



RP 59-6

TELECOMMUNICATIONS

SELECTION OF TELECOMMUNICATIONS POWER SUPPLIES FOR MANNED OFFSHORE FIXED INSTALLATIONS

November 1994

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TELECOMMUNICATIONS - SELECTION OF TELECOMMUNICATIONS POWER SUPPLIES FOR MANNED OFFSHORE FIXED INSTALLATIONS											
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SCOPE AND PURPOSE This Recommended Practice provides guidance on the design, selection and installation of Telecommunications Power Supply Systems for manned offshore fixed installations. Its purpose is to provide design engineers and management with:- (a) Guidance on the need and selection of telecommunications power supply systems for manned offshore fixed installations. (b) A basis for sizing telecommunications power supply systems for manned offshore fixed installations. (c) Guidance on health and safety aspects associated with the selection and operation of emergency power supply systems for manned offshore fixed installations.											
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FOREWORD

Introduction to BP Group Recommended Practices and Specifications for Engineering

The Introductory Volume contains a series of documents that provide an introduction to the BP Group Recommended Practices and Specifications for Engineering (RPSEs). In particular, the 'General Foreword' sets out the philosophy of the RPSEs. Other documents in the Introductory Volume provide general guidance on using the RPSEs and background information to Engineering Standards in BP. There are also recommendations for specific definitions and requirements.

Value of this Recommended Practice

There is currently no document which covers this requirement. Future applications will benefit from the ability to specify and procure such best-practice systems in a quicker and more cost effective manner. It is anticipated that this Recommended Practice will stimulate standard products to emerge and these will produce cost benefits compared with current bespoke systems.

Application

Text in *italics* is Commentary. Commentary provides background information which supports the requirements of the Practice, and may discuss alternative options.

This document may refer to certain local, national or international regulations but the responsibility to ensure compliance with legislation and any other statutory requirements lies with the user. The user should adapt or supplement this document to ensure compliance for the specific application.

For further information contact Standards Group, BP International or the Custodian. See Quarterly Status List for contacts.

Feedback and Further Information

Users are invited to feed back any comments and to detail experiences in the application of BP RPSE's, to assist in the process of their continuous improvement.

For feedback and further information, please contact Standards Group, BP International or the Custodian. See Quarterly Status List for contacts.



1. INTRODUCTION

1.1 Scope

This Recommended Practice provides a guide for the selection and design of telecommunication power supply systems that are used to provide electrical power for telecommunication systems installed on manned offshore fixed installations. The purpose of this Recommended Practice is to supplement the information presented in BP Group [RP 12-5](#) and clarify how the requirements stated in BP Group [RP 12-5](#) relate to telecommunications power supply systems for manned offshore fixed installations.

The following aspects are not covered by this Recommended Practice:-

- (a) Telecommunication Power Supply Systems for Mobile Offshore Drilling Units
- (b) Telecommunication Power Supply Systems for unmanned or not normally manned offshore installations
- (c) Telecommunication Power Supply Systems for temporary offshore units for construction, hook-up or workovers
- (d) Telecommunication Power Supply Systems for onshore installations

The purpose of this Recommended Practice is to provide design engineers and managers with a basis for the selection and sizing of telecommunication power supply systems for manned offshore fixed installations. The details given in BP Group [RP 12-5](#) are not specific to telecommunications systems that are used on manned offshore fixed installations and further information is required to explain how BP Group [RP 12-5](#) should be used. This Recommended Practice is restricted in applicability to manned offshore fixed installations because the requirements for telecommunication power supplies on other types of offshore installation; offshore unit or onshore installation can vary in size, capacity and regulatory requirements.

2. EXPOSITION

2.1 Telecommunications

In terms which are generally accepted Telecommunications is defined as the transportation of voice, image, text or data between physically separated points. To achieve this function, electronic devices predominate, with either cable or radio connection being employed to implement the physical interconnections. However, other mediums such as optical technology is being used in an increasing number of



applications, particularly in the field of optical fibre cables, infrared and laser.

