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**Note: The National Health and Medical Research Council (NHMRC) is due to release an updated Guide regarding EMR some time in 2006. Therefore, once this Guide has been released, this Corporate Standard will be updated accordingly.**

## Functional Flowchart

*Where applicable, a flow chart should be used to document the high level steps in the process that the standard describes in more detail.*

## Objective

To provide a corporate standard that outlines SCL's procedure for managing the hazards associated with **electric** and **magnetic radiation (EMR)**.

## Scope

This corporate standard applies to any location or situation in which a SCL employee or contractor may be exposed to **electric** and / or **magnetic radiation (EMR)**.

## Definitions

**Current:**

The rate of flow of electricity through a conductor, measured in amperes (amps).

### **Electric field:**

The effect produced by the existence of an electric charge. Electric fields are found wherever voltage is present. The higher the **voltage** and nearer the source, the stronger the field.

### **Frequency:**

The rate at which an electrical **current** alternates, expressed as the number of cycles per unit of time; **frequency** is typically measured in Hertz (Hz) or cycles per second.

### **Magnetic field:**

A field of force that is generated by electric **currents**. The strength of a **magnetic field** depends on the amount of the **current** carried (amps).

### **Voltage:**

The rate at which energy is drawn from a source that produces a flow of electricity in a circuit; expressed in volts.

## Responsibilities

Position/Title	Description
OH&S Systems Manager	To maintain the currency and accuracy of the <b>Electric and Magnetic Radiation (EMR)</b> Corporate Standard reflective of legislative and corporate change
Station / Site Manager	To monitor the implementation of the <b>Electric and Magnetic Radiation (EMR)</b> Corporate Standard and allocate responsibilities and resources to ensure site-specific practices/procedures are developed to satisfy the Corporate Standard
Workers and Contracted Staff	To comply at all times with the requirements specified within this Corporate Standard and any site-specific procedures

## Hazards

Electric and magnetic radiation (EMR) is primarily created from electric energy generation, transmission, distribution and use, normally at a frequency of 50/60 Hz. To date, whilst there is no causal link established between adverse health effects and EMR; there are unresolved questions concerning the biological effects of exposure to EMR.

Therefore, it is necessary for SCL to take all practicable precautions to prevent and / or limit worker exposure levels to as low as possible.

In relation to undertaking work activities involving potential excessive exposure to EMR, a safe system must be implemented to prevent the excessive or unnecessary exposure to 50/60 Hz fields, and to control risks to health and safety arising from hazards and issues such as, but not limited to:

- exposure to excessive EMR levels

## Identification of Hazards

1. EMR surveys are to be undertaken at all SCL operational sites to identify potential sources of EMR where controls for limiting workers' exposure may be required. Areas that may be of particular interest include (but are not limited to):
  - inside substations;
  - in the vicinity of cabling or phase isolated buses between generators and generator transformers;
  - Automatic Voltage Regulator (AVR) Cubicles;

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  - at large motor terminations;
  - at terminations to unit transformers and distribution transformers; and
  - in motor control centres and switch rooms.

+ Note: EMR surveys will usually be undertaken by an authorised external agency (contractor).

- + 2. Upon completion of an EMR Survey, an EMR Survey Report is to be obtained by SCL which includes (as a minimum):
  - plan drawings showing survey results;
  - table of survey results; and
  - risk assessment(s) and action plans for limiting exposure levels where required.

