



Science and  
Technology  
Facilities Council

# **WORKING WITH STRONG STATIC MAGNETIC FIELDS**

STFC SHE Code 39

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## Revisions

1	Initial launch	March 2011
1.1	Updates to audit checklist	May 2013
1.2	Document Retention Policy Added	August 2014
2.0	Updated to comply with European Directive 2013/35/EU and HSE Consultation Document CD276 and audit findings.	November 2016
2.1	Minor update to reflect the launch of SHE Assure	October 2018
3.0	Update following static fields audit and Control of Electromagnetic Fields at Work Regulations 2016 by PHE and reviewed by internal STFC subject specialists	March 2021
3.1	Changed EMF Protection Adviser to 'Static Magnetic Fields Protection Adviser'	December 2021

# Working with Strong Static Magnetic Fields

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# Working with Strong Static Magnetic Fields

## 1. Purpose

Static magnetic fields are used in a range of applications across the STFC sites, for example superconducting magnets in ISIS sample environments, or the permanent magnets in particle physics experiments and accelerator wigglers or undulators. The code aims to minimise so far as is reasonably practicable, the health and safety risks to staff and other persons who may be adversely affected by strong static magnetic fields.

People can experience vertigo and other physiological effects relating to balance when an individual's head and trunk moves within a strong static magnetic field. Moreover, very strong fields may affect the cardiovascular system. However, the main hazards to people associated with such fields comes from their influence on active medical devices and their ability to attract magnetisable objects at distance and speed, see Appendix 1.

This code sets out the arrangements adopted by STFC to achieve compliance with the Control of Electromagnetic Fields at Work Regulations 2016.

## 2. Scope

This code is applicable to all staff, contractors, users and tenants working with strong static magnetic fields at STFC sites.

This code applies to all static and quasi static magnetic fields (from 0 to <1Hz) which extend into areas readily accessible to people and applies to all such fields on all STFC sites irrespective of ownership of the apparatus generating the fields. It applies to both electrically generated fields, including superconducting magnetic fields, and those produced by permanent magnets. It does not address the changes arising from a quenched/collapsing static magnetic field.

This code is *not* intended to cover every piece of equipment in which magnetic fields are present. For example, the code is not intended to apply to electric motors, loudspeakers and magnetrons in normal use. However, if strong magnets from such pieces of equipment were removed and made into an assembly for some new purpose generating a magnetic field extending into areas readily accessible to people then this code would apply.

This code does not address the hazards associated with time varying electro-magnetic fields, see STFC SHE Code 23: [Working with time-varying EMFs](#).

## 3. Definitions

### 3.1 Exposure limits

Exposure limit values are specified for frequencies from 0 Hz to 1 Hz and are intended to protect employees from the direct adverse effects of exposure. It is a legal requirement to comply with the exposure limit values, subject to certain specific exceptions. Further details of exposure limit values are given in Appendix 2.

In addition, there are **action levels** that are intended to prevent or limit the consequences of specified indirect adverse effects. See Appendix 2 for further details of action levels. These are not legal limits, but should be used as a guide to managing risks arising from indirect effects.

## 4. Responsibilities

### 4.1 Directors responsible for activities employing strong sources of static magnetic fields shall:

- 4.1.1 Appoint one or more suitably qualified and experienced Static Magnetic Fields Protection Advisers (MPA) for those areas housing equipment generating strong static magnetic fields. The letter of appointment should define the geographic and equipment scope of their responsibility and should be recorded in SHE Directory, which will generate an appointment in writing. It would be normal for the technical manager responsible for the day-to-day operation of the equipment to be appointed the MPA.