2.2 Telecommunications Systems

Within the definition of this Recommended Practice a Telecommunication System is defined as a collection of individual items of equipment interconnected by means of transmission media to form a communication network. Such a network is used to provide the transmission path for any combination of voice, image, text or data communications.

A number of communication applications are used on existing offshore oil and gas fixed manned installations. These are generally divided into the following categories:-

1. Network Communications and Communication links (BP Group [RP 59-2](#))
2. Shipping and Aeronautical Communications (BP Group [RP 59-3](#))
3. On-Platform Communications (BP Group [RP 59-4](#))
4. Emergency Communications (BP Group [RP 59-5](#))
5. Telecommunication Power Supplies (BP Group [RP 59-6](#))

This Recommended Practice covers the requirements for telecommunication power supply systems. The other categories are dealt with in other parts of the BP Group RP 59 series and will be referred to as and when required.

3. PURPOSE OF TELECOMMUNICATION POWER SUPPLIES

Telecommunication power supply systems are provided to maintain a source of electrical power to telecommunications systems that are installed on manned offshore fixed installations when the primary sources fail. Telecommunications equipment should be fed from battery ups systems to provide the following safeguards:-

- (a) Power is provided for those systems that are necessary to maintain in operation during an evacuation of the installation after the final stage of shutdown or in an emergency situation when all primary sources of electrical power have been shutdown,

See BP Group [RP 59-5](#) regarding emergency telecommunications systems; a period of four hours of standby power is recommended to ensure the installation can be evacuated safely.

- (b) Continued operation of telecommunications equipment during any changeover of primary power electricity generators and in the event of temporary breakdown of the installations main primary power.



A summary of the telecommunications that are normally supplied from the ups systems are described in Table 1 of this Recommended Practice. See BP Group [RP 59-2](#), BP Group [RP 59-3](#) and BP Group [RP 59-4](#) for further details.

If the main primary source of electrical power is lost for a period of longer than one hour due to electrical or mechanical breakdown, or if gas has penetrated into the electrical generator enclosures on the installation, then it is very likely that the installation will be evacuated and a further period of four hours will be required to supply power to just the emergency telecommunication systems. All other telecommunication systems would be isolated from the power supply when the installation is shutdown. Under these circumstances, a minimum period of one hour standby power will be required for all telecommunications equipment that is supplied from the ups system followed by a period of four hours for all emergency telecommunications equipment.

- (c) Protection against installation mains voltage variations, transients and mainsborne interference which could damage or degrade the performance of equipment

The main source of electrical power should comply with EMC requirements (see BP Group [RP 59-7](#)) and should not generate harmful transients and interferences. However, where this is not possible improved immunity can be gained by using a ups system

This requirement would apply to all telecommunications equipment; however, some telecommunications equipment may be isolated from the telecommunications power supply when ever the primary source of electrical power fails., E.g. ups power would be disconnected from the central equipment cabinets of the entertainment and data lan PC networks. These systems also rely on primary power to be supplied to equipment in field locations and disconnecting the ups power would therefore not affect the period of time that these systems could operate.

The main requirement is to provide power to those telecommunication systems that are required to remain in operation while the installation is being evacuated after the installation has been shutdown, i.e. the emergency telecommunication systems. The other requirements should be considered as secondary when considering any other design constraints that may be imposed, such as limit on space for battery accommodation and air conditioning ratings. i.e. the HVAC systems may not be able to remain in operation for a sufficient length of time after the installation is shutdown to maintain the correct environmental conditions for the operation of all the essential telecommunications equipment including the telecommunication power supplies.

4. DESIGN REQUIREMENTS

The equipment and its installation should be in accordance with BP Group [RP 12-5](#); however, the classification and the size of the power supplies should be designed in accordance with the details included in this Recommended Practice.



