

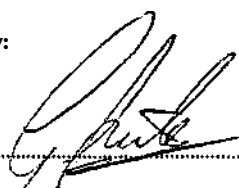
Ref	RT/E/G/27225
Issue	I
Date	June 2005

Business Process Document

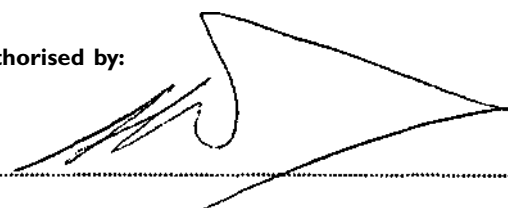
Guidance manual for stations and depots - equipment maintenance

Endorsement & Authorisation

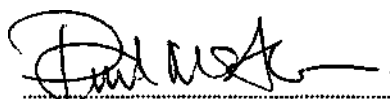
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Contents

I	Purpose	9
2	Scope	9
3	Reference documentation	10
4	Definitions	11
5	General	13
6	Responsibilities of depot facility owner	15
APPENDIX A Sample Depot equipment register		18
Vehicle washing plants		19
I	Possession for maintenance	19
2	Specimen forms	20
3	Plant maintenance instruction	25
Electric points heating installations		33
I	Possession for maintenance	33
2	Specimen forms	34
3	Plant maintenance instruction	37
Non-traction electrical substations		41
I	Possession for maintenance	41
2	Specimen forms	44
3	Plant maintenance instruction	46
Fixed electrical installation equipment		57
I	Possession for maintenance	57
2	Specimen forms	58
3	Plant maintenance instruction	60

Emergency lighting	63
1 Possession for maintenance	63
2 Specimen forms	64
3 Plant maintenance instruction	66
3 Plant maintenance instruction - continued	67
Equipment and infrastructure associated with oil interceptor and recovery systems	71
1 Reference documentation	71
2 Procedures	71
3 Inspection and minor maintenance works	71
4 Asset and equipment maintenance file	72
5 Planned maintenance	73
6 Reporting	75
APPENDIX A Sample equipment register	77
APPENDIX B	79
Sample equipment data register	79
Sample record of drawings/manuals	79
Sample lubrication data manuals	79
APPENDIX C Sample planned maintenance inspection register	83
APPENDIX D Sample equipment maintenance record	88
APPENDIX E Sample equipment inspection record	90

Compressed air/vacuum installations	93
1 Possession for maintenance	93
2 Specimen forms	94
3 Plant maintenance instruction	97
Ventilation/Extraction and air conditioning units	101
1 Possession for maintenance	101
2 Specimen forms	102
3 Plant maintenance instruction	105
Gas and oil fired heating systems	110
1 Documentation	110
2 Procedures	110
3 Inspection and minor maintenance works	110
4 Asset and equipment maintenance file	111
5 Planned maintenance	112
6 Reporting	113
APPENDIX A Sample equipment register	115
APPENDIX B	117
Sample equipment data register	117
Sample record of drawings/manuals	117
Sample lubrication data manuals	117
APPENDIX C Sample planned maintenance inspection register	121
APPENDIX D Sample equipment maintenance record	128
APPENDIX E Sample equipment inspection record	130

Ref:	RT/E/G/27225
Issue:	I
Date:	June 2005

Fire alarms	133
1 Possession for maintenance	133
2 Specimen forms	134
3 Plant maintenance instruction	136
Underfloor wheel lathes	141
1 Possession for maintenance	141
2 Specimen forms	142
3 Plant maintenance instruction	145
Diesel-electric turntables	153
1 Possession for maintenance	153
2 Specimen forms	154
3 Plant maintenance instruction	158
Electric jacks	166
1 Possession for maintenance	166
2 Specimen forms	167
3 Plant maintenance instruction	170
Depot protection equipment	174
1 Possession for maintenance	174
2 Specimen forms	175
3 Plant maintenance instruction	178
Sewage disposal plants	183
1 Possession for maintenance	183
2 Specimen forms	184
3 Plant maintenance instruction	187

Train pre-heating shore supplies	191
1 Possession for maintenance	191
2 Specimen forms	192
3 Plant maintenance instruction	195
Fixed battery chargers	197
1 Possession for maintenance	197
2 Specimen forms	198
3 Plant maintenance instruction	200
Overhead cranes	202
1 Possession for maintenance	202
2 Specimen forms	203
3 Plant maintenance instruction	207
Car park equipment	211
1 Possession for maintenance	211
2 Specimen forms	212
3 Plant maintenance instruction	215
Assets maintained to current industry standards	219

Ref:	RT/E/G/27225
Issue:	I
Date:	June 2005

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Ref:	RT/E/G/27225
Issue:	I
Date:	June 2005

I Purpose

This guidance manual describes maintenance practices, including minimum maintenance attention, for station and depot plant and equipment, and is to be read in conjunction with the relevant contract documentation.

2 Scope

This guidance manual applies to the maintenance of the following equipment installed within stations and depots and includes recommendations:

1. Vehicle washing plant
2. Electric points heating installations
3. Non-traction electrical sub-stations
4. Fixed electrical installation equipment
5. Emergency lighting
6. Equipment and infrastructure associated with oil interceptor and recovery systems
7. Compressed air/vacuum installations
8. Ventilation/extraction and air conditioning units
9. Gas and oil fired heating systems
10. Fire alarms
11. Underfloor wheel lathes
12. Diesel-electric turntables
13. Electric jacks
14. Depot protection equipment
15. Sewage disposal plant
16. Train pre-heating shore supplies
17. Fixed battery chargers
18. Overhead cranes
19. Car park equipment

Ref:	RT/E/G/27225
Issue:	I
Date:	June 2005

This guidance manual also applies to the maintenance of the following equipment installed within stations and depots and includes cross references to industry standards which contain recommendations:

20. Conductor rails
21. Traction supply equipment (including OLE structures, catenary and supply equipment and/or feeder cables to conductor rails but not the conductor rails), power supplies and negative bonding/earth return
22. Building Services
23. Gas, water, electricity utility supply equipment and transmission media
24. Fire and Security Systems, including Fixed and moveable fire appliances and Sprinkler systems Electrical Services
25. Electrical Services, including Security installations (including CCTV systems), External lighting and Lighting towers and gantries
26. Mechanical Services, including:
 - Gas installations fittings and fixed appliances
 - Sanitary Installations and fittings where accessible and/or visible
 - Sanitary installations and fittings where not accessible and/or visible
 - Hot and cold water and soil waste plumbing installations where accessible and/or visible
 - Hot and cold water and soil waste plumbing installations where not accessible and/or visible
 - Other above ground drainage installations
 - Vehicle water systems
27. Pumping stations
28. Non Hegenscheidt Wheel lathes
29. Winches and capstans
30. Sand towers

3 Reference documentation

Tabulated references to other documentation, including Railway Group Standards; other Company Standards, relevant forms etc.

