Centres shall be listed.

4 MODULE 4 - INCIDENT AND EMERGENCY

4.1 Introduction

The action to be taken by the ECO in the event of an incident or emergency occurring shall be stated together with the need to act in accordance with the information available at the time of the occurrence and the requirements of the instructions when determining any subsequent action to be taken.

4.2 Loss of H.V. Supplies

The procedure to be carried out following a loss of h.v. supply at an ESI supply point shall be clearly stated.

4.3 Tripping of H.V. Supplies

The procedure to be carried out following a tripping of the incoming feeder circuit breaker at a Railtrack substation or a tripping of the supply circuit breaker at an ESI supply point shall be clearly stated. This instruction shall include the procedures for progressive re-charging to locate and isolate the fault with minimum further supply trippings.

4.5 Tripping of H.V. Feeder Circuit Breakers

The procedures to be followed when feeder circuit breakers on 3-phase h.v. distribution systems have tripped off load shall be stated. This instruction shall cover all feeder circuit breakers, bus-section and interconnector circuit breakers, forming part of the main h.v. distribution system but shall exclude, for example, all subsidiary circuits such as those associated with rectifiers and auxiliary transformers.

4.6 Tripping of Other H.V. Circuit Breakers

The procedures to be followed when h.v. circuit breakers feeding other single point loads have tripped off load shall be stated.

4.7 Emergency Isolations

The procedures to be followed when an emergency overhead line or conductor rail isolation is requested shall be clearly stated, together with the situations in which emergency isolations are to be granted.

The attention of ECO's shall be drawn to the relevant sections of the appropriate Electrified Lines Instructions.

4.8 Emergency Isolations of Overhead Line Equipment

The procedures to be followed when an emergency isolation is to be carried out shall be clearly stated together with the arrangements for shortening the emergency isolation, where practicable, to minimise disruption to traffic.

The procedures shall include for invoking the isolation procedures and the issue of Overhead Line Permits and circumstances in which the overhead line is to be de-energised.

4.9 Emergency Conductor Rail Isolations on D.C. Railways

The procedure to be followed when an emergency isolation of the conductor rail is called for, and the creation of abutting sections, together with the arrangements for shortening the emergency isolation, where practicable, to minimise disruption to traffic.

4.10 Conversion of an Emergency Conductor Rail Isolation into a Planned Isolation and Engineering Possession

The procedure to be followed when an emergency isolation is to be converted into a planned isolation and engineering possession shall be clearly stated.

The procedures shall include for the preparation of safety documentation.

4.1.1 Emergency Evacuation of Electrical Control Room

A local instruction shall be inserted. The instruction shall state the actions to be taken to safeguard the operation of the electric traction power supply system.

The instructions shall include where appropriate the actions to be taken if access supervisory control and telecommunications systems are not available.

5 MODULE 5 - NORMAL OPERATIONS**5.1 Major Feeding Arrangements for 25 kV Overhead Line Systems**

The arrangements for normal, and emergency feeding shall be stated, together with any restrictions or special switching instructions.

5.2 25 kV Supply Outages

The principles for the planning of outages including the production of an outage programme shall be stated.

5.3 Circuit Breaker Trippings on 25 kV Systems

The principles for the re-closure of track feeder circuit breakers with and without trains in section shall be stated.

The procedures shall include for examination of the OLE following trippings.

5.4 Isolation of 25 kV Overhead Line Equipment

The general procedures to be followed shall be stated for the isolation, where appropriate, and earthing of overhead line equipment, bare feeders, SMOS switching stations, booster transformers, return conductors etc.

5.5 Overhead Line Equipment (including Bare Connections from Outdoor Switchgear Bushings to Overhead Line Switches)

The supplementary procedures for the isolation and earthing of overhead line equipment shall be stated with particular reference to Section 7 of Module 7 of Railtrack Company Specification RT/E/S/29987.

5.6 Outdoor Switching Station High Voltage Equipment (with Associated Cables and Roof mounted Bushings)

The procedures to be followed when isolating high voltage equipment at outdoor switching stations with cables and/or roof mounted bushings shall be stated.

The procedures for the issue of high voltage Permits to Work, Sanctions for Test shall be included.

5.7 OUTDOOR SWITCHING STATION HIGH VOLTAGE EQUIPMENT (WITH ASSOCIATED CABLES AND ROOF MOUNTED BUSHINGS), COVERED BY THE APPROPRIATE OPERATION & MAINTENANCE PROCEDURE AGREED BY THE RAILWAY AND THE SUPPLY AUTHORITY AND ENGINEERING RECOMMENDATION G.38/I

The particular procedures to be followed at interfaces with a Supply Authority shall be stated.

5.8 Issue of Overhead Line Permits Spanning a Neutral Section Forming the Boundary Between Adjacent Control Rooms

The procedures for the issue of Overhead Line Permits shall be stated and designated ECR's listed.

5.9 Loss of Running Rail Continuity

The procedures to be followed in the event of loss of continuity in a traction return path shall be stated.

5.10 Loose or Defective APC Track Inductor

The procedure for initiating repair of loose or defective APC inductors shall be stated.

5.11 Local Isolations

The procedures to be followed for the granting and carrying out of local isolations shall be stated.