Each ups system should be supplied in accordance with the details given in BP Group [RP 12-5](#), BP Group [GS 112-10](#) and BP Group [GS 112-11](#). However, the following aspects should be given particular consideration for telecommunication power supplies:-

- (a) Modular construction for ease of maintenance, fault diagnosis and repair.
- (b) Each battery charger module should be equipped with output ammeter and voltmeter.
- (c) Each system should have a battery ammeter indicating both charge and discharge.
- (d) Low voltage and high voltage alarms should be provided and the alarm settings should be adjustable.
- (e) A common alarm output should be included for each system. This should be in a form that is suitable for display on a DCS or SCADA monitoring system.
- (f) The battery banks should be mounted in frames/racks for easy access for maintenance.
- (g) The battery bank for each of the power supply systems should be divided into two sub banks of batteries to enable part isolation for maintenance purposes and protection against complete loss caused by individual cell short circuit.
- (h) Each bank of batteries should be connected to its own dedicated battery charger module(s) to enable individual control of charging.
- (i) Each battery charger should be able to supply the load and meet the output performance and ripple specification with the batteries disconnected.
- (j) The distribution cabinets should contain the Automatic Emergency Shut Down (ESD) contactors and the manual circuit breakers for the distribution networks. They may consist of one 'main' distribution cabinet including the ESD contactors, located adjacent to the ups systems, and separate distribution cabinets located in the different telecommunication equipment rooms and radio consoles, containing the circuit breakers for each system.
- (k) The distribution cabinets should be designed with 50% spare capacity both regarding cable entry and circuit breakers.
- (l) Each ups system should include a distribution board ampere meter and voltmeter.

Where necessary the telecommunication power supplies should comply with the regulations and guidelines issued by the appropriate national telecommunications authority.

It may be necessary for the telecommunication power supplies to comply with the requirements of the national telecommunications authority when the power supplies are connected to telecommunications equipment that is used to connect to public telecommunications systems and networks. The requirements normally relate to the interface between the power supply and the telecommunications equipment and are not usually concerned with the internal design of the power supply system. The requirements normally requires the ripple voltage of any output supply to not exceed 2 millivolts rms CCITT telephone weighted, 50 millivolts rms flat response and 5 millivolts rms above 3 kHz.

A minimum of two independent uninterruptible power supplies (ups) systems should be installed. One for each of the two separately located groups of telecommunication systems. Each system should consist of the appropriate quantity of battery charger units, battery banks, invertors, by-pass transformers, shut down contactors and



distribution cabinets as necessary to meet the design requirements stated in this Recommended Practice.

The term 'Uninterruptable Power Supply' (ups) should mean either a dc or ac power supply that comprises at least one rechargeable battery unit. A ups would include battery chargers, control board, invertors, cabinets, distribution board and all associated equipment as necessary. The ups's should supply power to telecommunications equipment located in two telecommunication equipment rooms, the radio room, the control room and the helicopter landing office and where practical, to parts of telecommunications equipment located elsewhere on the platform. See BP Group [RP 59-2](#), BP Group [RP 59-3](#), BP Group [RP 59-4](#) and BP Group [RP 59-5](#). Each ups should be installed in geographically separate locations of the installation in order to provide protection against simultaneous outage caused by internal component failures or breakdowns caused by external influences.

Each ups system should supply electrical power to one set of the following duplicated and emergency telecommunication systems:-

- (a) Public address/general alarm system.

See BP Group [RP 59-4](#) and BP Group [RP 59-5](#)

- (b) Radio link equipment and hotline telephone units.

See BP Group [RP 59-2](#) and BP Group [RP 59-5](#)

- (c) Vhf marine and vhf aeronautical radio equipment.

A power supply to the vhf marine radio equipment may not be necessary if an independent SOLAS power supply is installed; see BP Group [RP 59-3](#). See BP Group [RP 59-5](#).

Other telecommunication or control systems may be connected to either ups system as appropriate to meet the requirements stated in Section 3 of this Recommended Practice.

It may be desirable for economic reasons to share the telecommunication ups's and connect other electrical and electronic systems to the telecommunications power supplies, such as a DCS or SCADA system. If this is considered then precautions should be taken to shutdown the various loads at the appropriate times either manually or automatically to preserve the capacity of the batteries for the emergency and essential telecommunications equipment. In all cases where various loads are being connected to a common output load connection point, consideration must be given to achieving an electromagnetically compatible (EMC) installation; see BP Group [RP 59-7](#).