[GM/RT1040](#)

Safe Working on or Near Electrical Equipment
 IEE Guidance Note 3, Inspection and Testing
 Health and Safety Series Booklet HS(G)70, The Control of
 Legionellosis Including Legionnaires' Disease

BS EN 671	Fixed fire fighting systems. Hose systems. Hose reels with semi-rigid hose
BS EN 752	Drain and sewer systems outside buildings. Maintenance and operations
BS EN 12056	Gravity drainage systems inside buildings. Installation and testing, instructions for operation, maintenance and use
BS EN 12845	Fixed firefighting systems. Automatic sprinkler systems. Design, installation and maintenance
BS 3169	Specification for first aid reel hoses for fire-fighting purposes
BS 5306	Fire extinguishing installations and equipment on premises. Hydrant systems, hose reels and foam inlets
BS 5839	Fire detection and alarm systems for buildings. Code of practice for system design, installation, commissioning and maintenance
BS 6700	Design, installation, testing and maintenance of domestic services supplying water for domestic use within buildings and their curtilages
BS 7958	Closed-circuit television (CCTV). Management and operation. Code of practice
BS7671	Requirements for Electrical Installations - IEE Wiring Regulations 16th Edition
BS5266	Emergency Lighting

4 Definitions

These definitions apply generally throughout this guidance manual or to specific section(s), where indicated.

Associated Infrastructure

(Applicable to oil interceptor and recovery systems)

Any underground contaminated water drainage system leading from and to an oil interceptor facility, including non-electromechanical parts of the oil interceptor, and any other infrastructure associated with an oil interceptor and drainage system.

Competent Person

A person who has such practical and theoretical knowledge and actual experience of the type of equipment as will enable them to detect defects which it is the purpose of the examination to discover.

Competent Person (Applicable to oil interceptor and recovery systems and gas and oil fired heating systems)

A person, appointed by the Responsible Organisation, who has sufficient training and experience or knowledge to enable him to properly implement the inspection and maintenance procedures.

Electrical installation An assembly of associated electrical equipment to fulfil a specific purpose and having certain co-ordinated characteristics

Equipment All electromechanical plant, electrical and mechanical building services, and associated infrastructure contained within depots that are the subject of Depot Lease Agreements.

Equipment (Applicable to oil interceptor equipment and recovery systems)

Electromechanical plant and oil interceptor equipment associated with contaminated water drainage systems.

Equipment (Applicable to gas and oil fired heating systems).

Those individual items of electromechanical plant forming the complete Gas and Oil Fired Heating System.

Major Spillage Spillage of a substance above 20 litres.

Nominated Person (Applicable to non-traction electrical substations)

An authorised person over 20 years of age who has been appointed in writing by or on behalf of Network Rail to issue and cancel permits to work for particular equipment and/or to carry out isolation and earthing procedures at locations where local isolation is allowed.

Responsible Organisation The depot facility owner as defined in the depot access conditions.

User/Operator A person using/operating the plant/equipment.

4.1 Abbreviations

A.V.R Automatic Voltage Regulator

CCTV Closed Circuit Television

COSHH	Care of Substances Hazardous to Health
DFO	Depot Facility Owner
LED	Light emitting diode
EPU	Earth Proving Unit
HV	High Voltage
LV	Low Voltage
LHS	Left Hand Side
RHS	Right Hand Side
SWL	Safe Working Load
LED	Light Emitting Diode
MCB	Miniature Circuit Breaker
PICOW	Person In Charge Of Work (Rule Book Term)

5 General

5.1 Specific documentation

This guidance manual applies to many items of plant and equipment of a similar but not identical nature.

The person responsible for routine maintenance should produce Data Extracts and Records of Drawings and Manuals for individual items of plant and equipment for inclusion in contract documentation. Specimen forms for specific items of equipment are included in its specific section.

Listed maintenance tasks should only be deleted if they refer to components and sub-systems that are not present on the specific item of plant being considered.

Where this guidance manual does not adequately cater for particular features, components and sub-systems, further maintenance tasks should be added using the same layout and terminology and with due consideration to periodicities.

All maintenance records should be stored at an agreed location, and should be available for inspection at all times by Network Rail.

5.2 Requirements

The periodicities of the maintenance tasks recommended in this guidance manual are the minimum requirement. The Maintainer should be satisfied that after carrying out each check and subsequent action/s the components will perform satisfactorily until the next examination. If not then action should be taken to ensure their satisfactory performance, or the frequency of examination increased as appropriate.

5.3 Procedures

The Maintainer should have, and follow, a procedure for carrying out the maintenance of each installation in accordance with this document. This procedure should incorporate the following stages:

1. Check all relevant components and systems for condition and security and measure all parameters for conformance with the stated limits as required.
2. Record the condition and parameters.
3. Decide on appropriate action, record decision and reason.
4. Take appropriate action.
5. Record action and report as required.

5.4 Rubbish

Rubbish should not be left anywhere on the installation. Remove any to a safe disposal area.

5.5 Tolerances

All tolerances/adjustments should be in accordance with the data extract and the manufacturers' maintenance manuals/data sheets.

5.6 Reporting defects

All defects should be reported by the approved method.

5.7 Handling chemicals

Ensure the utmost care is taken in the handling and storage of chemicals.

5.8 Competent Person

All maintenance inspections should be carried out by a Competent Person.

