

Company Directive

STANDARD TECHNIQUE: HS12R

Relating to Occupational Exposure to Electromagnetic Fields

Summary

This document details the requirements to ensure the health and safety of staff and contractors in WPD that may be exposed to electro-magnetic fields during their work activities.

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Implementation Date: **July 2016**

Approved by:



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1st July 2016.

Date:

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Implementation Plan

Introduction

This document details the requirements to ensure the health and safety of staff and contractors in WPD that may be exposed to electro-magnetic fields (EMFs) during their work activities.

Main changes

This is a new document.

Impact of Changes

Staff who are pregnant or who have designated fitted medical devices are required to advise their line managers, so that a risk assessment can be carried out on their work activities so as to ensure they are not exposed to unnecessary risks from EMFs.

Line managers shall ensure that a suitable risk assessment is carried out for their staff who are pregnant or are fitted with AMDs (active medical devices) so as to ensure compliance with the guidance in this ST.

Managers responsible for sites where EMFs exist but where they would not normally be expected to exist, shall assess whether warning notices are required per these guidelines.

Implementation Actions

Team managers shall brief their relevant staff following the issue of this document.

Implementation Timetable

The policy shall be implemented from 1st July 2016.

Document Revision & Review Table		
Date	Comments	Author
1 st July 2016	<ul style="list-style-type: none"> • New Document issued 	Steven Pinkerton-Clark

1.0 INTRODUCTION

- 1.1 The term Electromagnetic Fields (EMFs) encompasses two different though related concepts: electric fields and magnetic fields. Electric fields are created by electric voltage and magnetic fields by electric current.
- 1.2 Electric fields are measured in volts per metre (V/m), the higher the system voltage, the higher the electric field strength. Magnetic fields are produced by the flow of electrical (current) the higher the current, the stronger the magnetic field, magnetic fields are measured in microteslas (μT).
- 1.3 Electric fields are very easily screened - by buildings, hedges, fences and trees, however magnetic fields are not.
- 1.4 Further guidance on power frequency EMFs is set out in POL: TP24 and Standard Techniques in the TP24 series.

2.0 NATIONAL GUIDELINES

2.1 Occupational Exposure

- 2.1.1 The Control of Electromagnetic Fields at Work Regulations 2016 (CEMFWRs) specifies limits for occupational exposure to EMFs. This document requires employers to ensure their employees are not exposed to EMF field levels in excess of the Exposure Limit Values (ELVs). These values depend on the frequency of the EMFs and which part of the body is exposed.
- 2.1.2 In order to satisfy the ELVs a series of magnetic field and electric field levels, known as Action Levels (ALs) are specified. As long as these ALs are satisfied the ELVs will not be exceeded. If the ALs are exceeded a detailed investigation is required to ensure compliance with the ELVs.
- 2.1.3 Western Power Distribution designs and operates its network to ensure that the high ALs are not exceeded. Table 1, specifies these ALs for 50Hz fields.

Field Type	Field level
Magnetic Field	6000 μT
Electric Field	20kV/m

Table 1 Occupational Exposure High Action Levels for 50Hz Fields

- 2.1.4 The ENA (Energy Networks Association) has developed [Safety Health and Environment \(SHE\) Standard 10](#) on EMFs - Occupational Exposure Limits which provides additional guidance. WPD has adopted this standard.
- 2.1.5 These levels incorporate a considerable safety margin. Exceeding the lower ALs is not expected to produce any harm unless the levels are exceeded several-fold. The ALs relate to instantaneous effects. They do not include any time factors or restrictions and there is no basis for restrictions for repeated or long-term exposures provided the ALs are not exceeded. Compliance with the ALs are intended to prevent all known risks from EMFs.

2.2 Public Exposure Guidelines

- 2.2.1 In the UK, the 1998 ICNIRP Guidelines have been adopted for public exposure. These guidelines include Reference Levels for magnetic and electric fields above which further analysis is required to ensure that the Basic Restriction (i.e. the limit for current density in the central nervous system) is not exceeded. While this document is not normally used for occupational exposure these Reference levels are sometimes used where additional precautions are required (see Section 4.0).

Field Type	Field Level
Magnetic Field	100 μ T
Electric Field	5kV/m

Table 2 Public Exposure Reference Levels for 50Hz Fields

3.0 RISK ASSESSMENT

- 3.1 The ENA have developed and will maintain a series of risk assessments that cover all aspects of work carried out by DNO staff where there is a potential for EMFs to be an issue. These risk assessments demonstrate that staff and contractors working for WPD should not be exposed to mains frequency EMFs above the exposure levels defined in the regulations and are freely available to all staff and the public. The ENA risk assessment is available from the following website: www.energynetworks.org
- 3.2 Overhead power lines produce electromagnetic fields. The fields are usually greatest directly under the conductors and fall rapidly with distance to the sides of the conductors. Typical field strengths near to overhead line assets are well below the workplace exposure levels, as shown in the table below:

Overhead Line Support	EMF field measurement (location)	Magnetic Field (microteslas)	Electric Field (volts per metre)
Large steel towers (275kV and 400kV)	Maximum field (under line)	100	11,000
	Typical field (under line)	5 - 10	3,000 - 5,000
Small steel towers and large wood poles (132kV)	Maximum field (under line)	40	4,000
	Typical field (under line)	0.5 - 2	1,000 - 2,000
Wood poles (11kV and 33kV)	Maximum field (under line)	7	700
	Typical field (under line)	0.2 - 0.5	200

- 3.3 High-voltage underground cables can produce higher magnetic fields directly above them than an overhead line would produce at ground level, because the physical distance from the underground cable is smaller. The field falls more rapidly with distance to the sides however, and they produce no external electric field. Such cables are not normally located beneath buildings.
- 3.4 Electricity distribution substations, produce up to 2 microteslas close to their perimeter fence (or occasionally more if built into another building), and often no electric field at all. The fields fall rapidly with distance, and within 1 to 2 metres from a typical substation, the fields associated with it are usually indistinguishable from other fields present in homes.
- 3.5 Plant in large electricity transmission substations do not produce strong magnetic fields themselves (typically less than one microtesla); the EMFs close by are mainly produced by power lines and cables.
- 3.6 For comparison, field strengths produced by appliances within domestic premises is shown in the table below, and the earth's magnetic field which everybody is constantly exposed to is approximately 50 μ T in the UK.

