	SPECIFICATION FOR OVERHEAD LINE WORK USED DURING THE INSTALLATION OF NEW CONNECTIONS	Page 1 of 10
Applies to Third party installers of new connections		SP-PS-316
Prepared by D.B		Rev: 1.02

Authorised by: A.B	Proposed Review Date: N/A	Issue Date: Oct 01	No. of this copy:
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**INFORMATION PROVIDED TO ASSIST THE
INSTALLER OF NEW CONNECTIONS:**


REFERRED TO IN EACH:

**HARMONISATION DOCUMENT/
EUROPEAN STANDARD**

I.E.C.

**BRITISH STANDARD
1990, 3288, 6485, 7884**

DEROGATIONS (IF ANY)

	SPECIFICATION FOR OVERHEAD LINE WORK USED DURING THE INSTALLATION OF NEW CONNECTIONS	Page 2 of 10
Applies to Third party installers of new connections		SP-PS-316
Prepared by D.B		Rev: 1.02

1. INTRODUCTION

The purpose of this document is to provide guidance to Third Parties erecting overhead lines in S+S territory, on the standards and specifications to be adopted when surveying, designing and building overhead lines that will be adopted by S+S.

2. DESIGN

2.1 General

Overhead lines erected in S+S territory shall comply with the requirements of Electricity Supply Regulations 1988 and Amended Regulations.

2.2 Survey and Design


Survey Requirements

The basic requirements for carrying out overhead line surveys and the preparation of associated schedules are given in Appendix 1.

2.3 Pre-Construction Documents

The following survey documents will be provided by the Third Parties for approval by S+S prior to construction work starting;

- a) Two copies (One transparent copy), 1:10,000 Ordnance Survey plans, showing the routes of all HV and LV lines and cables using the symbols shown in S+S Specification SP-PS-317. One plan shall also show locations that require tree cutting.
- b) Two copies, pole and/ or cable schedule of all HV and LV lines and cables including types, excavation details, lengths and clearly indicating pole positions, stays and other attachments.
- c) Two copies dismantling pole schedule (where applicable).
- d) One copy, profile of all 11kV and 33kV overhead lines to scale of 1:2000 horizontal and 1:200 vertical.
- e) Two copies, British Telecommunications and railway crossing sketches. These should indicate, for each crossing, the horizontal separating distance

	SPECIFICATION FOR OVERHEAD LINE WORK USED DURING THE INSTALLATION OF NEW CONNECTIONS	Page 3 of 10
Applies to Third party installers of new connections		SP-PS-316
Prepared by D.B		Rev: 1.02

from the point of crossing to British Telecommunications or railway telegraph poles on either side of the line, pole numbers, crossing angle, number of British Telecommunications or railway telegraph wires and their height, and vertical clearance at the conductor maximum operating temperature.

- e) Two copies, tree cutting schedules; the swath in forests and plantations shall be 9 metres on either side of the line, unless a special instruction is given to the contrary in a specific case. The tree cutting schedule shall indicate the number and species to be cut.
- f) Two copies, contract drawing list detailing all general arrangement drawings in the contract, for approval; on receipt of the list S+S will specify the number of prints required from each drawing.

2.4 Final Records

The following "As Constructed Records" shall be provided by the Third Party:


- a) Two copies, 1: 10,000 Ordnance Survey sheets, or as otherwise required, showing routes of all lines.
- b) Two copies, Pole Schedule with land entry dates shown at the top left hand corner of each sheet.
- c) Two copies, Earthing Schedule.

2.5 Overhead Line Clearances

The recommended minimum clearances between buildings, other power lines, general obstacles etc. are detailed in Electricity Association Technical Specification (EATS) 43-8.

3. WAYLEAVES

3.1 S+S will be responsible for obtaining wayleaves and statutory consents for any overhead lines and associated underground cables based on the information provided by the contractor in the pre-construction documents. No work shall start until S+S has obtained all necessary wayleaves and consents.