In accordance with BP Group [RP 12-5](#) the telecommunication power supplies should generally meet the type 'A' classification; however, an ac system is preferred in order to cover the wide range of power supply voltage requirements of the various telecommunications equipment that are to be supplied. Each system should consist of at least two battery charger units, two batteries, two invertors and a by-pass transformer.

BP Group [RP 12-5](#) states that Class A control system power supplies must always be dc; however, the range of telecommunications equipment voltage requirements makes this arrangement impractical and an ac solution is preferred for telecommunication systems. The lower integrity of an ac Class A



power supply system is overcome by having two power supply systems which are independent of each other and which are each supplying identical independent telecommunication systems. The overall integrity of the essential and emergency telecommunication systems is therefore maintained to a Class A standard.

A nominal 120V rms ups output is preferred for standardisation and personnel safety.

Facilities to manually and automatically isolate the battery banks and individual supply outputs during shutdowns should be installed. The shut down system contactors should be located in the telecommunication equipment rooms. Distribution cabinets may be located in the telecommunication equipment rooms or in other equipment rooms, as appropriate.

5. BATTERY, BATTERY CHARGER AND INVERTOR SIZING

The battery banks for each system should be sized to have a minimum capacity to supply the average load of all essential telecommunications equipment for one hour followed by the average load of the emergency telecommunications equipment for a period of four hours. Each battery should be sized to supply the capacity of half the total average load.

The battery chargers and the invertors should be sized to supply the peak telecommunications load and to supply the standing load on the batteries. Each battery charger should be sized to have sufficient capacity to supply the total telecommunications load or recharge its associated battery. Under normal operation with primary power available and both battery charger units available, the battery charger units should be able to supply the telecommunications load and supply the standing load of the batteries. i.e. trickle charge

Typically the battery recharging time should be 12 hours and a maximum of 24 hours.

The load for the batteries should be determined from the average load of the systems. Special consideration should be given to public address system amplifier loadings and duty cycles, and radio transmitter duty cycles. Consideration should also be given to non-simultaneous operation of similar systems. i.e. during normal operation mf/hf ssb and vhf marine radios are not used simultaneously and PA amplifiers are normally 70% loaded and rarely used for more than 10% of the time. Similarly other radio transmitters are rarely used for more than 10% of the time. During emergency evacuation, however, these duty cycles are likely to increase. The following table is an example of how to derive the peak and average load for sizing the batteries, battery chargers and invertors:

In order to size the ups invertors and battery chargers the peak load for UPS No. 1 of typically 35 kW (without considering any expansion or system losses) should be used. The power factor of the various telecommunications loads will vary and an overall power factor may be determined but it is likely to vary between 0.7 and 1.0 as the different types of telecommunication equipment loads are used, i.e. typically 50 kVA peak load and 21/7 kVA average loads.

The invertor can be designed to be more efficient if the range of power factors can be more closely defined and for this reason on some installations it may be more economic to have dedicated power supplies for some of the larger loads. E.g. it may be more economic for the load of the PA/GA system to be supplied by two dedicated independent ups systems; however, this option should be evaluated when the specific loads are known and other constraints such as accommodation and HVAC requirements are being considered.