### 4.2 Managers responsible for sources of static magnetic fields stronger than 0.5mT (5 Gauss) whose field extends in permissible and accessible areas shall:

- 4.2.1 Ensure that exposure assessments or surveys are carried out for equipment and activities in areas under their control. Ensure that only suitably calibrated monitoring equipment is used to measure strong static magnetic fields and to determine compliance with the exposure limit values and action levels.
- 4.2.2 Ensure that no equipment capable of generating strong static magnetic fields is brought into their areas of responsibility, including equipment provided by visitors, facility users, contractors etc., until the advice of the MPA has been sought and the manager has approved it and suitable controls have been put in place
- 4.2.3 Where equipment generating strong static magnetic fields is designed and constructed in house, ensure that accessible fields are considered in the context of the exposure limit values and action levels and the advice of the MPA sought.
- 4.2.4 Ensure that documented risk assessments address the hazards from static magnetic fields, see Appendix 1, SHE code 6 Risk Management. Such risk assessments must be undertaken by individuals with sufficient expertise in such hazards (see Appendix 1), and must be based upon an assessment of the magnetic field, derived as appropriate from: field calculations; from manufacturer's guidance; or from a site survey of the field contours using a calibrated gaussmeter. Where accessible fields exceed the action level for interference with active implanted medical devices, an EMF-specific risk assessment will be required (see Appendix 4) with the advice of the MPA. Implement the controls detailed in the risk assessment including but not limited to installing signage, barriers, floor markings etc.
- 4.2.5 Locate warning signs at all entrances to areas containing magnetic fields with strengths greater than 0.5mT (5 Gauss) where the field extends into permissible and accessible areas and able to achieve full body exposure, see Appendix 4.
- 4.2.6 The barriers, or floor marks, should define a zone outside which the magnetic field is less than 3mT (<30 Gauss) in order to delineate the boundary where magnetisable materials such as tools may be accelerated and present projectile hazards, see Appendix 1a. Specific consideration should be given to the rate of change of the field with distance above 30 Gauss.

### **In addition for static magnetic fields above 0.1T (1000 Gauss)**

- 4.2.7 Where equipment incorporating strong permanent magnets is employed the specific risk assessment must address the movement of magnet and all such equipment constrained appropriately.
- 4.2.8 Develop and implement documented local procedures for the safe operation of equipment generating the static magnetic fields, see Appendix 1.
- 4.2.9 Ensure that only sufficiently competent people are authorised to operate equipment and work in the areas where strong static magnetic fields are present, and that they are aware of the hazards, risk assessments and local procedures for the safe operation of equipment generating static magnetic fields.
- 4.2.10 The magnetic field hazards arising from the quenching of superconducting static magnet fields should always be subject to a risk assessment alongside related hazards such as asphyxiation from escaping cryogenes, and suddenly varying forces.

### **4.3 Static Magnetic Fields Protection Advisers (MPA) shall:**

- 4.3.1 Provide advice to management on the need to undertake specific static magnetic exposure assessments on equipment or activities for which they have been appointed. MPAs should not provide advice for equipment that they are solely responsible for and should seek the advice of another independent MPA.
- 4.3.2 Provide advice to management responsible for sources of strong static magnetic fields on technical modifications, changes to work practices or engineering controls that could eliminate static magnetic field hazards or minimise their impact so far as reasonably practicable, including the use of signage or other warning mechanisms where appropriate.
- 4.3.3 Where exposure or risk assessments identify the potential for hazardous exposures advise on required controls. Specific consideration should be given to undertaking field measurements following any changes that could reasonably be expected to affect the strength or spatial distribution of fields. Surveys should be documented and identify all areas above the action levels or exposure limit values.

### **4.4 STFC Staff, visitors, facility users, tenants and contractors shall:**

- 4.4.1 Comply with the risk assessments and local procedures for the safe operation of equipment generating the strong static magnetic fields.
- 4.4.2 Ensure, if any person has:
  - an active implanted medical device such as a cardiac pacemaker, implanted cardiac defibrillator, neuro stimulator, or cochlea implant; or
  - body-worn active medical device, such as a hormone infusion pump a passive ferromagnetic implant, such as an artificial joint, surgical pin, aneurysm clip, metal surgical clip, stent, heart valve prosthesis, annuloplasty ring, contraceptive implant, active implant, or metallic dental implant

that they inform their manager or other person responsible for their safety before entering an area where static magnetic fields greater than 0.5 mT (5 gauss) are present in the working environment. Anyone with any of these medical devices may wish to contact Occupational Health or the SHE Group for advice on the likely sensitivity of the device to magnetic fields.