	SPECIFICATION FOR OVERHEAD LINE WORK USED DURING THE INSTALLATION OF NEW CONNECTIONS	Page 4 of 10
Applies to Third party installers of new connections		SP-PS-316
Prepared by D.B		Rev: 1.02

4. LOW VOLTAGE OVERHEAD LINES

4.1 S+S current policy is that all new low voltage overhead lines should, where practical, utilise Aerial Bundled Conductors (ABC). The ABC system currently approved by S+S is only suitable for use on Protective Multiple Earthed (PME) networks.

4.2 General

The design of LV ABC overhead lines shall comply with the requirements of S+S Code of Practice No. 6 'Low Voltage Insulated Aerial Bundled Conductors'.

4.3 Conductors

Conductors used on ABC systems shall comply with the requirements of EATS 43-13 "Aerial Bundled Conductors (ABC) insulated with Cross-Linked Polyethylene for Low Voltage Overhead Distribution".

The preferred sizes of conductor for Distribution lines are 95 mm², 2 core and 4 core bundles, and for service lines and Service spans are 35 mm² 2 core and 4 core bundles.

5. 11 AND 33kV OVERHEAD LINES

5.1 Design & Construction


11kV and 33kV overhead lines shall be designed to comply with the requirements of S+S Code of Practice 7 'Specification for 11kV and 33kV Single Circuit Overhead Lines on Wood Poles'.

5.2 Conductors

Conductors installed on 11kV and 33kV overhead lines shall comply with the following BS Standards

- | | |
|------------------------------------|----------|
| a) Hard Drawn Copper Conductors | BS 125 |
| b) PVC Covered Conductors (type 8) | BS 6485 |
| c) BLX Conductor | EATS 120 |

PVC conductors shall be greased in accordance with EA Engineering Recommendation L38/1.

	SPECIFICATION FOR OVERHEAD LINE WORK USED DURING THE INSTALLATION OF NEW CONNECTIONS	Page 5 of 10
Applies to Third party installers of new connections		SP-PS-316
Prepared by D.B		Rev: 1.02

S+S should be consulted on the correct conductor to use before design work begins.

6. GENERAL STANDARDS AND SPECIFICATIONS

6.1 Wood Poles

Wood poles and associated timber used for overhead construction shall generally comply with BS 1990 and EATS 43-88.

6.2 Steelwork

Steelwork shall generally comply with EA Technical Specification 43-95 (but subject to narrower conductor spacing for BLX).

6.3 Insulators

6.3.1 Pin Insulators

Pin insulators shall, in general, comply with the requirements of BS 3288 and EATS 43-93. The insulators shall be manufactured of porcelain and be provided with semi-conducting glaze over the areas indicated in EATS Drg. No.439301 and 439302. The profile of the insulators shall incorporate the alternative head design specified in EA Technical Specification 43-93. The minimum total creepage distance for 11kV and 33kV pin insulators shall be 330 mm and 740 mm respectively.


6.3.2 String Insulator Units

String insulator units shall, in general, comply with the requirements of EATS 43-93. The insulator units shall be manufactured of toughened glass. The profile of the insulators shall be in accordance with EATS Drg. No.439306.

Where a Third Party wishes to use polymeric insulators as an alternative to glass or porcelain units a specification shall be submitted to S+S for approval.

6.3.3 Low Voltage Insulators

LV coach screw service insulators and reel insulators shall comply with the

	SPECIFICATION FOR OVERHEAD LINE WORK USED DURING THE INSTALLATION OF NEW CONNECTIONS	Page 6 of 10
Applies to Third party installers of new connections		SP-PS-316
Prepared by D.B		Rev: 1.02

requirements of EATS 43-93 and be in accordance with EATS Drg No.439304 and 4395305.

6.3.4 Stay Insulators

Stay insulators for lines of up to and including 33 kV shall be in accordance with the requirements of EATS 43-91, except that they shall be coloured brown. The insulators shall be dimensioned in accordance with EATS Drg. No. 439107 Type 1 for LV and 11kV and Type 2 for 33 kV.

6.3.5 Insulator Fittings

Insulator fittings and pins shall comply with BS 3288.