6 Responsibilities of depot facility owner

6.1 General

The DFO should institute and undertake systems of routine preventative maintenance, the objective of which is to ensure that the equipment functions, for the agreed level of usage, with the optimum degree of safety and reliability and does not suffer premature wear or failure.

6.2 Asset and equipment maintenance file

The DFO should set up an asset and equipment maintenance file to include as a minimum the following items, which are described more fully below:

- a) A depot equipment register
- b) An equipment data register
- c) A planned maintenance inspection register for all equipment and associated infrastructure
- d) A maintenance record for all equipment and associated infrastructure

The Asset and equipment maintenance file should be kept up to date and regularly reviewed by the DFO to ensure the completion of all records contained therein. The Asset and equipment maintenance file is to be available for inspection by Network Rail, on demand, at an agreed location.

6.3 Depot equipment register

The DFO should prepare and maintain, on an annual basis, a full register of the depot equipment in a format similar to that included in Appendix A of this section or use the format indicated in later sections of this document applicable to specific items of plant and equipment.

6.4 DFO's inspection, examination and maintenance responsibilities

The DFO's system of regular routine preventative maintenance should include:

- a) Statutory inspections. (Including 3 yearly Electrification & Installation tests)
- b) All current relevant standards and legislation.
- c) Periodic examination and testing in accordance with the Electricity at Work Regulations and BS 7671, Requirements for Electrical Installations. (Including 3 yearly Electrification & Installation tests)
- d) Any current standards or codes of practice issued by the Institution of Electrical Engineers.

Ref:	RT/E/G/27225
Issue:	I
Date:	June 2005

- e) Routine inspection to ensure safety and correct operation and to identify potential problems and items requiring attention.
- f) Inspection and reporting to identify and control the discharge of harmful substances to the environment.
- g) Fault finding and investigation in the case of breakdown or malfunction.
- h) Minor repair work arising from either routine inspection or malfunction including the replacement of parts and consumable materials.
- i) Adjustment of components as required where dimensions or tolerances are specified within maintenance instructions.
- j) Calibration as specified in maintenance instructions.
- k) Lubrication as specified in maintenance instructions.
- l) Replacements of parts and consumable materials as specified in maintenance instructions.
- m) Cleaning, the objectives of which are to minimise fire and safety hazards and to facilitate good maintenance.
- n) Touch-up re-painting to prevent corrosion.
- o) Routine inspections and cleaning to ensure drainage systems remain free and operate efficiently.

The DFO should set up a documented Equipment data register and planned maintenance inspection register for all inspection, examination and maintenance procedures to identify and record the type of inspection or other maintenance works required to be performed on the Equipment, and the frequency at which these will be performed. These registers should be in a format similar to that included in the following sections of this Guidance manual.

In addition to the above, the DFO should prepare a full and detailed Maintenance record for the depot equipment which should record by signature and date, the responsible person for carrying out the relevant inspection or maintenance task and the date at which it was performed. This Maintenance record should be in a format similar to that included in the following sections of this Guidance manual.

The master Planned maintenance inspection register and the master Maintenance record should be held at the depot in the Depot maintenance file.

6.5 Replacement parts and consumable materials

The DFO is responsible for the provision of all consumable materials and parts, including, but not necessarily limited to:

- a) Drive belts
- b) Filters
- c) Lubricants
- d) Hydraulic fluid

- e) Flexible hoses
- f) Seals
- g) Fastenings (excluding structural/foundation fastenings)
- h) Bearings
- i) Wire ropes
- j) Nozzles
- k) Valves
- l) Fuses
- m) Flexible cables
- n) Components within luminaires
- o) Individual luminaires
- p) Contractor contact tips/fingers
- q) Indicator lamps
- r) Electrical circuit components: relays, switches etc.

All parts should be replaced on a like-for-like basis unless they are no-longer commercially available. Parts that are no longer commercially available may be replaced by similar parts that meet or exceed the relevant standards.

6.6 Equipment condition

The DFO should immediately advise Network Rail where equipment failure occurs at an increasing frequency, or where repetitive faults are occurring, so that the requirement to overhaul or renew equipment can be assessed at the earliest opportunity.

The DFO should immediately advise Network Rail where component replacement cannot be undertaken due to original components having become obsolete and where an alternative cannot be used without significant modification work.

6.7 Modifications

The DFO should not undertake any modification to the Equipment unless he has supplied full documentation and has obtained written approval from Network Rail to proceed with the modification, or unless the modification is of a minor nature required to maintain the asset to the required standards.

6.8 Annual Report

The DFO should present to Network Rail, on an annual basis, a summary report detailing the following:

- a) a summary of maintenance inspections carried out during the year.
- b) a summary of any maintenance repair or replacement works carried out by the DFO or Network Rail to the Equipment during the year.
- c) a list of outstanding actions with respect to Equipment maintenance or replacement.

APPENDIX A

Sample Depot equipment register

REGISTER OF DEPOT EQUIPMENT		
Depot Name		
Date Register Prepared/Updated		
Schematic Drawing No.		
Register Prepared/Updated by		
Equipment Details (1)	Equipment Type	Equipment Location (2)
e.g. Fuel Pump No.1 Fuel Pump No.2 Fuel Pump Controls Fuel Pump Dispensers Heating System Etc.		

Notes

- 1) Equipment Details are to list individual items of plant, which would normally be the subject of separate manufacturers or other specific maintenance instruction requirements.
- 2) Equipment Location should describe the general location only (i.e. within or external to a specific building).
- 3) Tests certificates required for Inspection Depot Plant.

Vehicle washing plants

I Possession for maintenance

I.1 Taking possession

Before work is undertaken the local managers appointed PICOW should determine the on-site conditions and ensure that any work undertaken is in accordance with the relevant sections of the Rule Book and any local instructions appertaining to the site.

Report to the Movements Manager or his Representative, sign the Visitors' book and obtain agreement to carry out maintenance.

Before taking possession, the Maintainer should establish contact with the YARD SUPERVISOR to be informed of intent and his agreement obtained to proceed. Liaison should be maintained throughout the period of possession.

Stop and isolate the Vehicle Washing Plant.