- 4.4.3 Report all incidents relating to strong static magnetic fields through Evotix Assure following SHE Code 5, Incident Reporting and Investigation.

#### **4.5 Occupational Health advisers shall:**

- 4.5.1 Provide advice for anyone with an active implanted medical device, body-worn active medical device, or passive ferromagnetic implant.

## **5 References**

- 5.1 Control of Electromagnetic Fields at Work Regulations 2016.
- 5.2 Directive 2013/35/EU of the EU on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields).
- 5.3 [International Commission for Non-Ionising Radiation Protection \(ICNIRP\) Guidelines on Limits of Exposure to Static Magnetic Fields](#). Health Physics 96(4):504-514; 2009 and associated [Fact Sheet](#), 2009.
- 5.4 [Amendment to the ICNIRP “Statement of medical magnetic resonance \(MR\) procedures: protection of patients”](#)
- 5.5 NRPB Publication ‘*Review of the scientific evidence for limiting the exposure to electromagnetic fields (0-300GHz)*’: Documents of the NRPB Volume 15 Number 3: 2004.
- 5.6 World Health Organization (WHO), Static Fields Environmental Health Criteria Monograph No.232.
- 5.7 Non-binding guide to good practice for implementing Directive 2013/35/EU Electromagnetic Fields.

## 6 Technical definitions

### 6.1 Exposure assessment

Like all employers/personnel, STFC has a duty under the regulations to carry out exposure assessments and record the results. It may not be necessary to measure or calculate exposure and the first approach should always be to consult any information supplied by a manufacturer or supplier. Appendix 3 provides a non-exhaustive list of some equipment that may require assessment.

In contrast, any equipment with a 'yes' in the first column should be subject to a specific assessment to determine if exposures comply with the **exposure limit values** specified in the regulations (see below).

An action plan is required if the exposure assessment does not demonstrate that exposures are below the exposure limit values. This must include some or all of the items in the first part of Appendix 4.

### 6.2 Risk assessment

There is a legal requirement to carry out an EMF-specific risk assessment if any of the following apply:

- it cannot be demonstrated that the exposure limit values will not be exceeded; or
- it cannot be demonstrated that the indirect effects action levels will not be exceeded; or
- there are employees at particular medical risk in the workplace, see 6.3.

An EMF-specific risk assessment must address the matters listed in Appendix 4.

Any risks identified in the EMF-specific risk assessment must be either completely eliminated or reduced to an acceptable minimum.

Anyone who may be exposed to risks identified in the EMF-specific risk assessment must be provided with information and training (see second part of Appendix 5).

### 6.3 Employees at particular risk

Some people are at increased risk from exposure to strong static magnetic fields and may not be adequately protected by the exposure limit values. In the regulations, these people are called 'employees at particular risk' (see Section 4) and there is a specific requirement to consider them in the EMF-specific risk assessment. Those at particular risk from exposure to strong static magnetic fields are likely to include people reliant on an implanted or body worn active medical device, and those with passive ferromagnetic implants (see Appendix 1 for details of typical devices). It may be assumed that if exposures do not exceed the action level for interference with active implanted medical devices, then there will be no increased risk and no further action is necessary.

### 6.4 Medical assessment

If any person is exposed above the exposure limit value for static magnetic fields and reports experiencing a health effect as a result of the exposure, then they must be provided with a medical assessment. A record of the assessment must be retained.