	Typical Peak Design Load (Watts)		Typical Average Load during evacu ation See BP Group RP 59-1 and BP Group RP 59-5 (Watts)		Typical Average Load during normal operation (i.e. load during total generator break down) Watts)		Comments
Telecoms UPS Location	UPS No. 1	UPS No. 2	UPS No. 1	UPS No. 2	UPS No. 1	UPS No. 2	See Notes 1 and 2
Typical Equipment requiring power							Other equipment loads should be added as required
(a)Network Communications							See BP Group RP 59-2
Radio satellite fixed link system	2,000	2,000	2,000	2,000	2,000	2,000	Continuous load
Microwave radio link	500	Not required	500	Not required	500	Not required	Continuous load
Hotline telephone equipment	100	100	100	100	100	100	Continuous load
PABX	2,000	Not required	Not Used	i.e shutdown	2,000	Not required	Continuous load
Data communi- cations systems	1,200	Not required	Not Used	i.e. Shutdown	1,200	Not required	Continuous load
Equipment cabinet test sockets etc.	1,000	1,000	Not Used	i.e shutdown	1,000	1,000	Continuous load
Sub-Totals	6,800	3,100	2,600	2,100	6,800	3,100	
(b)Shipping and Aeronautical Communications							See BP Group RP 59-3
Vhf aeronautical radio(s)	110	110	75	75	75	75	Only one transceiver is considered to be operational at a time Av. load=[70W (Tx) x 50% + 40W(Rx)]
Lf/mf non- directional radio beacon and monitor receiver	Not required	550	Not Used i.e shut down		Not required	100	Only one transmitter is considered to be operational at a time Av.load=[500W (Tx) x10 % + 50W (Rx)]
Weather monitoring system	50	200	Not Used i.e shut down		50	200	Continuous loads: (i) 200W main equipment, and (ii) 50W console displays

TABLE 1
TYPICAL TELECOMMUNICATION POWER SUPPLY LOADING CALCULATIONS (Page 1 of 4)



Mf/hf transceiver	650	Not required	Not Used i.e shut down		110	Not required	Av. load=[600W (Tx) x 10 % + 50W(Rx)]
Watch receiver/ weatherfax/ Navtex receivers	150	Not required	Not Used i.e shut down		150	Not required	Continuous load
Vhf marine radio(s)	150	150	100	100	100	100	Only one transceiver is considered to be operational at a time Av. load=[100W (Tx) x 50% + 50W(Rx)]
Inmarsat A terminal (if fitted)	500	Not required	Not Used i.e shut down		400	Not required	Av. load=[105 (Tx) x 5% + 395 (Rx/standby)]
Marine radar	850	Not required	Not Used i.e shut down		85	Not required	Av. load= 850W x 10% (i.e. marine radar system only used 10% of the time)
Radio consoles (sockets/lighting etc.)	1,000	1,000	100	100	1,000	1,000	Socket outlets would be isolated during evacuation, only console lighting would remain
Sub totals	3,400	2,010	275	275	1,970	1,475	
(c)On-Platform Communications							See BP Group RP 59-4
Public address/ general alarm system - loudspeakers	10,000	10,000	2,000	2,000	2,000	2,000	Peak load=all control equipment and amplifiers functioning Av. load=[Actual loudspeaker load (e.g. 2000W - i.e. l/s tappings) x 55% (for amplifier efficiency) x 70% (for maximum tone level) x 50% (duty cycle) + 500W (quiescent) = 2000W

TABLE 1

TYPICAL TELECOMMUNICATION POWER SUPPLY LOADING CALCULATIONS
(Page 2 of 4)



Public address/ general alarm system - flashing lights	2,000	2,000	Not Used i.e shutdown (i.e. all machinery and process stopped and platform is quiet - flashing lights not required during evacuation)	1,000	1,000	Peak load=[20000W (actual beacon load) x 10 % (for non- coincidental flashing)] Av. load= [20000W (actual beacon load) x 10 % (for non coincidental flashing) x 50% (duty cycle)]
Uhf handportable radio repeater system	600	Not required	Not Used i.e shut down	500	Not required	Av. load=[200W (Tx) 50%+400W(Rx & standby)]
Handportable radio battery chargers	2,000	2,000	Not Used i.e shut down	1,000	1,000	Battery chargers are considered only 50% loaded
Radio paging system	150	Not required	Not Used i.e shut down	100	Not required	Av. load=[100W (Tx) x 50% + 50W (standby)]
Entertainment system	5,000	Not required	Not Used i.e shut down	Not Used i.e shut down		In order to conserve battery capacity for life support systems, the entertainment system would be shutdown if there is a major generator failure
Local area data networks	2,000	Not required	Not Used i.e shut down	Not i.e shut	Used down	In order to conserve battery capacity for life support systems, the local area data network would be shutdown if there is a major generator failure
Equipment cabinet test sockets etc.	1,000	1,000	Not Used i.e shut down	1,000	1,000	Continuous load
Sub totals	22,750	15,000	2,000	2,000	5,600	5,000
(d) Miscellaneous	2,050	2,390	125	625	630	425
GRAND TOTAL	35,000	22,500	5,000	5,000	15,000	10,000