Secure Warning Notices over or adjacent to the controls, so that they are clearly visible to anyone who may attempt to use the Vehicle Washing Plant.

I.2 Special safety requirements

Observe the Rule Book regarding possession e.g., red flags, clips, etc. whilst working.

Sectional Appendix and the latest issue of the Track Safety Handbook.

Ensure that you are wearing the prescribed protective clothing before attempting to undertake any maintenance work on this machine.

For safety in the handling of the DP 17 detergent see relevant safety data sheets.

Never work on the Vehicle Washing Plant when vehicle movement is possible.

I.3 Returning to normal service

Ensure Vehicle Washing Plant is fit to be returned to normal service.

Remove Warning Notices and any other protective measures in accordance with the

Rule Book and local instructions that have been observed, appertaining to the site.

Advise the Movements Manager or his Representative that the Vehicle Washing Plant is back in normal service and sign out in the Visitors' Book.

2.1 Data extract

EQUIPMENT DETAILS		LOCATED AT	
VEHICLE WASHING PLANT Manufacturer Type Year of Installation			
SETTINGS			
APPLICATION	DIMENSION	REMARKS	
SPECIMEN FORM			
Brush to Vehicle Body contact lengths. Flail to Vehicle Body contact length.			
Height of Bodyside Brushes above rail level.			
Minimum Brush length Minimum Flail length			
Frost Protection Air Stat settings: Min/Max	+0.5° to +1.5° C		
FUSES			
F1	Amp	Type	
F2	Amp	Type	
F3	Amp	Type	
F4	Amp	Type	
F5	Amp	Type	
F6	Amp	Type	
F7	Amp	Type	
F8	Amp	Type	
F9	Amp	Type	
F10	Amp	Type	
F11	Amp	Type	
F12	Amp	Type	
F13	Amp	Type	
F14	Amp	Type	
F15	Amp	Type	
F16	Amp	Type	

Ref:	RT/E/G/27225
Issue:	I
Date:	June 2005

EQUIPMENT DETAILS		LOCATED AT	
VEHICLE WASHING PLANT Manufacturer Type Year of Installation			
SETTINGS			
F17		Amp	Type
F18		Amp	Type
F19		Amp	Type
F20		Amp	Type
F21		Amp	Type
F22		Amp	Type
F23		Amp	Type
F24		Amp	Type
F25		Amp	Type
F26		Amp	Type
F27		Amp	Type
F28		Amp	Type
F29		Amp	Type
F30		Amp	Type
F31		Amp	Type
F32		Amp	Type
F33		Amp	Type
F34		Amp	Type
F35		Amp	Type
F36		Amp	Type
F37		Amp	Type
F38		Amp	Type
F39		Amp	Type
F40		Amp	Type
F1/2/3 Remote Panel		Amp	Type
OVERLOADS			
O/L1		Amp	
O/L2		Amp	
O/L3		Amp	
O/L4		Amp	
O/L5		Amp	
O/L6		Amp	
O/L7		Amp	
O/L8		Amp	

Ref:	RT/E/G/27225
Issue:	1
Date:	June 2005

EQUIPMENT DETAILS		LOCATED AT	
VEHICLE WASHING PLANT Manufacturer Type Year of Installation			
SETTINGS			
O/L9 O/L10		Amp Amp	
SPECIMEN FORM			

Ref:	RT/E/G/27225
Issue:	I
Date:	June 2005

2.2 Record of drawings - Manuals

DRAWING NUMBER	REV.	TITLE	LOCATION
SPECIMEN FORM			
MANUALS	REV.	TITLE	LOCATION

Ref:	RT/E/G/27225
Issue:	I
Date:	June 2005

2.3 Lubrication

REF	ITEM	LUBRICANT	
		TYPE	CAT No.
	SPECIFIC LUBRICATION SCHEDULES NEED TO BE DETERMINED FOR EACH RESPECTIVE MACHINE		
SPECIMEN FORM			

Ref:	RT/E/G/27225
Issue:	I
Date:	June 2005

3 Plant maintenance instruction

This instruction is intended to cover a typical pattern of daily usage.

The detailed maintenance requirements of the particular washing plant to which this instruction is to be applied should be determined.

The standard of maintenance required to be given to the washing plant covered by this Instruction is determined by the application of this Maintenance Kit.

3.1 Eye wash

Check that there is an eye wash applicator available together with application instructions, and that the drench shower is working correctly.

3. Plant maintenance instruction

C = Monthly, D = 3 Monthly, E = 6 Monthly, F = Yearly				
DESCRIPTION	C	D	E	F
<u>STRAINERS</u> Clean and visually examine for condition and security.			*	*
<u>VALVES</u> Visually examine valves for condition, leaks, security and correct operation. Lightly lubricate operating mechanisms. Visually examine dump valves and pipework for condition, security and correct operation.			* * *	* * *
<u>TANKS & PIPEWORK</u> Visually examine: tanks for condition and security. pipework and lagging for condition and security. access ladders for condition and security. tank ball valves and level gauges for condition, security and correct operation. float switches for condition, security and correct operation. tank level gauges for condition, security and correct operation. Clean out water storage tank and chlorinate as required. Visually examine pre-wet/final rinse spray nozzles for condition, security, leaks and clean as required.			* * * * * * * *	* * * * * * *
<u>CONTROL PANELS</u> Visually examine for condition and security: Panels all labels for condition and security. indicator lights for condition and security. Switches/buttons for condition and security. Contactors/relays for condition and security. all fuse carriers and bases for condition, security and correct ratings.				* * * * *

3 Plant maintenance instruction - continued

C = Monthly, D = 3 Monthly, E = 6 Monthly, F = Yearly				
DESCRIPTION	C	D	E	F
<u>CONTROL PANELS - Continued</u> Visually examine for condition and security: main isolator and door interlock heater and thermostat and correct operation. Cables and terminals. Conduit and cable entries. trip indicators and prove operation of all warning lamps. MCBs and correct rating and operation. Clean exterior and interior of panel.				* * * * * * *
<u>CONTROL PANEL (Remote Site)</u> Visually examine for condition and security: Panels clean exterior and interior all labels. Indicator lights. Switches/buttons. Contactors. all fuse carriers and bases and correct ratings. Cables and terminals. Conduit and cable entries. frost stat. and operation.				* * * * * * * * *
<u>ALARM SYSTEM</u> Visually examine system for condition, security and correct operation.			*	*
<u>MONITORING SYSTEM (Intelligent Thermostat, Acid/ Alkaline Levels and Data Logger)</u> Visually examine condition, security and correct operation.			*	*
<u>FROST PROTECTION</u> Visually examine systems for condition, security and correct operation.			*	*