(Numbers 5.12 to 5.19 not used)

5.20 Operation of 3-phase H.V. Distribution Systems

The normal h.v. feeding arrangements shall be stated, together with the procedures to be followed when carrying out switching.

5.21 System Loading of 3-phase H.V. Distribution Systems

The procedures to be followed to ensure that the h.v. system is not overloaded, system losses are minimised and voltage regulation is kept within limits shall be set out.

5.22 Outage Programming of 3-phase H.V. Distribution Systems

The procedure for the pre-planning of h.v. outages and the associated h.v. switching shall be set out.

5.23 Track Feeding Arrangements of D.C. Conductor Rail Systems

The requirements for normal track feeding arrangements shall be clearly stated, together with the arrangements to be implemented when abnormal track feeding has to take place.

5.24 Operation of Hookswitches and Track Isolating Switches

The requirement that hookswitches and track isolating switches shall only be operated when off circuit shall be clearly stated.

5.25 Track Circuit Breaker Trippings on D.C. Conductor Rail Systems

The procedure to be followed when track feeder circuit breaker trippings occur shall be clearly set out.

5.26 Location of Short Circuits on D.C. Conductor Rail Systems

The procedure to be followed to identify the location of short circuits shall be clearly set out. These procedures shall minimise the number of re-closures onto the faulty section. Methods shall be included by which conductor rail faults and train faults may be distinguished and dealt with.

5.27 Conductor Rail Isolations when the PICOP is Responsible for Arranging Signal Protection (GO/RT/3091, Procedure A)

The procedures for checking, issuing and cancellation of electrical isolations in connection with Rule T(iii) of the Rule Book (GO/RT/3000) shall be clearly stated.

The procedures to be followed when issuing and cancelling Conductor Rail Permits shall be included.

The attention of ECO's shall be drawn to the relevant sections of the appropriate D.C. Electrified Lines Instructions, making it clear that this instruction applies when the PICOP is responsible for blocking the line..

The procedures to be followed upon late clearance of track possessions and electrical isolations shall be clearly set out.

5.28 Conductor Rail Isolations when the ECO is Responsible for Arranging Signal Protection (GO/RT/3091, Procedure B)

The procedures for checking, issuing and cancellation of electrical isolations shall be clearly stated.

The procedures to be followed when issuing and cancelling Conductor Rail Permits shall be included.

The attention of ECO's shall be drawn to the relevant sections of the appropriate D.C. Electrified Lines Instructions, making it clear that this instruction applies when the ECO is responsible for blocking the line.

The procedures to be followed upon late clearance of track possessions and electrical isolations shall be clearly set out.

5.29 Operation of Hookswitches and Track Isolating Switches in Connection with Conductor Rail Isolations for Absolute Engineering Possessions.

Arrangements shall be clearly set out for operation of these switches in order to prevent injury or damage due to operating a switch which may be carrying current.

5.30 D.C. Frame Leakage Protection

The procedures to be followed upon operation of d.c. frame leakage protection shall be set out. These shall include interpretation of the alarms and indications received to identify local and distant faults together with methods of isolation of faulty equipment and restoration of d.c. supplies to unaffected parts of the d.c. system.

5.31 Track Current Relays

Where TCR's are installed, procedures shall be set out which describe the actions to be taken to ensure that short circuits are detected in the event of TCR failure, pilot fault, rectifier outage or alterations to track feeding.

5.32 Operation of Controlled Track Switches

The procedure to be followed when operating Controlled Track Isolators (CTI's), or Controlled Track Switches (CTS's) shall be set out. The procedures shall include arrangements to ensure that CTI's are only operated when the conductor rails are dead. The arrangements for the use of CTI's and CTS's as points of isolation for conductor rail isolations shall be clearly stated.

5.33 Issuing and Cancelling an Isolation with a Protected Circuit Breaker

The procedure to be followed when issuing and cancelling isolations shall be set out. The procedure will cater for both Electro-mechanical Supervisory Systems as well as the modern electronic SCADA Systems.

6 MODULE 6 - SYSTEM MONITORING

6.1 Failure of SCADA Equipment

The procedures to be carried out by the ECO when SCADA equipment has failed shall be stated.

The procedures shall address the following types of failure and their consequences:

- a) temporary or intermittent failures in which control can be restored by direct actions of the ECO at the ECR;
- b) partial or complete failures which require the attendance of persons to identify and correct the fault;

loss of control, which may require locations to be manned in order to ensure safety and the reliability of supplies.

6.2 Actions in Response to Alarms

The actions to be taken by the ECO in response to SCADA and other alarms received at the ECR shall be stated.

In particular where electronic/VDU SCADA systems are in use a glossary of alarm symbols and mnemonics shall be included.

6.3 Glossary of Alarms - Electro-mechanical Systems

A glossary of alarms shall be provided.

6.4 Glossary of Alarms - Electronic/VDU - Keyboard Systems

A glossary of alarms shall be provided, identifying the mnemonics in use.

6.5 Action on Receipt of General Station Alarm (Electro-mechanical Systems)

The actions required to be taken by the ECO upon receipt of this alarm shall be stated, in particular, the use of other indications to establish the causes of such alarms shall be included.