6.3.6 Conductor Terminations, Joints and Binds

All connections to conductors shall be made using components, materials and or methods complying with EATS 43-92 or 43-15 as appropriate.

6.3.7 Fasteners and Washers

All fasteners and washers shall comply with EATS 43-96.

6.3.8 Stay components


Stay components shall generally comply with EATS 43-91. The Technical Specification lists a number of alternatives for stay strands and stay blocks, S+S construction standards permit the use of the following components:

7/3.25 mm and 7/4.00 mm 1150 kN grade stay strand.
Type 2 wood stay block ref. 439103

The screw-in type stay anchor - Drg. No. 439105 - is not included in any S+S construction specification.

6.3.9 Anti Climbing Devices

All anti climbing devices shall comply with EATS 43-90. S+S's normal practice is to specify barbed wire wraps as the preferred method of guarding. Third Parties should, however, consult S+S on the need to install enhanced anti climbing precautions in certain locations.

	SPECIFICATION FOR OVERHEAD LINE WORK USED DURING THE INSTALLATION OF NEW CONNECTIONS	Page 7 of 10
Applies to Third party installers of new connections		SP-PS-316
Prepared by D.B		Rev: 1.02

6.3.10 Safety Signs

The design and installation of 'Danger Notices' shall comply with The Electricity Supply Regulations 1988.

6.3.11 Pole Mounted Switchgear and Fusegear

The use of pole mounted switchgear and fusegear may be required in certain circumstances to improve or maintain the level of customer service provided by S+S. In such cases S+S will indicate to the Third Party the location and types of switchgear or fusegear required. All pole mounted switchgear will comply with the requirements of EATS 41-36 'Distribution Switchgear for service up to 36 kV (Cable and Overhead Conductor Connected)':

6.3.12. Pole and Equipment Numbering

S+S will provide the Third Party with details of the pole numbering sequence to be adopted and the correct nomenclature to be used for pole mounted transformer and overhead switchgear and fusegear.

7. EARTHING

7.1 General


Earthing and bonding shall be carried out to meet the requirements of the Electricity Supply Regulations 1988 and Electricity and Amended Regulations and the Electricity at Work Regulations 1989. Detailed guidance of S+S's earthing standards is given in our Specification SP-PS-113.

7.2 Earth Electrodes

Earth electrodes will comprise a driven rod or a nest of driven rods and buried conductor to give the required overall resistance to earth. The minimum depth of the tops of the earth rods shall be 500 mm.

7.3. High voltage Metalwork Earth Electrodes

The overall value of the HV metalwork earth resistance must be low enough to ensure that in the event of an earth fault the resultant leakage current shall not be less than twice the current required to operate the HV protection. The maximum value of resistance must

	SPECIFICATION FOR OVERHEAD LINE WORK USED DURING THE INSTALLATION OF NEW CONNECTIONS	Page 8 of 10
Applies to Third party installers of new connections		SP-PS-316
Prepared by D.B		Rev: 1.02

not exceed 50Ω or 10Ω where surge arresters are installed.

7.4. Low Voltage Neutral Electrodes

- (1) The combined value of PME system main substation, terminal and additional neutral earths should not exceed 20Ω.
- (2) The value of the main substation neutral earth of an SEN system should not exceed 40Ω.

8. HANDOVER

8.1 A completion and hand over certificate shall be raised by the Third Parties when the circuit is ready for commissioning. S+S may elect to carry out a top inspection of the overhead line before adopting the circuit and will expect the third party rectify any defects found prior to commissioning. The Third Party will also provide a copy of the results of all pre-commissioning tests carried out on transformers and underground cable connected to overhead circuits. The pre-commissioning tests required by S+S for transformers and underground cable are detailed in S+S document on the testing of High Voltage apparatus (PR-PS-063). A copy of these requirements will be made available on request.


8.2 The third party shall be responsible for construction and manufacturing defects that occur on overhead line components and any associated cables and plant for a period of 12 months commencing at the hand over date. At the end of this period a joint inspection by the third party and S+S shall identify any remedial works necessary and these shall be carried out by the Third Party at no cost to S+S.