3 Plant maintenance instruction - continued

C = Monthly, D = 3 Monthly, E = 6 Monthly, F = Yearly				
DESCRIPTION	C	D	E	F
<u>STRUCTURE AND APRON</u>				
Visually examine for condition and security:				
Structures.			*	*
Foundations.			*	*
Protective surface.			*	*
Cladding.				*
roof lighting and correct operation.			*	*
<u>BRUSH MODULES</u>				
Lubricate:				
Brush bearings.		*	*	*
Brush 'C' frame.		*	*	*
Gearbox output shaft bearing.			*	*
main wash section brush assembly bearings.			*	*
Visually examine for condition and security.				
Gearbox motor cable, cable entry and gland.			*	*
Brush 'C' frame.			*	*
Brush bearing lubrication pipework.			*	*
Brush carrier/brushes and vehicle contact.			*	*
Fixings and mountings.			*	*
Spray nozzles and leaks, clean as required.			*	*
roof flails and correct operation.			*	*
Overspray brushes and vehicle contact.			*	*
Flexible strips.				*
Motor bearings.				*
Gearbox.				*
Motor connections and gaskets.				*

3 Plant maintenance instruction - continued

C = Monthly, D = 3 Monthly, E = 6 Monthly, F = Yearly				
DESCRIPTION	C	D	E	F
<u>EQUIPMENT ROOM</u>				
Visually examine for condition and security:				
eye wash facilities and date.	*	*	*	*
Drench facilities and correct operation.		*	*	*
first aid box and presence.	*	*	*	*
fire extinguisher and date validity.	*	*	*	*
Heaters and correct operation.	*	*	*	*
Lights and correct operation.	*	*	*	*
hot water heater and correct operation.	*	*	*	*
all notices.	*	*	*	*
Visually examine:				
PVC overalls, gloves, head and face protection, and wellington boots are present and in good condition.	*	*	*	*
wash plant drawings are present and in good condition.	*	*	*	*
C.O.S.S.H. assessments are present and in good order.	*	*	*	*
Ensure equipment room is clean and tidy.	*	*	*	*
<u>STORAGE AREA</u>				
Visually examine correct and safe storage of all chemicals.	*	*	*	*
Visually examine that all hazard signs are correctly displayed.	*	*	*	*
<u>GULLIES/DRAINS/SUMPS</u>				
Ensure gullies, bunds and drains are clear and clean.	*	*	*	*
Visually examine grills for condition, security and cleanliness.	*	*	*	*
Clean return water rubbish interceptor.	*	*	*	*
Drain and clean effluent sump.	*	*	*	*
Visually examine for condition and security:				
Sump and bund pumps	*	*	*	*
float switches.	*	*	*	*
Cables and terminals.	*	*	*	*
Visually examine pH probe for condition and the pH reading against a buffer solution.	*	*	*	*

3 Plant maintenance instruction - continued

C = Monthly, D = 3 Monthly, E = 6 Monthly, F = Yearly				
DESCRIPTION	C	D	E	F
<u>LINESIDE EQUIPMENT</u>				
Visually examine for condition, security and correct operation:				
Treadle switches	*	*	*	*
proximity switches and settings.	*	*	*	*
Driver information/train wash indicator panels.	*	*	*	*
<u>SKIRT BRUSHES</u>				
Visually examine brushes for condition, security and vehicle contact.	*	*	*	*
Lubricate brush bearings.		*	*	*
Visually examine drive belts for correct tension.		*	*	*
Visually examine for condition and security:				
Brush carriers	*	*	*	*
structure, fixings and mountings.		*	*	*
Spray nozzles, clean as required.	*	*	*	*
Pneumatic pipework and leaks.	*	*	*	*
Cladding.			*	*
Motor and connections.				*
<u>COMPRESSOR - SKIRT BRUSHES</u>				
Visually examine:				
Crankcase oil and top up if required.		*	*	*
air intake filter is clear, clean if blocked.	*	*	*	*
vee belt for correct tension.	*	*	*	*
Motor, pump and pressure gauge for condition and security.		*	*	*
Flywheel is secure on drive shaft.		*	*	*
non-return valve for condition and correct operation.		*	*	*
Operating pressure settings.	*	*	*	*
Drain air receiver of any water.	*	*	*	*
Clean and examine pump head for condition.		*	*	*

3 Plant maintenance instruction - continued

C = Monthly, D = 3 Monthly, E = 6 Monthly, F = Yearly				
DESCRIPTION	C	D	E	F
<u>REVERSE OSMOSIS UNIT</u> Clean reverse osmosis filter. Renew hand filter pre-filter.			*	*
			*	*
<u>NOTE :- 2 Yearly</u> Renew hand filter. Renew carbon in the carbon filter.				
<u>5 Yearly</u> Renew sand in sand filter.				
<u>PUMPS (Delivery, Transfer, Dosing, Main Wash)</u> Visually examine: for leaks, condition, security and excessive noise. oil level in crankcase of dosing pumps. Pumps for correct delivery. Change oil in crankcase of dosing pumps. Lubricate bearings if required.	*	*	*	*
		*	*	*
		*	*	*
		*	*	*
		*	*	*
<u>EXMOVER MACHINES</u> Mixing Tanks (Exmover and Bicarbonate Solutions) Visually examine for condition and security: Tank Pipework. Cables and terminals. Storage for hopper. Pumps and correct operation. Mixing motor and correct operation. Mixing agitator and correct operation. Chemical screw delivery system and correct operation. float valves and correct operation. limit switches and correct operation. Operational timers and correct operation.	*	*	*	*
	*	*	*	*
	*	*	*	*
	*	*	*	*
	*	*	*	*
	*	*	*	*
	*	*	*	*
	*	*	*	*
	*	*	*	*

3 Plant maintenance instruction - continued

C = Monthly, D = 3 Monthly, E = 6 Monthly, F = Yearly	C	D	E	F
DESCRIPTION				
<u>FUNCTIONAL TEST</u> Visually examine: all functions for correct operation. all emergency stop buttons for correct operation. Record any defects in report book.	* * *	* * *	* * *	* * *

Electric points heating installations**I Possession for maintenance****I.1 Taking possession**

Where possession of the line is required to enable planned preventative maintenance to be undertaken, this should be programmed and arranged prior to commencement of work as laid down in Section T of the Rule Book and to the local instruction of the Depot.