6.6 Action on Receipt of General Type Alarms (VDU Systems)

The action to be taken upon receipt of each alarm identified by the SCADA system shall be stated.

6.7 Low Cable Oil Pressure Indication

The actions to be taken upon receipt of LOPI alarms shall be stated. In particular, the categorisation of individual cables into risk categories and/or groups, for which different levels or types of response may be required, shall be clearly set out.

6.8 Action on Receipt of Feeder Protection Alarms (VDU Systems)

The actions to be taken upon receipt of feeder protection alarms shall be stated. The response to failure of protection monitoring circuits shall be clearly set out.

6.9 Action on Receipt of Power Transformer Alarms

The actions to be taken upon receipt of power transformer alarms shall be stated.

6.10 Action on Receipt of Bus Zone Alarms

The actions to be taken upon receipt of bus zone alarms shall be stated.

6.11 Action on Receipt of Rectifier Alarms

The actions to be taken upon receipt of rectifier alarms shall be stated. In particular, the conditions, which require rectifiers to be taken out of service or remain out of service, shall be clearly stated.

6.12 Action on Receipt of Track Voltage Alarms

The actions to be taken upon receipt of track voltage alarms shall be stated.

6.13 Action on Receipt of H.V. Supply Alarms

The actions to be taken upon receipt of h.v. supply alarms shall be stated.

6.14 Action on Receipt of Weather Condition Alarms

The actions to be taken upon receipt of weather condition alarms shall be stated.

7 MODULE 7 - LOCAL INSTRUCTIONS

Where the main body of the instructions is common between several ECR's, then local instructions, which are unique to an individual ECR, shall be included in a separate section issued only to that ECR.

APPENDIX C: MODEL CLAUSES

Introduction

This appendix contains Model Clauses which are compliant with the Operating Principles set out in Appendix “B”.

The Model Clauses are numbered to match the corresponding module/instruction numbering system used in the Operating Principles set out in Appendix “B”.

The heading for each module indicates whether the module is applicable to a.c. and/or d.c. electrified railways.

For modules which apply to both a.c. and d.c. electrified railways, the main section title is suffixed (a.c.) or (d.c.) unless the wording of the title provides an unambiguous indication of the scope of the following sub-sections and clauses.

Where necessary, guidance is given to assist in the preparation of the instructions. Possible variations to the Model Clauses are indicated by **(emboldened text enclosed by parentheses)**.

I. MODULE I - GENERAL (A.C. & D.C.)

I.1 INTRODUCTION

I.1.1 Purpose

These procedures provide instructions to Electrical Control Operators in **(Name(s))** Electrical Control Room(s) operated by Railtrack **(Name)** Zone.

I.1.2 Scope

These procedures apply only to the actions of Electrical Control Operators responsible for the direction of Railtrack **(Name)** Zone Electrical Control Room operations and management of the interfaces with other railway control centres, infrastructure maintainers, train operating companies etc.

(This section may be expanded as required to provide further description of the role of the ECR)

I.1.3 Definitions

This section is in three parts:

- common definitions which apply to both a.c. and d.c. railways;
- definitions which apply to only a.c. railways;
- definitions which apply to only d.c. railways.

Common definitions applying to both a.c and d.c. railways

For the purpose of these instructions the following definitions shall apply:

Additional Earth	An earth applied to equipment after the issue of an h.v. Permit to Work.
Alive	See "Live".
Apparatus	Equipment including machines, switchgear, cables, overhead power lines and fittings in which conductors are used or of which they form part.

Authorised Person	A Competent Person over 18 years of age possessing sufficient knowledge, who has been appointed in writing by or on behalf of Railtrack to carry out specific work on Electrical Equipment and to set up safe systems of work for electrical apparatus operating below High Voltage. (Excludes work on 25 kV a.c. OLE and 650/750 V d.c. conductor rail)
Bond	An electrical connection to or in the running rail traction return circuit, or in a signalling track circuit.
Continuity bond (traction)	A bond across the gap in the traction return rails at points and crossings.
Cross bond (traction)	A bond between the traction return rails of the same track or adjacent tracks.
Impedance bond	A device which, whilst allowing the traction return current to flow freely, so impedes the flow of track circuit current as virtually to isolate two track circuits one from another.
Rail joint bond	A bond across a joint in the running rails.
Transposition bond (traction)	A bond connecting two traction return rails where the traction return rail changes from one side of the track to the other.
Bushing	A special insulator providing a passage for a conductor through a partition such as a wall or roof and insulating it there from.
Cant rail	The point on a vehicle or traction unit at which the profile between the bodyside and the roof changes.
Caution notice	A notice attached to electrical equipment or its control equipment when dead, giving warning against making it live.
Check	Determine a particular nominated condition (e.g. completeness, security, position)
Circuit	An arrangement of conductors and electrical apparatus connected to a source of electricity supply.
Open circuit	The condition applying when a circuit is incomplete, as by the opening of a switch, or by the omission of a connection in the circuit, thus preventing electric current from flowing.