Typical Magnetic Field Levels from Some Common Domestic Appliances

Appliance	Magnetic Field (microteslas)	
	Close to appliance	1 metre away
Vacuum cleaner	800	2
TV, Washing Machine, Microwave	50	0.2
Bedside Clock	50	0.02
Fridge	2	0.01

4.0 ACTIONS REQUIRED

- 4.1 Although the ENA risk assessment has identified that there is negligible risk to health of staff undertaking normal duties associated with the distribution network, the regulations identify two groups of people for whom additional precautions may be required. These two groups are those who are pregnant or who have an active medical device (implanted or body worn). If an employee falls under these categories their team manager shall risk assess the type of work they undertake, to assess their exposure to EMFs.
- 4.2 Any member of staff notifying the company that they are pregnant, shall be offered the choice of working in situations with field strength levels below the public exposure reference level for the duration of their pregnancy. Where a member of staff chooses to exercise this option, their line manager shall conduct a risk assessment to identify situations, plant items or work practices where exposures may occur that are high enough to trigger action under this provision. Reasonable adjustments to their work should be made to ensure the public exposure reference levels are not exceeded (see table 2).

(Note that this may occur on operational sites. All office sites are compliant with the public reference levels already).

There is no evidence to suggest that a mother or unborn baby is any more sensitive to EMFs than anybody else, however this provision is made for peace of mind and as a precautionary measure. The choice made by a pregnant member of staff shall be recorded by their line manager.

- 4.3 Active medical devices (AMDs) such as pacemakers etc. and body-worn medical devices such as insulin pumps and hearing aids, etc. can, in a few exceptional circumstances experience interference from power-frequency EMFs at levels below the occupational exposure levels. Passive devices, such as joints, plates, pins, screws etc. can be assumed not to give rise to any interference effects with EMFs. In the case of doubt, advice should be sought from relevant specialists.
- 4.4 Where a member of staff has an AMD, their exposure should be kept below the public exposure guidelines and their line manager shall carry out an assessment of their work environment, with assistance from relevant company specialists (EMF Advisors and/or Occupational Health and Safety Advisors) where necessary, to identify situations, plant items or work practices where the reference levels may be exceeded and therefore where interference is a possibility.
- 4.5 Staff with active medical devices will be identified through:
 - Voluntary information from the individual with the device
 - Return-to-work interviews
 - Pre-employment medical screening; and
 - Routine Occupational Health checks e.g. Health Surveillance and Fitness for Work assessments

Where absence from work could have involved fitting an AMD (active medical device) managers conducting return-to-work interviews shall ask whether one has been fitted. They should not rely solely on the employee volunteering this information. If an AMD has been fitted it will be necessary to seek further information about the device and its sensitivity levels. Staff will be expected to co-operate in providing this information and it may be necessary to refer the individuals to Occupational Health for advice on an individual's fitness for work with EMFs.

- 4.6 The line manager shall assess the implications for their employees fitted with AMDs to ensure suitable adjustments are made to their work practices based on the information obtained above in 4.5, to reduce the likelihood of any risks arising from interference to their medical device.
- 4.7 Inductions for staff, contractors, and visitors for sites where there is a possibility of exposure to EMFs above the public exposure reference levels should include a warning of the possibility of interference to AMDs.
- 4.8 Managers responsible for sites where electrical apparatus is situated shall ensure that warning signs are posted where; a.) exposures to EMFs higher than the general public reference levels could realistically occur, AND b.) the presence of such EMFs would not be expected from the general characteristics of the site.

In practice, this means that warning signs should not be required on electrical operational sites, unless there is unusual equipment present with significant capability of producing interference, in these cases assistance from the local EMF advisor shall be obtained to determine if any action is required.

- 4.9 Where warning signs are used, they should be a “yellow triangle” hazard warning sign, available via E5



- 4.10 There is no requirement or justification for routine health surveillance for staff exposed to EMFs; however any staff that have concerns about exposure to EMFs should raise them with their line manager in the first instance. If investigation reveals that a member of staff or contractor has been exposed to fields above the occupational exposure levels and the person reports a health affect then on going medical surveillance will be required and the WPD safety team shall be advised.

APPENDIX A

SUPERSEDED DOCUMENTATION

None.

APPENDIX B

ASSOCIATED DOCUMENTATION

ST:TP24/3 - Relating to Power Frequency Electric and Magnetic Fields

ST:TP24A/3 - Procedure for Handling Queries Concerning Electric and Magnetic Fields

ST:TP24C/1 - Customer Visit Protocol – Electric and Magnetic Field Queries

ST:TP24D/1 - Assessment of EMC Impact of New/Modified 132kV Circuits

APPENDIX C

KEY WORDS

EMF, Electric Fields, Magnetic Fields.