## Risk Assessment

*State what needs to be assessed and the person/s responsible for undertaking the risk assessment.*

## Controls

1. Maximum **EMR** exposure limits are detailed in the following table:

**Table - Limits of exposure to 50 / 60 Hz electric and magnetic fields**

Exposure characteristics	Electric field strength (kV / m (rms))	Magnetic flux density mT (rms)
<b>Occupational</b>		
Whole working day	10	0.5
Short term	30 <sup>a</sup>	5 <sup>b</sup>
For limbs	–	25
<b>General Public</b>		
Up to 24 hours / day <sup>c</sup>	5	0.1
Few hours / day <sup>d</sup>	10	1

(a) *The duration of exposure to fields between 10 and 30kV / m may be calculated from the formula  $t \leq 80 / E$  where  $t$  is the duration in hours per work day and  $E$  is the electric field strength in kV / m.*

(b) *Maximum exposure duration is two (2) hours per work day.*

(c) *This restriction applies to open spaces in which members of the general public might reasonably be expected to spend a substantial part of the day, as recreational areas, meeting grounds and the like.*

(d) *These values can be exceeded for a few minutes per day provided precautions are taken to prevent indirect coupling effects.*

2. Where a risk assessment indicates it necessary to restrict access, limit exposure and / or warn personnel of a potential **EMR** exposure within a designated area(s) on site, suitable controls that may be implemented include (where practicable):
  - barricading and warning signs;
  - site work procedures / instructions which prescribe maximum exposure limits / times for workers within a designated area; and
  - additional controls in accordance with **EMR** Survey Report(s).

+ + **Note:** Refer to [HB#570000 : Safety Signs](#), for further information regarding appropriate safety signage.

## Contractor Management

1. Where contractors are required to undertake work activities on SCL sites where they may be exposed to an EMR hazard, the contractor(s) is to adopt standards equal to or exceeding this Corporate Standard.
2. Safety Plans / Safe Work Method Statements developed by contractors and reviewed by SCL (where relevant) are to adequately identify all hazards associated with the work to be undertaken where an EMR hazard exists, and are to detail specific controls to be implemented.

## Training and Competency

1. SCL workers who are identified through the risk assessment process as being potentially at risk of exposure to EMR are to receive training / instruction in relation to EMR. Such training / instruction should include (as a minimum):
  - hazards associated with EMR;
  - sources of EMR at the particular SCL site;
  - exposure limits; and
  - controls as per this corporate standard and applicable EMR Survey(s) Report (where relevant).

## Review

This Corporate Standard will be reviewed following implementation, upon release of the upcoming NHMRC Guide, and then annually thereafter.

## Links and References

- QLD : Plant Safety Link: Radio Frequency – Generating Plant
- Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)
- Electricity Supply Association of Australia Limited (ESAA)
- National Health and Medical Research Council (NHMRC) - Interim guidelines on limits of exposure to 50/60 Hz electric and magnetic fields (1989)

## Attachments

Attachment 1 : Audit Checklist

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# Corporate Standard

## Electric and Magnetic Radiation (EMR)

HB#562492

Amd Date 22/06/06

### Attachment 1 : Audit Checklist

Item	Status			Action Required	Responsible Person	Completed (Insert Date & Initials)
<b>Identification of EMR Hazards</b>						
EMR Surveys undertaken on site?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>			
EMR Survey Report(s) obtained and filed?	Yes <input type="checkbox"/>	No <input type="checkbox"/>				
Risk assessment undertaken to identify workers who may be at risk of EMR exposure?	Yes <input type="checkbox"/>	No <input type="checkbox"/>				
EMR Survey Report recommended controls implemented on site?	Yes <input type="checkbox"/>	No <input type="checkbox"/>				
<b>Training and Competency</b>						
Relevant workers have received training/instruction in accordance with this Corporate Standard?	Yes <input type="checkbox"/>	No <input type="checkbox"/>				
EMR training details recorded and maintained on site?	Yes <input type="checkbox"/>	No <input type="checkbox"/>				
<b>Contractor Management</b>						
Process in place for reviewing contractor Safety Plans / Safe Work Method Statements?	Yes <input type="checkbox"/>	No <input type="checkbox"/>				

**Other / Further Details:**

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**Signature of Person Conducting Inspection:** \_\_\_\_\_

**Copies Provided to:** \_\_\_\_\_  
*(Print First & Last Names)*

**Relevant Manager's signature on completion of Actions:** \_\_\_\_\_