Short circuit	The introduction of a path of low resistance to electric current between conductors which are connected to a source of electricity supply or between a live conductor and earth. This will generally cause the electricity supply to be switched off by the action of circuit breakers.
Circuit breaker	A switch arranged to open automatically when a current above a pre-determined value flows through it.
Circuit State Certificate	A form of declaration, detailing the isolation and earthing carried out on apparatus where there is an interface between Railtrack and another authority, e.g. a Regional Electricity Company.
Competent Person	A person possessing sufficient technical knowledge or experience to enable them to avoid danger and who has been appointed in writing by or on behalf of Railtrack. (Excludes work on 25 kV a.c. OLE and 650/750 V d.c. conductor rail)
Conductor	A material, which permits the flow of electricity.
Contractor	An organisation contracted to Railtrack for specific work on its infrastructure.
Control	The direction of operations on electricity supply systems.
Control Room	A building for the purpose of controlling the supply of electrical energy.
Control Room Log Book	The record of all operations, incidents and messages carried out at the Control Room concerned.
Current	The flow of electricity.
Danger	Risk of injury. Refer to Electricity at Work Regulations, 1989.
Danger notice	A notice attached to or near electrical equipment, which is live, calling attention to the fact that, it is dangerous to approach or interfere with it.
Dead	Not electrically charged.
Dual electrified line	A line, which is electrified using the 650/750 V d.c. conductor rail system, as well as the 25 kV a.c. overhead system, to allow trains of either system to operate.
Earth	The general mass of the earth and any conductor in direct electrical connection with it.

Earthed	Connected to the general mass of the earth in such a manner as will ensure at all times an immediate discharge of electrical energy without danger.
Electrical Control Operator	The person having control of the power supply to the electric traction system and who is responsible for all switching operations and isolations of electrical equipment thereon, and is certificated as competent in these duties.
Electrical Control Room	The location of the apparatus for the remote control of the equipment associated with the electric traction system, and the staff who operate it.
Electrical Control Room Instructions	Specific instructions describing the procedures to be adopted by the Electrical Control Operator in the carrying out of his duties, and the actions to be taken in particular circumstances.
Electrical equipment	Includes anything used, intended to be used or installed for use to generate, transmit, transform, rectify, convert, conduct, distribute, control, store, measure or use electrical energy.
Electricity Company Control Engineer	The appropriate REC or NGC Engineer.
Energised	See “Live”.
Examine	Determine the general condition.
High Voltage	Normally exceeding 1000 V a.c. or 1500 V d.c. between conductors or 600 V a.c. or 900 V d.c. between conductors and earth.
Infrastructure Maintainer	The organisation responsible for the maintenance of the infrastructure.
Insulation	Material which offers extremely high resistance to the passage of electricity.
Insulator	A component constructed of insulation material to separate the live parts of a circuit from each other or from earth.
Isolate	In the context of these instructions “Isolate” can be taken to refer to the process of disconnection and separation. See “Isolated”.
Isolated	Electrical equipment is isolated when it is disconnected and separated from all sources of electricity supply in a secure way.

Isolating section	A section of overhead line equipment usually at the changeover from a 25 kV a.c. overhead system to a 650/750 V d.c. conductor rail system, and installed to prevent d.c. traction return current from entering the a.c. system.
Key safe	An approved device for the secure retention of all keys used to lock means of isolation, earthing or other safety devices necessary for the issue of a High Voltage Permit to Work, Sanction for Test or Circuit State Certificate.
Live	Being at a voltage by being connected to a source of electricity.
Method statement	A statement in a required format of the methods, systems, tools plant and equipment and competence of persons to be used in performing a particular task, for the purpose of demonstrating that safety is not prejudiced.
Nominated Person	An Authorised Person over 20 years of age who has been appointed in writing by or on behalf of Railtrack to set up safe systems of work for work on high voltage equipment. (Excludes work on 25 kV a.c. OLE and 650/750 V d.c. conductor rail)
Open circuit	See "Circuit".
Operation	The local or remote switching, isolation or earthing of electrical apparatus.
Operations Control	The term generally applied to Railtrack Zone Control offices
Permit (High voltage, conductor rail or overhead line)	A statement in standard approved form signed by a Nominated Person that particular electrical equipment is safe to work on - that is, it is dead, isolated from all live conductors, has been discharged, is connected to earth, and on which it is safe to work.
Person in Charge of Work	As defined in the Master Rule Book GO/RT 3000.
Railtrack	The organisation owning and controlling the railway infrastructure.
Railtrack controlled infrastructure	As defined in the Railtrack Railway Safety Case.
Railtrack Company Standard	A Standard forming a Specification, Procedure or a Code of Practice, published by a Directorate of Railtrack.
Railtrack Zone	One of the geographical sub-divisions of Railtrack.