Take all safety precautions before starting work.

Where it is necessary, isolate the points heating and secure Warning Notices over or adjacent to the controls, lock-off if possible, so that they are clearly visible to anyone who may attempt to use the points heating.

I.2 Special safety requirements

Observe Local Instructions regarding possession of the line protection whilst working on the Points Heating.

Observe the Rule Book and Track Safety Handbook regarding Red Flags, Clips, etc whilst working on the Points Heating.

Ensure prescribed protective clothing is worn before attempting to undertake any maintenance work.

Before carrying out work, where it is necessary to reach into the gap between the switch and stock rails, or major work is to be carried out in close proximity to the gap, ensure that the switch is scotched in accordance with the local procedures.

The exposed parts of cartridge and strip heaters when energised may be at a temperature in excess of 200°C. Care should be taken to avoid touching the heaters to avoid the risk of burns.

I.3 Returning to normal service

Ensure points heating is fit to be returned to normal service.

Remove Warning Notices and any other protective measures in accordance with the Rule Book and local instructions that have been observed.

Advise the Associated Signal Box Panel Supervisor that the points heating is back in normal service, unless it has been necessary to leave any switches isolated, then details of these should be supplied. Where possession of the line has been obtained, arrange for this to be cancelled.

2.1 Data extract - continued

SETTINGS		
APPLICATION	DIMENSION	REMARKS
STRIP HEATER CONTINUITY TEST Values		
4 metre Strip Minimum	15 Ohms	
4 metre Strip Maximum	20 Ohms	
5 metre Strip Minimum	13 Ohms	
5 metre Strip Maximum	18 Ohms	
6 metre Strip Minimum	10 Ohms	
6 metre Strip Maximum	15 Ohms	
SPECIAL TOOLS & EQUIPMENT		
Aerosol Freeze Spray Points Scotches Temperature Meter Weather Monitoring/Control Unit Test Set WD40 Spray Can Transformer Insulating Oil		

2.2 Record of drawings - Manuals

DRAWING No.	REV.	TITLE	LOCATION
		Electric Points Heating – Switchgear Cubicle (Phase) General Arrangement Electric Points Heating – Switchgear Cubicle (Phase) Schematic Diagram General Arrangement of 230/110v Points Heating Transformer 3.0/5.0kVA General Arrangement of 230/110v Points Heating Transformer 10kVA Site Layout Plan	
MANUAL	REV.	TITLE	LOCATION

SPECIMEN FORM

Ref:	RT/E/G/27225
Issue:	I
Date:	June 2005

3 Plant maintenance instruction

This maintenance instruction covers Electric Points Heating Installations available for continuous use during the period from 1 October of one year to 31 March of the following year. Examination 'C' to be carried out in November, December, January, February and March, April. Examination 'F' to be carried out in October.

The detailed maintenance requirements of this instruction apply to all electric points heating installations, details of which are shown on the relevant site layout plan. The periodicities stated in this instruction are to be considered the minimum requirements for the usage specified.

3. Plant maintenance instruction - continued

C = Monthly, D = 3 Monthly, E = 6 Monthly, F = Yearly				
DESCRIPTION	C	D	E	F
ELECTRICAL SUPPLY CUBICLE				
Visually examine for satisfactory condition and security:				
Cubicle	*	*	*	*
All labels for presence	*	*	*	*
Door handle and locking mechanism and correct operation	*	*	*	*
Door seals	*	*	*	*
Switchgear				*
All fuse carriers and bases and correct fuse ratings				*
Cables and terminals				*
Conduit and cable entries	*	*	*	*
RCD correct operation	*	*	*	*
470 Ohm resistor				*
Lubricate door hinges, locking mechanism, lock and handle				*
Visually examine switch mechanism for correct operation				*
Clean exterior and interior of cubicle, switches and busbar chamber				*
Visually examine base is free of litter and vegetation				*
ELECTRICAL CONTROL CUBICLE				
Visually examine for satisfactory condition and security:				
Cubicle	*	*	*	*
All labels for presence	*	*	*	*
Door handle and locking mechanism and correct operation	*	*	*	*
Door seals	*	*	*	*
Indicator lights, push buttons, switches and MCBs				*
All fuse carriers and bases and correct fuse ratings				*
Contactors				*
Main isolator and door interlock				*
Anti-condensation heater				*
Cables and terminals				*
Conduit and cable entries	*	*	*	*
470 Ohm resistor				*

3. Plant maintenance instruction - continued

C = Monthly, D = 3 Monthly, E = 6 Monthly, F = Yearly				
DESCRIPTION	C	D	E	F
<u>ELECTRICAL CONTROL CUBICLE – Continued</u>				
Visually examine integrity of protective devices				*
Lubricate door hinges, locking mechanism, lock and handle.				*
Clean exterior and interior of cubicle				*
Visually examine base is free of litter and vegetation				*
<u>CABLES AND HEATERS</u>				
Visually examine for satisfactory condition and security:				
Cable and harness	*	*	*	*
Junction boxes	*	*	*	*
Cable terminations				*
Plugs and sockets	*	*	*	*
Heater pads, cartridges and strips	*	*	*	*
All retaining clips	*	*	*	*
All troughs and ducts				*
<u>HEATING TRANSFORMER</u>				
Visually examine for satisfactory condition and security:				
Transformer	*	*	*	*
All labels for presence	*	*	*	*
Main isolating switch and correct operation	*	*	*	*
Conduit and cable entries	*	*	*	*
Cables and terminals				*
Fuse carriers and correct fuse ratings				*
RCD and correct operation				*
Lubricate main isolating switch cover hinges and lock				*
Visually examine:				
Oil level and top up if required				*
Base is free of litter and vegetation				*