TABLE 1

TYPICAL TELECOMMUNICATION POWER SUPPLY LOADING CALCULATIONS (Page 3 of 4)



Notes:

- (a) Telecoms UPS No. 1 would typically serve the equipment in:
(i) Telecoms Equip. Room No. 1
(ii) Radio Room
(iii) Control Room
- (b) Telecoms UPS No. 2 would typically serve the equipment in:
(i) Telecoms Equip. Room No. 2
(ii) Helicopter Landing Office

From the above table the battery capacity for UPS No. 1 would therefore be typically based on:

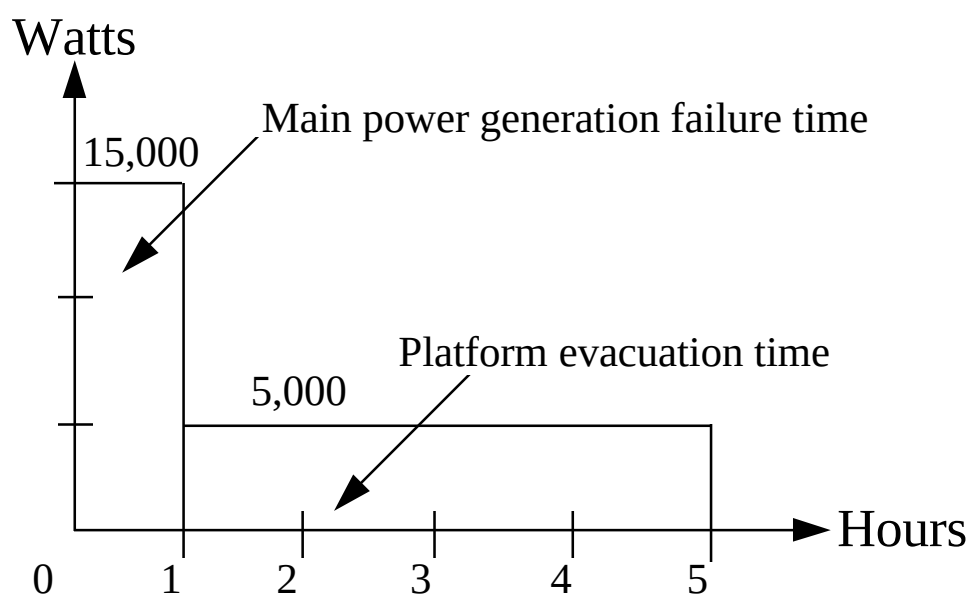


TABLE 1

TYPICAL TELECOMMUNICATION POWER SUPPLY LOADING CALCULATIONS (Page 4 of 4)