Railtrack Zone Control(ler)	The Railtrack Organisation (Person) that has replaced Operations Control(ler) in the post-April 1994 Railway Structure.
Reasonably practicable	For full explanation refer to Electricity at Work Regulations, 1989.
Risk assessment	A process carried out to evaluate in a structured manner the consequences of certain tasks or activities.
Sanction for Test	A statement in standard approved form signed by a Nominated Person that particular electrical equipment is safe to work on - that is, it is dead, isolated for the purpose of testing, and earthed, but which permits the earths to be removed temporarily for the testing.
Sealing end	The termination of a cable in a special insulator mounted on an overhead line structure or on a special structure.
Senior Authorised Person (Electricity Company)	An Electricity Company Authorised Person who has been appointed in writing by an Electricity Company to issue and cancel Permits-to-Work, Sanctions-for-Test, Limitations-of-Access, Isolation Requests and Circuit State Certificates.
Short circuit	See 'Circuit'.
Signaller	Operations Control/Signal Box Supervisor/Signaller
Supervisory control	An electrical system for the remote control of electrical equipment at switching stations, motorised overhead line switches and other locations.
Supply circuit breaker	The circuit breaker located at an Electricity Supply Company substation controlling a circuit terminated at a Railtrack installation.
Switched off	Electrical equipment is switched off when it is disconnected and separated from all sources of electricity supply.
Test	Prove electrical condition by trial.
Transformer	Apparatus for supplying an alternating current at one voltage when fed with alternating current at another voltage.
Tripping	The action of a circuit breaker opening automatically on detecting a fault or an overload.
Work	All operations or duties which cause a person to be in such a position that he can make contact with conductors which are normally live, or come so close to such conductors that the person would be in danger if those conductors were live.

Working Party	Persons under the direct supervision of a Competent Person, Authorised Person or Nominated Person, including such persons when working alone. (Excludes work on 25 kV a.c. OLE and 660/750 V d.c. conductor rail)
Zone Electrification and Plant Engineer	The Railtrack Zone Director's nominated representative competent in Electrification and Plant Engineering, or his appointed agent.
Zone Civil Engineer	The Railtrack Zone Director's nominated representative competent in Civil Engineering, or his appointed agent.
Zone Control	Railtrack lead Control for defined areas.
Zone Signal Engineer	The Railtrack Zone Director's nominated representative competent in Signal Engineering, or his appointed agent.
Zone Telecommunications Engineer	The Railtrack Zone Director's nominated representative competent in Telecommunications Engineering, or his appointed agent.

Definitions applying to a.c. railways

For the purpose of these instructions the following definitions shall apply:

APC track inductor	A magnet fixed on the sleeper ends before and after a neutral section which operates the automatic power control system on a train.
Authorised Person	A person certificated as competent to carry out specific duties in relation to the requirements of Railtrack Company Specification RT/E/S/29987.
Authority to Test (Form B)	A form of declaration issued by an Electrical Control Operator to a Nominated Person using the Form B 'Authority to Test'. The purpose of the form is to make known to the Nominated Person exactly which equipment is switched off and upon which to commence testing and the application of local earths.

Automatic dropping device	The automatic dropping device, where provided, will automatically lower the pantograph to minimise damage to the overhead line equipment if: (a) the pantograph carbons are displaced or the head is damaged; or, (b) the pantograph head becomes damaged or detached; or, (c) the pantograph height limit is exceeded.
Automatic power control	Means whereby the electric power circuits on the traction unit are: (a) automatically switched OFF before a train enters a neutral section; and, (b) automatically switched ON after a train leaves a neutral section. Note: This is also used where a permanently earthed section under which electric trains may run is installed beneath a very low bridge. See “Permanently earthed section”.
Auxiliary catenary wire	A bare stranded conductor being the middle wire of the three wires in the overhead line equipment. It is suspended from the catenary wire. The contact wire is suspended from the auxiliary catenary wire.
Bare feeder	A bare live conductor, forming a connection between a switching station and the overhead line equipment identified as such on an isolation diagram. (See also ‘Riser’).
Block to Electric Trains (Form AE)	A form initiated by an Electrical Control Operator to arrange for a Zone Controller/signal box Supervisor/Signaller to block to electric trains specific lines or routes and to obtain confirmation that the block to electric trains has been imposed.
Bond	An electrical connection to or in the running rail traction return circuit, or in a signalling track circuit.
Red bond	A red bond is one which, if disconnected could result in either the bond or the equipment to which it is connected rising to a dangerous voltage.
Return conductor-to-rail bond	A bond from the traction return rail to the return conductor, often called a ‘mid point connection’. These will usually be ‘Red bonds’.

Structure bond	A bond connecting the steelwork of an overhead line equipment structure, or bridge, or other metal structure, to the traction return circuit.
Yellow bond	A yellow bond is one that is required for track circuit integrity and normally also for traction return purposes.
Booster transformer	A device to induce into the return conductors, virtually the whole of the traction return current, in order to reduce to a minimum interference with communication circuits.
Buffer Section	See “Permanently earthed section”.
Cable	An insulated conductor which may be laid directly in or on the ground or in pipe or troughing or attached directly to an overhead line structure.
Catenary wire	A bare stranded conductor, being the uppermost of the wires forming the overhead line equipment.
Caution notice	A notice attached to overhead line switches giving warning that it may form part of an isolation.
Circuit breaker	A switch arranged to open automatically when a current above a pre-determined value flows through it.
Earthing circuit breaker	A normally open circuit breaker arranged to connect the overhead line equipment to earth when closed.
Competent person	In the context of these instructions; a person with sufficient technical knowledge or experience to avoid danger.
Conductor	A material that permits the flow of electricity. In this context a solid or stranded wire forming part of the overhead line equipment and which carries the electric current.
Return conductor	A conductor attached to the overhead line equipment supporting structures, generally at the side of the track, and which carries traction return current. In some areas it is carried on insulators and may be used in conjunction with booster transformers. At certain places it is sheathed with insulating material, but otherwise it is bare. In other areas it is not on insulators and it is in electrical contact with the structures and also fulfils the function of an earth wire.
Supplementary conductor	A conductor supported on insulators attached to the overhead line equipment supporting structures and which is connected to and in parallel with the catenary and contact wire arrangement for the purpose of reducing the electrical impedance of the overhead line equipment.