3. Plant maintenance instruction - continued

C = Monthly, D = 3 Monthly, E = 6 Monthly, F = Yearly				
DESCRIPTION	C	D	E	F
<u>PORTABLE TOOL TRANSFORMER</u>				
Visually examine for satisfactory condition and security:				
Transformer	*	*	*	*
All labels for presence	*	*	*	*
Cables and terminals	*	*	*	*
Conduit and cable entries	*	*	*	*
Fuse carriers and correct fuse ratings				*
Socket outlet cap/locking device	*	*	*	*
470 Ohm resistor				*
Visually examine:				
Oil level and top up if required				*
Base is free of litter and vegetation				*
<u>MOISTURE AND TEMPERATURE SENSORS</u>				
Visually examine for satisfactory condition and security:				
Moisture sensor and cleanliness of surface	*	*	*	*
Rail temperature sensor	*	*	*	*
<u>ELECTRICAL TEST</u>				
Carry out insulation and resistance tests on transformers, heaters, cables and harnesses. Record Results.				*
<u>FUNCTIONAL TESTS</u>				
Visually examine for correct operation:				
Mains supply pilot light	*	*	*	*
Manual over-ride switch	*	*	*	*
Weather monitoring/control unit	*	*	*	*
Phase available indicators	*	*	*	*
Moisture sensor	*	*	*	*
Rail temperature sensor	*	*	*	*
Heater pads, cartridges and strips	*	*	*	*
Anti-condensation heater	*	*	*	*

Non-traction electrical substations

I Possession for maintenance

I.1 Taking possession

- I.1.1 Adequate advance notice should be given to the Local Manager or his representative where it is known that services will be affected whilst maintenance is being carried out. This will enable all concerned to be advised, in order that any necessary arrangements can be made and agreement given for a date and time for the maintenance to be carried out.
- I.1.2 Report to the Local Manager or his representative, sign the Visitors' Book and obtain agreement to carry out maintenance.
- I.1.3 Take all normal safety precautions before starting work and ensure that the following are in operation where applicable:
 - Permit to Work card
 - Sanction for Testing card
 - Circuit State Certificate
 - **and** prevent access by unauthorised persons.
- I.1.4 Secure warning notices over/adjacent to the controls and/or point of entry, as appropriate, so that they are clearly visible to anyone approaching that the substation is out of service, undergoing maintenance and that access is prohibited to other than Authorised Persons. If possible lock-off supplies under maintenance, to prevent interference.
- I.1.5 Ensure that the sub-station equipment is in the correct mode for the work being carried out.
- I.1.6 Observe Local Safety Procedures.

I.2 Special safety requirements

I.2.1 Precautions to be taken before working on high voltage systems

No persons should undertake any repairs, maintenance, cleaning, alteration or such work, on any part of high voltage apparatus unless such parts of the apparatus are:

- a) 'Dead'
- b) Isolated and all practicable steps taken to lock-off from live conductors

- c) Efficiently connected to earth at all points of disconnection of supply to such apparatus, or between such points and the point/s of work and caution notices fixed
- d) Screened where necessary to prevent danger and Danger Notices fixed.
- e) Positively identified
- f) and unless such person:
- g) Is certified as a Competent Person and is fully conversant with the nature and extent of the work to be done.

It is the duty of the person issuing the Permit to Work, Sanction For Testing Cards or Circuit State Certificates, as appropriate, to ensure that the foregoing provisions are complied with.

Where the design of apparatus precludes the strict compliance with all details of these precautions, the work should be carried out to the instructions of a Nominated Person, who should be present and after agreement with the Engineer responsible for the equipment.

1.2.2 Precautions to be taken before working on low voltage systems

The consequences of shock or burns from short circuits associated with low voltage systems may be serious, or, in some circumstances, fatal. wherever practicable therefore work on low voltage apparatus, conductors and equipment should be done whilst the equipment is 'Dead'.

When working on 'dead' low voltage apparatus, suitable precautions should be taken by screening or other means, to avoid danger from inadvertent contact with live conductors within the working zone.

Since it is not always possible to make 'dead' or earth low voltage apparatus, all work on low voltage apparatus should be carried out as if it were live unless it is proved 'dead'.

When working on live low voltage apparatus, suitable precautions should be taken by screening, use of protective clothing, insulated tools and equipment, or other means to avoid danger from inadvertent contact with live conductors or earthed metalwork.

Work on live low voltage apparatus, conductors or equipment should be undertaken only by a Certified Competent Person and with the necessary safety precautions in place.

Ref:	RT/E/G/27225
Issue:	I
Date:	June 2005

I.3 Returning to normal service

- I.3.1 Ensure plant is fit to be returned to normal service.
- I.3.2 Ensure Permit to Work/Sanction for Testing cards/Circuit State Certificate conditions have been satisfied as appropriate before re-energising the system where applicable.
- I.3.3 Remove all warning notices from controls and/or point of entry.
- I.3.4 Remove warning notices from other locations.
- I.3.5 Advise the Local Manager or his representative that the substation is back in normal service and sign out in the Visitors' Book.

I.4 Returning to service after an electrical fault

After a fault involving the tripping of high voltage circuit breakers, the Maintainer should carry out a check to ensure the integrity of the circuit breakers, to efficiently and safely continue to perform their function. Items listed for the planned preventive maintenance 'J' examination, for circuit breakers and switches, should be used as a guide for this purpose.