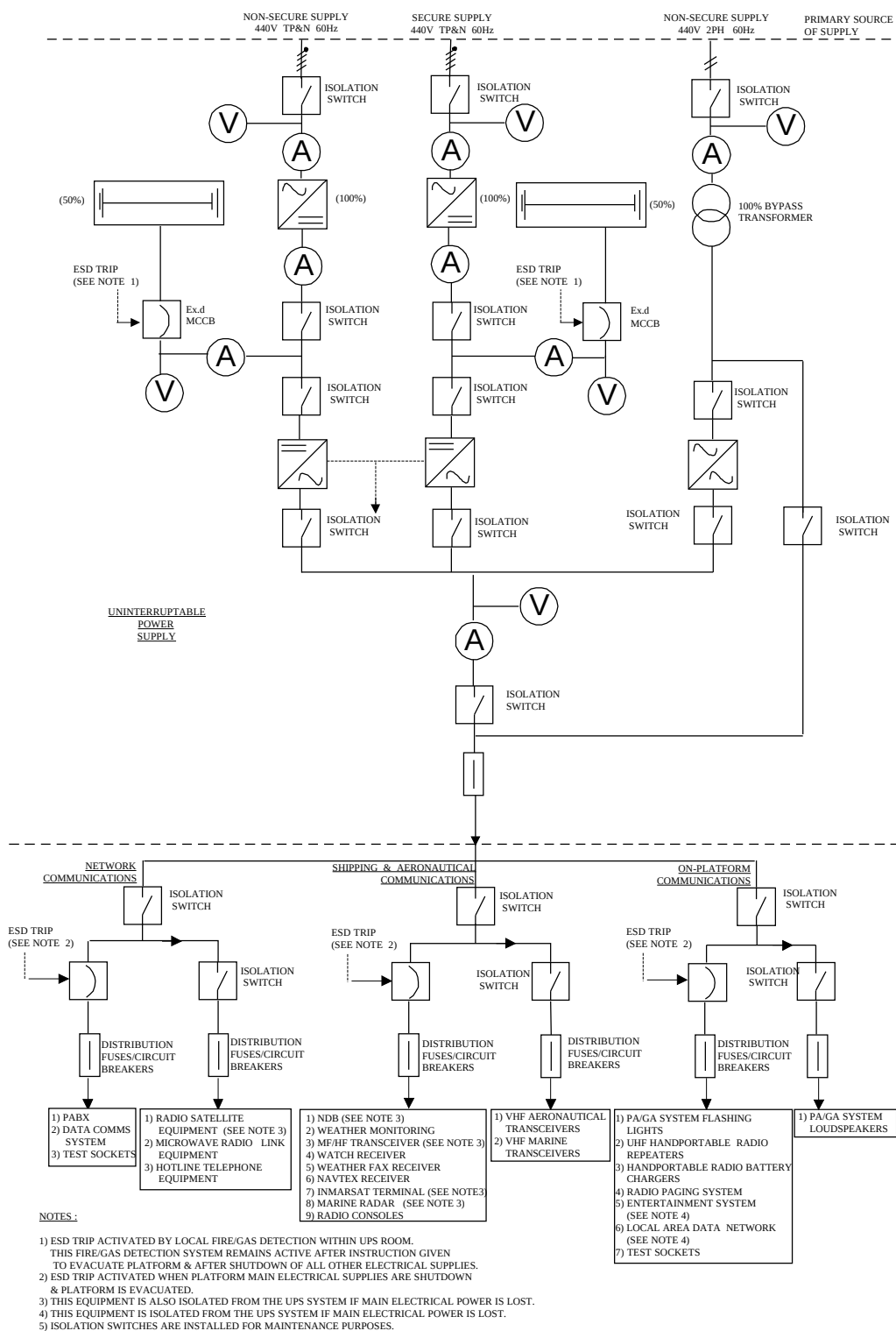


FIGURE 1

TYPICAL TELECOMMUNICATION POWER SUPPLY DISTRIBUTION BLOCK DIAGRAM



DEFINITIONS AND ABBREVIATIONS

Definitions

Standardised definitions may be found in the BP Group RPSEs Introductory Volume.

Abbreviations

AC	Alternating Current
CCITT	International Committee for Telephony and Telegraphy Recommendations
DC	Direct Current
DCS	Distributive Control System
ESD	Emergency Shutdown
PA	Public Address system
SCADA	Supervisory Control and Data Acquisition System
UPS	Uninterruptable Power Supply
VHF	Very High Frequency (30 MHz to 300 MHz)



LIST OF REFERENCED DOCUMENTS

A reference invokes the latest published issue or amendment unless stated otherwise.

Referenced standards may be replaced by equivalent standards that are internationally or otherwise recognised provided that it can be shown to the satisfaction of the purchaser's professional engineer that they meet or exceed the requirements of the referenced standards.