Contact wire	A bare solid conductor being the lowermost of the wires forming the overhead line equipment. The pantograph carbons of electric trains press against the underside of this wire and collect the electric current required by the trains.
Cross span wire	A wire stretched across tracks, holding the overhead line equipment in the desired position.
Current	The flow of electricity.
Traction current	The flow of electricity to the electric traction units through the overhead line equipment and back through the return circuits.
De-energisation	The switching off of the electricity supply to overhead line equipment.
Designated earthing point	A location at which the overhead line equipment may be earthed, for the purpose of issuing Overhead Line Permits, using short portable earths and insulated earthing poles.
Dropper	An arrangement of wires or strips and clips by which one wire of the overhead line equipment is suspended from another.
Earth	The general mass of the earth and any conductor in direct electrical connection with it. 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 thereto. Note 2: The term 'Earth' is also used to refer to the cable used to form a connection between isolated overhead line equipment and earth. See 'Local earth'.
Earth attachment point	A physical point or assembly at a designated earth point to which either the line end or earth end of a short earth is to be connected. One earth attachment point is connected to the overhead conductor system and another to traction earth.
Earthed	The term 'Earthed' when applied to overhead line equipment which is normally live, means connected to the traction return running rail either directly or to a structure which is itself connected thereto.

Earth wire	A wire electrically connecting together the steelwork of two or more structures where circumstances prevent each structure from being independently bonded direct to the traction return running rail. The earth wire may be aerial, ground level or buried.
Earthing connection	A conductor for connecting electrical equipment to earth or to the running rail traction return circuit.
Earthing pole	A device consisting of a handle, primary insulator and other attachments, used for the application and removal of short earths, long earths and continuity jumpers.
Electric train	An electrically powered train having on the traction unit a pantograph through which electric current is collected from the overhead line equipment.
Electrification fixed equipment	All the lineside equipment provided for supplying electricity to electric trains, including the overhead line equipment, its structures and foundations, the trackside switching stations, booster transformers and bonding arrangements.
Emergency Isolation	An isolation of overhead line equipment initiated by the Electrical Control Operator in circumstances when it is essential to switch off the electricity supply immediately to remove danger to persons from live overhead line equipment. Such an isolation is effected by the Electrical Control Operator switching off the electricity supply from all lines between neutral sections, typically 25 km (15 miles) apart, or between a neutral section and the end of the electrified line. In certain locations, facilities are provided to enable the emergency isolation to be shortened in order to reduce the affected area.
Energised	See “Live”.
Feeder	A transmission line or cable in the electrical power distribution system for: (a) bringing a supply of electricity to a Feeder Station; (b) connecting a Feeder Station or Track Sectioning Cabin or Track Sectioning Location to the overhead line equipment.
Feeder Station	A building or compound containing electrical switchgear and equipment to which main supplies from the Electricity Supply Industry are brought and from which the overhead line equipment is supplied.

Headspan	A form of construction where the overhead line equipment is supported by wires suspended from masts on each side of the track.
Headspan wire	A wire suspended across tracks and from which overhead line equipment is suspended.
Infrastructure Maintainer's staff	Persons employed by the Infrastructure Maintainer who are competent, and certificated where appropriate, to undertake specific duties in connection with 25 kV A.C. Electrified Lines.
Isolate	In the context of these instructions "Isolate" can be taken to refer to the process of disconnection and separation. See "Isolated".
Isolated	Electrical equipment is isolated when it is disconnected and separated from all sources of electricity supply in a secure way. Note: It is not possible to isolate the return conductors as they are part of the return current system and in these instructions 'isolated' refers to the disconnection, separation and securing of those parts of the overhead line equipment normally live at 25 kV.
Isolation	Isolation is the action of causing an electrical section(s) or sub-section(s) of the overhead line equipment to be isolated. See 'Isolated'. Note: An 'Isolation' can be taken to refer to the arrangements for the interruption of traction electricity to a particular part of the railway, including details of the section(s) or sub-section(s) or group of section(s) or sub-section(s) being isolated, together with the dates and times, and shown as such in the Weekly Operating Notice. It embraces the entire process of switching off, securing, testing and earthing, and issue of Overhead Line Permits.
Local isolation	An isolation performed locally by a person having local control over train movements, and hence not requiring the Form A procedure, and implemented by means of locking off rather than the issue of an Overhead Line Permit.