## **Appendix 1. Summary of hazards associated with strong static magnetic fields**

### **a) Physical Hazards**

#### **Collision Hazards**

Danger is frequently encountered where loose magnetic or magnetisable objects are in the vicinity of strong magnetic fields or where magnetic field gradients are high. The field may be strong enough to attract such objects and to cause them to fly along the field lines towards the magnet – the ‘missile effect’ or simply a crushing effect. Therefore metallic objects such as rings, glasses, watches, coins, steel toe caps and in particular those with sharp edges, keys, scissors, tools, gas cylinders, trolleys, vacuum cleaners *etc.* may become dangerous projectiles and their use should be controlled in any areas where the magnetic field exceeds 3 mT (30 Gauss) in the stray field from a strong >100 mT (>1000 Gauss) magnet. Consideration should be given to establishing systematic search protocols before electrically generated magnetic fields are started up to ensure that relevant areas are free from loose magnetic objects.

#### **Permanent Magnets**

Permanent magnets, particularly rare earth magnets, can pose extra hazards since, by their nature, they are always generating a strong static magnetic field and gradient. Extra precautions need to be taken when handling them as the risk of pinching skin and crushing fingers is high. The magnets should only be handled one at a time, unless special fixtures are being used to restrain them, and non-magnetic tools should always be used in the vicinity of permanent magnet blocks or magnet assemblies that are powered by permanent magnets.

#### **Movement of conducting materials in static magnetic fields**

The movement of electrically conducting materials in strong static magnetic fields can result in the generation of eddy currents in the conductor which should be considered if assessing hazards.

#### **Effect on medical implants and body-worn devices**

See reference 4.2.

Passive medical implants that contain ferromagnetic materials may be subject to forces and torques in the presence of strong static magnetic fields, which can result in movement of the implant that could result in injury to the wearer. The following types of implant may be susceptible, although it should be noted that this list is not necessarily exhaustive and not all implants of a given type will be manufactured from the same materials:

- artificial joints
- aneurysm clips
- metal surgical clips
- stents
- heart valve prostheses and annuloplasty rings
- contraceptive implants
- cases of active implants
- dental implants

Active medical devices may be subject to electromagnetic interference from strong external static magnetic fields. This is a particular issue where the device contains a magnetic switch, which is often included in the design to permit the device to be switched from outside the body. The following non-exhaustive list gives examples of devices that may be susceptible:

- cardiac pacemakers
- implanted cardiac defibrillators
- neuromuscular stimulation devices
- neurostimulators
- cochlea implants
- electronically operated prosthetic devices
- hormone infusion pumps

In general, medical implants and body-worn devices are not normally affected by fields less than 0.5 mT (5 Gauss).

## **b) Biological Hazards**

See reference 4.2.

Movement through a strong magnetic field generates electric fields in the body that may affect excitable tissues. The organs of balance are particularly sensitive, leading to feelings of dizziness (vertigo), when walking through, or quickly moving the head in the field. The tongue may also be affected with a metallic taste in the mouth often reported. Other symptoms can include nausea. These are all considered to be sensory effects and normally only occur at fields in excess of 2 T. Where it is necessary for exposures to exceed 2 T, effects can be limited by avoiding rapid movements, although there is limited recent evidence to suggest that these effects may occur in the absence of movement.

As noted above, when a conductor moves in a static magnetic field, an electric field will be induced in the conductor. As blood is conductive, its flow in a strong field will result in the induction of electric fields even when the person is not moving. The magnitude of the induced flow potential depends on the strength of the magnetic field, the velocity of blood flow and the diameter of the blood vessel; the strongest electric fields will be induced by flow through the aorta and have the potential to disrupt the sinoatrial node. These electrodynamic effects should not occur to any significant extent for fields less than 8 T.

When a static magnetic field is applied perpendicular to the direction of blood flow, magnetohydrodynamic forces will act to reduce the flow rate. The magnitude of this effect is approximately proportional to the square of the magnetic field strength; aortic flow rates would be reduced by around 5% at 10 T. Similar effects are possible in other major blood vessels.

Collectively electrodynamic and magnetohydrodynamic effects are considered to be adverse health effects, but should not be significant provided exposures do not exceed 8 T.

## Appendix 2. Summary of exposure limit values and action levels

### Exposure limit values

The exposure limit values from the Schedule to the Control of Electromagnetic Fields at Work Regulations 2016 are given in table 1. These are legal limits on exposure.