9. APPLICABLE STANDARDS

9.1 Third Parties will obtain copies of non S+S Standards from the issuing organisations at their own expense.

9.2 Third Parties will obtain copies of S+S Standards from the S+S Power Systems Document Administrator, Inveralmond House, 200 Dunkeld Road, Perth PH1 3AQ.

9.3 There will be a cost of £50 for each Standard requested to cover administration and copying costs.

	SPECIFICATION FOR OVERHEAD LINE WORK USED DURING THE INSTALLATION OF NEW CONNECTIONS	Page 9 of 10
Applies to Third party installers of new connections		SP-PS-316
Prepared by D.B		Rev: 1.02

APPENDIX 1

BASIC REQUIREMENTS FOR LINE SURVEYS AND SCHEDULES FOR LINES OPERATING AT 33 kV AND BELOW

10 Survey & Profile

10.1 Where the new line is it tapping from an existing circuit, the proposed tapping pole may require to be changed to obtain the necessary ground clearance. The existing line should be surveyed for two spans on either side of the tapping position to check for uplift. A profile of this section line shall be included on the main profile sheet so that S+S can confirm that uplift does not exist.

10.2 Interfering stays in arable ground are to be avoided if possible.

10.3 The horizontal clearance to any building should be not be less 4.5 m, but 6 m is preferred.


10.4 Angle positions are to be pegged and tied to physical features, e.g., fence posts, existing poles, crosses painted on rocks, etc. A sketch with tie-in dimensions should be drawn on the profile.

10.5 If from any angle position the next angle position cannot be seen, then line pegs should be installed' at positions from where both angles or the next line peg can be seen. Ideally the line pegs should be tied in as described in 1.4. Their position should be marked on the profile by chain dotted line and the legend "LINE PEG".

10.6 Except at water crossings or gullies which can be spanned, levels should be taken no further apart than 30 m and should, in any case, be frequent enough to produce an accurate ground profile.

10.7 Profiles should be A1 size maximum.

10.8 The calculation of ground clearance should, in addition to vertical clearance, take account of side slope. Profiles should show side slope if it is higher than the level of the centre line of the proposed line. Side slope is measured 3 m from the centre line, and is shown on the profile as a broken line.

	SPECIFICATION FOR OVERHEAD LINE WORK USED DURING THE INSTALLATION OF NEW CONNECTIONS	Page 10 of 10
Applies to Third party installers of new connections		SP-PS-316
Prepared by D.B		Rev: 1.02

10.9 The ground clearances to be adopted should conform to The Electricity Supply Regulations 1988.

10.10 Care should be taken when deciding the height of an 'H' pole on a side slope. The planting depth should be maintained on the lower side.

10.11 Uplift section poles in bog are to be avoided if possible.

11 Schedules and Sketches

11.1 Schedules should be numbered sequentially, and should be clearly named, e.g. MAIN LINE ,T/OFF TO,etc.

11.2 Stay angles and spreads should be written in the remarks column as should earthing types (HV or LV), number of LV fuses, size of transformers, etc.

11.3 Transformers up to and including 750 kg can be erected on single poles. Above this weight they should be erected on 'H' poles or in line lay leg 'H' poles.

11.4 The routes of cables should be shown on sketches with cable details and length, ducts, type of ground, etc.

11.5 BT crossing sketches are to be done on A4 paper. The crossings are to be individually numbered. The position of the crossings should be marked on the 1:10,000 route plan.

11.6 Lines in proximity to BT or British Rail overhead circuits should be shown on a sketch with separating distances, difference in level, heights of lines, proposed means of protection, etc.

11.7 On 1:10,000 plans 33kV lines and cables should be marked as per the S+S Specification SP-PS-317.

11.8 All pole numbers should be shown on the 1:10,000 plan.

11.9 The location of all items of auxiliary plant, such as A/B switches, transformers, etc. should be shown on the 1:10,000 plan.