Isolation Details Form (Form IDF)	A form issued by an Isolation Planner and Nominated Person. The purpose of the form is to make known, in advance, to all parties involved in the isolation process specific details of each isolation.
Isolation Diagram	A diagram denoting the electrified lines, the overhead line equipment sectioning, switching and feeding arrangements together with certain relevant signal and point numbers, adjacent overhead power lines and other relevant information.
Isolation Instructions	Instructions, in two forms, which specify for each section or sub-section of overhead line equipment, either: (a) the electrical switching which has to be carried out to effect an isolation and the associated limits of the isolation for the purpose of issuing Overhead Line Permits; or (b) the protecting signals, the limits beyond which electric trains must not proceed and the signals or routes not to be used for electric trains, applicable to an isolation.
Isolation Plan	A form issued by an Isolation Planner. The purpose of the form is to make known, in advance, to all parties involved in the isolation planning process the agreed isolations.
Isolation Planner	The Railtrack Zone Director's nominated representative competent in the isolation planning process, or his appointed agent.
Isolation Record Book	A document in which isolations carried out under a local isolation procedure are recorded. See 'Isolation - Local isolation'.
Jumper	
Continuity jumper	A length of cable provided with clamps for use as a temporary connection to bridge across a gap, e.g. when the continuity of the overhead line equipment is disturbed, or in a pipe, running rail, cable sheath.
Overhead line jumper	A flexible conductor being part of the overhead line equipment and connecting the parts together electrically.
Knuckle	

Uninsulated knuckle	An item of equipment used to arrange the meeting of two sets of overhead line equipment at an angle without crossing one over the other, and so designed that pantographs of electric trains may pass smoothly and without break of contact from one contact wire to the other.
Insulated knuckle	A knuckle with insulation between the two sets of overhead line equipment so that one is normally electrically separated from the other, except whilst the pantograph of an electric train passes under it.
Line guard	A short length of mechanical protection fitted onto an overhead line conductor to prevent damage to the conductor when local earths are applied.
Local earth	A portable appliance of an approved type for establishing electrical connection between isolated overhead line equipment and earth. (See Notes under 'Earth').
Short earth	A local earth, which is a maximum of 1.5 metres long, is fitted at each end with electrical clamps, which can be applied using insulated poles, and is specifically for use at a designated earthing point. It has orange coloured sheathing.
Long earth	A local earth longer than 1.5 metres, for use at locations other than designated earthing points, with a pole applied electrical clamp at one end and a hand-applied clamp at the other. It has blue coloured sheathing.
Local isolation	See 'Isolation'
Mid point connection	See 'Bond - Return conductor-to-rail bond'.
Neutral section	An arrangement of insulators introduced into the overhead line equipment and designed to ensure that two sections, which must not be connected electrically, are kept separated even during the passage of the pantographs of electric trains.
New overhead line equipment	Overhead line equipment that is complete in every respect but is not commissioned.
Nominated Person	A person certificated as competent to carry out isolation and earthing, to issue and cancel Overhead Line Permits, and nominated as such with the Electrical Control Room in relation to particular equipment or locations.

Overhead line equipment	An arrangement of wires, suspended over the railway line, for supplying electricity to electric trains, together with associated fittings, insulators and other attachments including feeders, switches, jumpers and return conductors. This equipment together with its structures, foundations, lineside switching stations etc., is described collectively as 'electrification fixed equipment'.
Overhead Line Permit (Form C)	A form of declaration signed and issued by a Nominated Person to the Person in Charge of Work (PICOW) for work to be carried out on or near to electrical equipment using the Form C 'Overhead Line Permit'. The purpose of the form is to make known to the PICOW exactly which equipment is isolated and earthed, and upon which, or near to which, it is safe for the specified work to commence so far as the electrical equipment is concerned. This form constitutes a Permit-to-Work in accordance with the Electricity at Work Regulations 1989. The issue of an Overhead Line Permit does not mean that train movements are stopped on the lines concerned and where necessary such arrangements shall be made in accordance with the Master Rule Book GO/RT 3000.
Overhead line switch	A non load breaking device for opening or closing an electrical circuit
Alternative feed switch	A switch, mounted on a structure, provided to connect a sub-section of overhead line equipment to either of two other sections of overhead line equipment. Alternative feed switches are also used to provide a supply to other electrical equipment from either of two sections of overhead line equipment.
Earthing switch	A switch, mounted on a structure, provided to connect a section of overhead line equipment to earth. Earthing switches are also fitted on the roofs of electric traction units to enable the pantographs and electric train equipment to be connected to earth.
Feeder switch*	A switch, mounted on a structure, provided to connect a section of overhead line equipment to its feeder at a switching station.
Motorised switch*	A power-operated overhead line switch which may be remotely controlled.

Section switch*	A switch, mounted on a structure, provided to connect one section or sub-section of overhead line equipment to another.
Siding switch*	A switch, mounted on a structure, provided to connect the overhead line equipment of a siding or group of sidings to another section of overhead line equipment. Note: * These switches may also have an 'earth' position.
Overhead line under construction	Overhead line equipment that is not complete and in the process of being built.
Overlap span	
Uninsulated overlap span	An overlapping of the ends of two lengths of overhead line equipment, arranged in such a manner that the pantographs of electric trains can pass smoothly and without break of contact from one contact wire to the next over the same track.
Insulated overlap span	An overlap span arranged with insulation between two lengths of overhead line equipment so that by the opening of a switch or circuit breaker, or by the removal of connections, one equipment is electrically separated from the other except whilst the pantograph of an electric train passes under it.
Pantograph	A mechanism, mounted on insulators on the roof of electric traction units, the head of which carries carbon strips which when the pantograph is raised press against the underside of the contact wire and through which the electric current is collected from the overhead line equipment.
Permanently earthed section	A sub-section of overhead line equipment permanently connected to earth, but treated the same as any other sub-section with respect to isolation, earthing and Overhead Line Permits. In some circumstances electric trains may run under them (e.g. where installed beneath very low overbridges).
Buffer section	A particular instance of a permanently earthed section used to separate live overhead line equipment from overhead line equipment either under construction and not yet commissioned or decommissioned.