**Table 1 Exposure limit values for static magnetic fields (0 Hz – <1 Hz)**

Exposed location	Exposure limit values (T)	
	Sensory effects	Health effects
Head and trunk	2	8
Limbs	8	8

The sensory effects exposure limit values may be exceeded during a shift, provided that:

- they are exceeded only temporarily
- protection measures have been implemented that minimise, so far as is reasonably practicable, the sensory effects related to movement in the magnetic field
- adequate information is provided to the employee on the possibility of sensory effects occurring
- where any sensory effects are reported to the employer, the exposure assessment and the protection measures are updated where necessary.

Exposures must not exceed the health effects exposure limit values.

### Action levels

The action levels from the Schedule to the Control of Electromagnetic Fields at Work Regulations 2016 are given in table 2. Action levels are not legal limits. Instead they are a guide to the avoidance of indirect effects.

**Table 2 Action levels for static magnetic fields**

Potential indirect effect	Action level (mT)
Interference with active implanted medical devices	0.5 (5 Gauss)
Attraction and projectile risk in the fringe field of high field strength sources (>100 mT, 1000 Gauss)	3 (30 Gauss)

### **Appendix 3. Requirements for specific EMF assessments in respect of common work activities and equipment**

The table in this Appendix lists some common work activities, equipment and workplaces, and provides an indication of whether assessments are likely to be required for:

- people with active implants
- people with passive implants
- employees not at particular risk

The entries in this table are based on whether a situation is likely to give rise to field strengths in excess of either the action levels the exposure limit values and if so, whether those fields are likely to be highly localised or not.

The table is based on the use of equipment conforming to recent standards that has been correctly maintained and is being used as intended by the manufacturer. Where work involves the use of very old, non-standard or poorly maintained equipment, the guidance in the table may not be applicable.

Where every activity in a workplace has a 'no' in all three columns, it should not be necessary to carry out a specific assessment as there is expected to be no risk from static magnetic fields. In these situations, further actions will not normally be required. Similarly, for workplaces where there is no access for those reliant on active medical devices or who have passive implants, provided every activity has a 'no' in column 1, it should not be necessary to carry out a specific EMF assessment.

## Requirements for specific EMF assessments in respect of common work activities, equipment and workplaces

Type of equipment or workplace	Assessment required for		
	Employees not at particular risk	People reliant on passive medical devices	People reliant on active medical devices
	(1)	(2)	(3)
Bore of MRI scanners	Yes	Yes	Yes
Work around MRI scanners	No	Yes	Yes
Bore of NMR spectrometers	n/a	Yes	Yes
Work around NMR spectrometers	No	Yes	Yes
Bore of other superconducting magnets	Yes	Yes	Yes
Work around other superconducting magnets	No	Yes	Yes
Permanent magnetic chucks	No	Yes	Yes
Permanent magnetic tables and conveyors	No	Yes	Yes
Lifting magnets	Yes	Yes	Yes
Permanent magnetic brackets	No	Yes	Yes
Permanent magnetic equipment nameplates	No	No	Yes
Magnetisable badges	No	No	Yes
Wigglers	No	Yes	Yes
Undulators	No	Yes	Yes
Strong permanent magnets (e.g. rare earth magnets) whether incorporated in equipment or not	No	Yes	Yes
Bore of focussing quadrupoles	No	Yes	Yes
Work around focussing quadrupoles	No	No	Yes
Bore of dipole steering and switching magnets	No	Yes	Yes
Work around dipole steering and switching magnets	No	No	Yes

### Matters to be considered in an EMF-specific risk assessment

There is a requirement under regulation 8 of the Control of EMF at Work Regulations 2016 to assess risks arising from work with static magnetic fields.

This Appendix is a modification of that found in the Control of EMF at Work Regulations, 2016, to address static magnetic fields.

