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Technical
Guidance Note
TGN(E)133
Issue 1
April 1998

**Protection Against
Rise of Earth Potential
and Induced Voltages
on Telecommunication
Cables at Substation
Sites**

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PROTECTION AGAINST RISE OF EARTH POTENTIAL AND INDUCED VOLTAGES ON TELECOMMUNICATION CABLES AT SUBSTATION SITES

FOREWORD

Under power system fault conditions the substation earth (local earth) can rise to a high voltage compared to a remote earth. This phenomenon is known as Rise of Earth Potential (ROEP). Where telecommunication services are delivered to a site the ROEP can be sufficiently high to present a safety hazard both to personnel within the substation and to Public Telecommunications Operator (PTO) personnel remote from the site. Where the ROEP can rise above 430 Vrms or, for high reliability electricity transmission systems where high speed protection equipments are employed, 650 Vrms, the site is considered to be a 'Hot Site'. The higher category applies to the NGC transmission system. The International Telecommunications Union has issued directives which recommend that protective safety measures are taken where services are delivered to Hot Sites. A register of hot sites is maintained by the National Grid Company plc (NGC) and is issued to PTOs who provide telecommunication services.

1 SCOPE

This guidance note considers installation requirements for telecommunication services delivered on metallic cables to hot sites. In particular the responsibilities of National Grid are considered.

Also considered are the effects on services crossing a site where induction as well as ROEP will have to be considered.

2 REFERENCES

2.1 The International Telecommunication Union (ITU)

K26 Protection of Telecommunication Lines Against Harmful Effects from Electric Power and Electrified Railways.

Directives concerning the protection of telecommunication lines against harmful effects from electric power and electrified railway lines, Geneva 1988.

Volume VII Protective measures and safety precautions.

Volume VIII Protective devices.

2.2 European Telecommunications Standards Institute

ETS 300 386-1 Equipment Engineering; Public telecommunication network equipment Electro-Magnetic Compatibility (EMC) requirements. Part 1: Product family overview, compliance criteria and test levels.

2.3 British Standards

BS EN 41003 Particular safety requirements for equipment to be connected to telecommunications networks.

BS 5308 Part 1. Instrumentation cables.

2.4 BT plc

EPT/PPS/B013 Cabling and Wiring at Electricity Stations October 1996.