Protection wire	A wire connected to the non-live side of insulators, and insulated from earth, to act as a path for any fault current from insulator flashover to the traction return circuit, where this is insulated from masts etc. Usually associated with isolating sections.
Return conductor	See 'Conductor'.
Riser	A bare solid or stranded conductor between the roof bushing or sealing end of a switching station and the overhead line equipment not identified as a bare feeder on an isolation diagram. (See also 'Bare feeder').
Risk assessment	A process carried out to evaluate in a structured manner the consequences of certain tasks or activities.
Section	A length of overhead line equipment between switching stations, or between a switching station and a terminal end.
Sub-section	Part of a section which may be isolated from all other lengths of overhead line equipment by the operation of overhead line switches.
Section insulator	Insulation introduced between two sections of overhead line equipment to provide electrical separation except during the passage of pantographs and arranged so that pantographs may pass from one section to the other smoothly and without break of contact.
Spider plate	A metal plate used as the point of common connection where a number of bonds radiating from different connection points require to be commonly connected, or to provide a link in an unduly long bonding connection to facilitate maintenance and repair.
Stitch wire	A conductor, suspended from the catenary wire, and from which the contact wire is suspended at overhead line supporting structures.
Structure mounted outdoor switchgear	A form of lineside switching station construction, consisting of outdoor type switchgear mounted on steel masts.
Switched off	Electrical equipment is switched off when it is disconnected and separated from all sources of electricity supply. It is not possible to switch off the return conductors as they are part of the return current system and in these instructions 'switched off' refers to the disconnection and separation of those parts of the overhead line equipment normally live at 25 kV.

Switching station	The site of lineside equipment arranged together for the purpose of providing remote switching of the power supply to the overhead line equipment. This can include Feeder Stations, Track Sectioning Cabins and Track Sectioning Locations.
Tag	A reminder device attached to an overhead line switch key giving warning that the switch it relates to forms part of an isolation.
Tee-feed	The arrangement at a Feeder Station where a single supply feeds overhead line equipment in both directions.
Terminal end	A point where the overhead line equipment is finally terminated in both a physical and electrical sense, i.e. does not butt up to or overlap with any other overhead line equipment. Note: An overlap or crossover or similar does not constitute a terminal end.
Testing	The use of a voltage testing device. See 'voltage testing device'.
Track Sectioning Cabin	A building containing enclosed electrical switchgear and equipment, which is arranged to connect together a number of sections of overhead line equipment.
Track Sectioning Location	A compound containing outdoor electrical switchgear and equipment which is arranged to connect together a number of sections of overhead line equipment.
Traction return circuit	The path by which the traction current returns from the traction unit to the Feeder Station, incorporating the traction return rails, bonding connections, return conductors and booster transformers as appropriate.
Transformer	Apparatus for supplying an alternating current at one voltage when fed with alternating current at another voltage.
Isolating transformer	A particular type of transformer installed at an isolating section. See 'Isolating section'.
Voltage Testing Device	A device for use on those parts of the overhead line equipment normally live at 25 kV, operated from ground level, used to verify that the overhead line equipment under test has been switched off.
Working limits	The limits stated in the isolation instructions and on an Overhead Line Permit, usually by means of structure numbers, between which it is safe to work.

Definitions applying to d.c. railways

For the purpose of these instructions the following definitions shall apply:

Abutting Section	Those electrical sections additionally switched off to minimise the risk of re-energisation of an emergency isolation section.
Authorised Person	A person who has been appointed in writing to issue and cancel a Conductor Rail Permit and/or carry out the requirements of Section 41 of Railway Group Standard GO/RT3091.
Bond	An electrical connection to or in the running rail, traction return circuit, or in a signalling track circuit such as:
Expansion gap bond (figure 8 bond)	A flexible bond across a gap between two lengths of welded conductor rails.
Collector shoe	A device fixed to electric trains which bears on the conductor rail and collects the traction current.
Competent Person	A person trained, assessed and certificated to carry out the particular duties specified in these instructions. (GO/RT3091)
Comprehensive Track Feeding Diagram	An isolation diagram with additional information showing bridges, platforms, tunnels and other significant features
Conductor rail	A rail supported on insulators, located on the outside of one of the running rails and through which electricity is supplied to electric trains. Where reference is made to conductor rail, this also includes items connected to it.
Conductor Rail Permit	A form of authority signed and issued by an Isolation Agent to a person in charge of a group working on or near to, conductor rail equipment in accordance with a planned isolation. The purpose of the form is to make known to the person in charge exactly which equipment has been made electrically safe to allow work to commence. The issue of the conductor rail permit does not mean that train movements have been stopped on the lines concerned and where necessary such arrangements must be made.
Dead section	A section of conductor rail, which is not connected to a source of supply.