The following are U.K. Regulations, Standards, Guides and Codes of Practice containing sections relevant to Telecommunication Power Supply Systems and should be referred to for the interpretation and application of this Recommended Practice:

British Standards

BS 5345: *Code of Practice for the selection, installation and maintenance of electrical apparatus for use in potentially explosive atmospheres (other than mining applications or explosive processing and manufacture) Part 1 Basic requirements for all parts of the code Part 2 Classification of hazardous areas*

This is primarily concerned with the classification of hazardous areas and the selection of appropriately certified equipment for those areas;

BS 5501: *Electrical apparatus for potentially explosive atmospheres Part 1 General requirements Part 5 Flameproof enclosures Part 7 Intrinsic Safety 'i'*

This describes the requirements for equipment for use in hazardous areas;

BS 6656: *Guide to Prevention of inadvertent ignition of flammable atmospheres by radio frequency radiation Revised 1991;*

CCITT 1988 'Blue Book' Recommendations

Fascile III.2 *International analogue carrier systems. (Rec.G.211-G544)*

Fascile IV.1 *General maintenance principles: maintenance of international transmission systems and telephone circuits (Rec.M.10-M.782)*

Fascile IV.4 *Specifications for measuring equipment. (Rec. O series)*

Fascile V *Telephone transmission quality. (Rec. P series)*

CCITT recommendations are no longer published as complete sets i.e. fasciles, as shown above but as individual recommendations. A complete list of all up to date publications is available from Omnicom, Herts.

IEE Recommendations for the Electrical and Electronic Equipment of Mobile and Fixed Offshore Installations

A general design guide for electrical and electronic equipment on offshore applications.



Mineral Workings (Offshore Installations) Act 1971 Guidance Notes

- (i) *Offshore Installations: Guidance on life saving appliances - Department of Energy*
Includes guidance on matters relating to radio equipment for tempsc's and public address systems included in SI 486
- (ii) *Offshore Installations: Guidance on Design and Construction - Department of Energy*
Includes guidance on matters relating to certification, emergency shutdown systems and emergency power supplies included in SI 289

UK Statutory Instruments

- [SI 289](#) *Offshore Installations, Construction and Survey*
Prescribes the use of standards for the design and construction of offshore installations and includes requirements relating to equipment to be placed in hazardous areas.
- [SI 486](#) *Offshore Installations, Life saving Appliance*
[SI 1229](#) *Offshore Installations, Diving Operations*
[SI 1019](#) *Offshore Installations, Operational Safety, Health and Welfare*
[SI 1513](#) *Submarine Pipe-lines, Safety Regulations*
[SI 1542](#) *Offshore Installations, Emergency Procedures*

United Kingdom Offshore Operators Association

Guidelines for safety related telecommunications systems on normally-manned fixed offshore installations

BP Group Documents

- BP Group [RP 12-5](#) *Power Supplies for Control Systems
(replaces BP CP 17 Part 5)*
- BP Group [RP 59-1](#) *Telecommunication - Emergency Shutdown System.*
- BP Group [RP 59-2](#) *Selection of Network Communications for Manned Offshore Fixed Installation.*
- BP Group [RP 59-3](#) *Selection of Shipping and Aeronautical Communication for Manned Offshore Fixed Installations.*
- BP Group [RP 59-4](#) *Selection of On-platform Communication for Manned Offshore Fixed Installations.*
- BP Group [RP 59-5](#) *Selection of Emergency Communication for Manned Offshore Fixed Installation.*
- BP Group [RP 59-7](#) *Electromagnetic Compatibility for Manned Offshore Fixed Installations.*



BP Group [RP 59-8](#)

Selection and use of Temporary Telecommunication for Offshore Installation Projects.

BP Group [RP 59-11](#)

Design and Installation Practice for Telecommunication systems on Manned Offshore Fixed Installations.

BP Group [GS 112-10](#)

*Secure Static AC Power Supplies for Control Systems
(replaces BP Std 231)*

BP Group [GS 112-11](#)

*DC Power Supplies
(replaces BP Std 228)*