These risk assessments are not necessary where:

- the most recent exposure assessment shows that exposures are compliant with the exposure limit values;
- the indirect effects action levels are not exceeded; or
- there are no employees at particular risk

In carrying out a risk assessment, the employer is required to consider both indirect effects and employees at particular risk. Indirect effects are those caused by the presence of an object or substance in the field and include:

- interference with active implanted medical devices
- attraction and projectile risk in fringe field of high field strength sources (>100 mT)

Employees at particular risk are defined as:

- those employees who have declared to their employer a condition that may lead to a higher susceptibility to the potential effects of exposure to strong static magnetic fields

In the context of static magnetic fields employees who are likely to have a higher susceptibility to the potential effects of exposure to static magnetic fields are:

- those fitted with active medical implants (such as cardiac pacemakers, cardiac defibrillators, and neurostimulators)
- those fitted with passive medical implants (essentially any metallic implant including a variety of artificial joints, pins, plates, screws and contraceptive implants)
- those wearing body-worn medical devices (such as insulin infusion pumps)

By definition, employees at particular risk may not be adequately protected by the exposure limit values. In general, these employees will be adequately protected by compliance with the action level for interference with active implanted medical devices. In some cases, it may be possible to exceed this action level without risk, but this would generally have to be determined on a case by case basis.

Where relevant, a risk assessment must include consideration of:

- the action levels and exposure limit values
- the frequency, level, duration and type of exposure, including the distribution over the employee's body and the variations between areas in the workplace
- direct biophysical effects
- existence of replacement equipment designed to reduce the level of exposure to electromagnetic fields
- appropriate information obtained from health surveillance
- information provided by the manufacturer of relevant equipment
- other health and safety related information
- multiple sources of exposure
- simultaneous exposure to multiple frequency fields

Where a risk assessment is required, the employer must keep a written record of the most recent assessment.

## Appendix 4. Principles of risk control

### Action plan

Where it cannot be demonstrated that exposures do not exceed an exposure limit value, it is a requirement under regulation 7 of the Control of EMF at Work Regulations 2016 to make and implement a suitable and sufficient action plan to ensure exposures do comply. Note that this requirement does not apply where field strengths exceed only one or more action levels.

This Appendix is a modification of that found in the Control of EMF at Work Regulations, 2016, to address static magnetic fields.

Where relevant, the action plan should include consideration of:

- alternative working methods involving lower exposure
- replacement equipment producing lower exposures
- technical measures to reduce emissions of electromagnetic fields, including interlocks, screening or similar protection measures
- demarcation and access control
- maintenance programmes for equipment, workstations and workplaces
- design and layout of workstations and workplaces
- limitations on the duration and intensity of exposure
- availability of suitable personal protective equipment

The purpose of the action plan is to achieve compliance with the exposure limit values, so whenever there is evidence that the exposure limit values have been exceeded, employers are required to identify and implement whatever changes are needed to reduce exposures below the exposure limit values.

Where an action plan is required, the employer must keep a written record of the most recent plan.

### Risk management

It is a requirement to implement measures to either eliminate risks identified by an EMF-specific risk assessment or reduce them to a minimum. The approach taken should follow the principles established by the Management of Health and Safety at Work Regulations 1999. In particular, employers are required to consider:

- technical progress
- potential to restrict access to parts of the workplace
- availability of measures to control the production of electromagnetic fields at source

The practical application of these principles should lead to consideration of a number of control. These are presented below:

- a) It must be ensured as far as reasonably practicable that where equipment likely to generate a strong static magnetic field is purchased or borrowed, that the supplier provides details of the likely field characteristics and recommended control measures. Such data should already be provided if the equipment is 'CE' or 'UKCA' marked and falls within scope of the Supply of Machinery (Safety) Regulations 2008, but nevertheless it is recommended that the equipment is re-tested locally to confirm the accessible field strength.