2 Specimen forms

2.1 Data extract

EQUIPMENT DETAILS		LOCATED AT
NON-TRACTION ELECTRICAL SUB-STATION Manufacturer Type Year of Installation		
SETTINGS		
SPECIMEN FORM		
APPLICATION	DIMENSION	REMARKS
Transformer Operating Temperature Buchholz Alarm Setting Buchholz Trip Setting Circuit Breaker Trip Setting Circuit Breaker Close & Trip Mechanism Trip Bar/Tappet Setting <u>Circuit Breaker Arc Trap Design:</u> Arcing Contacts Engagement Setting Oil Dashpot Stop Adjustment Setting <u>Circuit Breaker Plain Break Design:</u> Arcing Contacts Engagement Setting Oil Dashpot Stop Adjustment Setting		

Ref:	RT/E/G/27225
Issue:	I
Date:	June 2005

2 Data extract - continued

EQUIPMENT DETAILS	LOCATED AT
NON-TRACTION ELECTRICAL SUB-STATION Manufacturer Type Year of Installation	
SPECIAL TOOLS/EQUIPMENT	
Test Probe H.V. Tester Earthing Device Locking-Off Device Transformer Oil SPECIMEN FORM	

DRAWING NUMBER	REV.	TITLE	LOCATION
		Site Layout Diagram	
		Schematic Diagram	
		Switching Instructions	
		Wiring Diagram	
		Network Diagram	
MANUALS	REV.	TITLE	LOCATION

Applicable to: Non-Traction Electrical Sub-Stations - H.V. Switchgear, power transformers and associated controls, protection and L.V. equipment.

Ref:	RT/E/G/27225
Issue:	I
Date:	June 2005

This maintenance Instruction is intended to cover a typical installation in continuous use.

The detailed maintenance requirements of the particular plant/services to which this instruction is to be applied should be determined by the local engineer. The periodicities stated in this Instruction are to be considered the minimum requirements for the usage specified. Due regard to custodian requirements and the vulnerability of the plant should be considered.

3. Plant maintenance instruction - continued

E = 6 Monthly, F = Yearly, H = 5 Yearly, J = 10 Yearly				
DESCRIPTION	E	F	H	J
<u>SITE</u>				
Report or remove debris and any untoward vegetation.	*	*	*	*
Visually examine for satisfactory condition and security:				
Anti-vandal measures	*	*	*	*
Barbed wire round fall pipes etc.	*	*	*	*
Fences and gates	*	*	*	*
Trench covers	*	*	*	*
Visually examine for and remove any birds nests.	*	*	*	*
Signs of vermin.	*	*	*	*
<u>BUILDING</u>				
Visually examine for satisfactory condition and security:				
Door and windows and lubricate locks and hinges if required	*	*	*	*
Trench covers	*	*	*	*
Lights and correct operation.	*	*	*	*
Emergency lights and correct operation	*	*	*	*
Fire fighting equipment for presence	*	*	*	*
Heaters and correct operation	*	*	*	*
All notices for presence, currency	*	*	*	*
Emergency exits for free access/egress and correct operation	*	*	*	*
Louvers and clear of debris.	*	*	*	*
Visually examine:				
For leaks, dampness and vermin.	*	*	*	*
For blocked drains and gullies.	*	*	*	*
Ensure equipment room is clean and tidy.	*	*	*	*
Report on condition of paintwork.	*	*	*	*
Visually examine entries in log book before working on equipment.	*	*	*	*
Endorse log book as appropriate on completion of work.	*	*	*	*

3. Plant maintenance instruction - continued

E = 6 Monthly, F = Yearly, H = 5 Yearly, J = 10 Yearly				
DESCRIPTION	E	F	H	J
<u>TRANSFORMER</u>				
Visually examine for satisfactory condition and security.				
Transformer	*	*	*	*
Insulators			*	*
Labels for presence	*	*	*	*
Locks for presence	*	*	*	*
Breather and renew crystals if necessary	*	*	*	*
Bucholz or similar detection device and all associated connections			*	*
Tap changer mechanism				*
Tap changer selector diverter contacts				*
HV Divider Box				*
LV Divider Box				*
All cable terminations				*
Visually examine for compound leaks from cable boxes.	*	*	*	*
Thoroughly clean transformer exterior			*	*
Visually examine operating temperature	*	*	*	*
Take oil sample and send for analysis, top-up as necessary			*	*
Record position of tap changer setting			*	*
Visually examine integrity of earthing system and record neutral to earth continuity value			*	*
Report on condition of paintwork			*	*
<u>FUNCTION TEST (Transformer)</u>				
Test insulation resistance (min test 5kV) of primary conductors.				*
Test insulation resistance of secondary conductors.				*
<u>TRANSFORMER LV BOARD OR PILLAR</u>				
Visually examine for satisfactory condition and security:				
Enclosure			*	*
Labels for presence	*	*	*	*
All conductor connections			*	*
Phase barriers and covers			*	*
Earth conductors and connections			*	*
Hinges, catches and locks and lubricate if necessary				

3. Plant maintenance instruction - continued

= 6 Monthly, F = Yearly, H = 5 Yearly, J = 10 Yearly				
DESCRIPTION	E	F	H	J
<u>TRANSFORMER LV BOARD OR PILLAR - Continued</u>				
Visually examine for satisfactory condition, security and correct operation:				
Instruments			*	*
Anti-condensation heater			*	*
Visually examine:				
For compound leaks from cable boxes.	*	*	*	*
Integrity of protective devices.			*	*
Test and record insulation resistance of all conductors.				*
<u>FUNCTION TEST (Transformer LV Board or Pillar)</u>				
Pressure test Buchholz protective device to check operation of alarm and trip circuit mercury switches and that they operate within the prescribed limits (see Section 2 – Data Extract).			*	*
<u>HV SWITCHGEAR</u>				
Examine for sound of electrical discharge and smell of Ozone	*	*	*	*
Visually examine for missing locks and warning devices	*	*	*	*
Visually examine for satisfactory condition and security:				
Equipment labels for presence	*	*	*	*
Voltmeters and ammeters and correct operation	*	*	*	*
Indicator lights	*	*	*	*
Earthing system			*	*
Visually examine:				
For oil leaks from tanks, bushings, current transformer chambers and voltage transformers	*	*	*	*
Compound leaks from cable boxes and busbar band joints	*	*	*	*
Fault indicator relays for operated flags and report any untoward findings.	*	*	*	*
Clean off loose dirt from switchgear and sweep floor.		*	*	*
Report on condition of paintwork.		*	*	*
Carry out inventory and serviceability check of tools and portable earthing equipment.		*	*	*