- b) Equipment generating strong static magnetic fields should be positioned as far away as reasonably practicable from areas normally occupied by staff and others.
- c) Ferromagnetic objects should be excluded from the vicinity of equipment generating strong static magnetic fields.
- d) Consideration should be given to the installation of shielding (normally either passive steel shielding for large areas or active systems to reduce fields at source) where there are significant stray fields that could present a risk to people.
- e) Work to assemble equipment incorporating strong permanent magnets should be carefully planned and executed using appropriate jigs to restrict the movement of magnets.
- f) Equipment designed and constructed in-house must be surveyed as part of the commissioning process.
- g) Managers responsible for new equipment generating strong static magnetic fields should ask the relevant MPA to undertake a field survey during commissioning.
- h) Warning signs as shown below indicating the presence of strong fields should be posted as appropriate where exposure above action levels may occur. Warning signs can be obtained from the SHE Group.

**Signs required where the action level for interference with active medical devices is exceeded**



**Signs required where action level for projectile risk is exceeded**





## Appendix 5. Training

Role	Initial Training	Refresher	Frequency	Comments
Managers, staff and others working in strong static magnetic fields	<p>Due to the very specialist nature of this hazard no specific training is defined.</p> <p>An STFC <a href="#">BiteSize training course</a> is available for this SHE code.</p>			<p>Familiarisation with this code, through the code launch presentation, <a href="#">BiteSize training course</a> and the risk assessments and local procedures for the safe operation of equipment established for working in areas where strong static magnetic fields exist.</p> <p>Staff likely to be exposed to risks identified in the risk assessment should receive information or training, which should include:</p> <ul style="list-style-type: none"> <li>• the measures taken to eliminate or reduce risks</li> <li>• the concepts and values of the action levels and exposure limit values and the possible risks associated with them</li> <li>• the possible indirect effects of exposure</li> <li>• the results of the most recent exposure assessment</li> <li>• how to detect and report sensory and health effects</li> <li>• the circumstances under which employees are entitled to medical examination and health surveillance</li> <li>• safe working practices</li> <li>• any additional measures required for employees at particular risk</li> </ul> <p>The following on-line video gives background to the hazards associated with strong static magnetic fields:  <a href="http://mrrc.yale.edu/users/GEMRI.aspx">http://mrrc.yale.edu/users/GEMRI.aspx</a></p> <p>Specialist and bespoke courses have previously been provided by PHE.</p>
Static Magnetic Field Protection Advisor	<p>Due to the very specialist nature of this hazard no specific training is available.</p>			<p>Competence in managing and controlling the hazards associated with static magnetic fields is generally a result of practical experience and scientific understanding.</p> <p>Specialist and bespoke courses have previously been provided by PHE.</p>

## Appendix 6. Audit Checklist

Ref	Item	Rating	Comments
1 (Section 4.1)	Has an MPA been appointed?		
2 (Section 4.2.1)	Has the MPA provided advice to management?		
3 (Section 4.2.3)	Has the MPA conducted surveys of static magnetic fields?		
4 (Sections 4.3.1 and 4.4.1)	Have exposure assessments been made?		
5 (Sections 4.3.3 and 4.4.3)	Have accessible fields been considered for equipment constructed in house?		
6 (Sections 4.3.4 and 4.4.4)	Are risk assessments documented for areas where work is undertaken in strong static magnetic fields?		
7 (Section 4.4.4)	Has a risk assessment been made and plans drawn up for assembly of equipment containing strong permanent magnets?		
8 Section 4.3.5)	Have warning signs been posted at entrances to areas where field strengths exceed 0.5 mT?		
9 (Section 4.4.8)	Is the 3mT (30 Gauss) perimeter of strong static magnetic fields marked/bounded?		
10 (Section 4.4.8)	Are warning signs for the presence of strong static magnetic fields posted at the entrances to areas where strong static magnetic fields are present?		
11	Have local procedures for the safe operation of equipment been developed for work undertaken in areas where strong static magnetic fields exist?		

**Appendix 7. Document Retention Policy**

<b>Records established</b>	<b>Minimum retention period</b>	<b>Responsible record keeper</b>	<b>location of records</b>	<b>Comments/Justification</b>
Magnetic field Risk Assessments	Current + 5 years	Line Management	Evotix Assure	SHE Group maintain Evotix Assure facility