

4 HAZARD TO HEALTH

4.1 Background

When electricity is used, electric fields are produced by the voltage in a conductor and magnetic fields are produced by the current or flow of electricity in a conductor. In a modern society that depends on electricity, electromagnetic fields (EMF) are a fact of life. EMFs are produced by virtually all consumer appliances, computer terminals, wiring in homes, offices and power lines.

Over the past few decades, the issue of possible health effects of EMF has generated a number of studies and reports. However, no conclusive scientific evidence showing health hazard from EMFs has been found. The weight of the evidence from those studies indicates that CLP Power's present power delivery methods are safe and no changes are warranted.

Notwithstanding this, the proposed project involving erection of overhead transmission lines and underground cables still has the possibility to arouse health concern of the surrounding residents or workers. This section is to address whether there is any potential adverse impacts arising from the operation of the overhead pole lines and underground cables and to recommend mitigation measures to reduce the impacts, if any, to acceptable standards.

4.2 Environmental Legislation and Guidelines

Guidelines on limits of exposure to power frequency EMF were issued by the International Commission on Non-ionizing Radiation Protection (ICNIRP) in 1998. The guidelines were recognised by both the World Health Organisation and the Hong Kong SAR Government. CLP Power has adopted the guidelines in total. EMF generated from the proposed overhead line and underground cables shall comply with the guidelines (see Table 4.1).

Table 4.1 Guidelines on Limits of Exposure to 50 Hz Power Frequency Electric and Magnetic Fields Issued by ICNIRP

Exposure Characteristics	Electric Field Strength kV/m (rms)	Magnetic Flux Density Millitesla (rms)
Occupational Continuous	10	0.5
General Public Continuous	5	0.1

Note: The standards stipulated in Chapter 7 of the Hong Kong Planning Standards and Guidelines follow the ICNIRP limits for 50 Hz electric and magnetic fields.

4.3 Assessment Methodology

In order to investigate the potential health hazard to humans due to exposure to EMF generated by overhead lines and underground cables, EMF assessment will be carried out in compliance with the EMF standards stipulated in Chapter 7 of the Hong Kong Planning Standards and Guidelines and the guidelines issued by the International Commission on Non-ionizing Radiation Protection in 1998, as well as the requirements of the Study Brief issued by Environmental Protection Department.

The strength of electric and magnetic field which will be generated by the proposed overhead lines was calculated and evaluated with reference to the stipulated standards. EMFs arising from overhead lines and underground cables of comparable voltage were also referenced to estimate the magnitude of EMFs which are likely to result from the proposed project.

4.4 Baseline Conditions

Parts of the existing Po Lam – Tui Min Hoi No.1 132 kV Overhead Pole Line runs across the Ho Chung area. People living in this area and nearby workers are already exposed to EMFs, which are actually very weak indeed, associated with the overhead lines. Other areas of the project site are free from transmission lines. Thus the residents or workers in these areas are not exposed to any EMFs emanating from the existing transmission line.

4.5 Prediction and Evaluation of Impacts

Studies of CLP Power's overhead lines in relation to EMF revealed that both the calculated and measured values are well within the guideline limits. The calculated values on maximum loading basis are presented in Table 4.2. The calculated EMF profiles for both H-pole and single pole are presented in Annex C which indicates that the maximum electric field (1.96 kV/m) generated from the proposed overhead line is underneath the conductors while maximum magnetic field (0.0162 Millitesla) is at the centre of the circuit. EMF are strongest close to the overhead line and diminish with distance and no effect is envisaged outside the working corridor.

Table 4.2 Electric and Magnetic Field Calculated for the Circuit, Po Lam – Tui Min Hoi No. 2

Circuit Name	System Voltage	Current	Height of Bottom Conductor from Ground Level	Electric Field Strength kV/m (rms)	Magnetic Flux Density millitesla (rms)
Po Lam – Tui Min Hoi No. 2	132kV	525A	6.7m	1.96	0.0162

Note: The calculation is based on the assumptions of maximum loading conditions and that the typical pole configuration with the bottom conductor is at the minimum safety clearance from ground level (i.e. 6.7m).

The electric and magnetic field measurements for existing overhead lines and underground cables of comparable voltage are indicated in Table 4.3.

Table 4.3 Electric and Magnetic Field Measurements for Existing Overhead Lines and Underground Cables of 132kV

Circuit Name	System Voltage	Current	Height of Bottom Conductor / Cable Depth Below Ground	Electric Field Strength kV/m (rms)	Magnetic Flux Density Millitesla (rms)
Fanling – Luohu overhead lines	132kV	402A	9.7m	0.65	0.004
Fanling – Chunfeng underground cables	132kV	380A	1m	< 0.01	0.0003

Measurements carried out on CLP Power's transmission system indicated that the associated electromagnetic fields arising from the proposed project will be only a fraction of the guideline limits. As long as an adequate electrical clearance will be maintained between power lines and areas accessible to the public and nearby residents or workers, the power lines are not anticipated to pose a hazard to human health. However, field measurements will be carried out to verify compliance with the ICNIRP guideline levels upon commissioning of the circuit.

4.6 Mitigation of Adverse Impacts

The assessment results demonstrate that the exposure of the public to the EMFs generated from the proposed overhead pole lines and underground cables will not exceed the guideline values laid down by the Government. Moreover, independent and authoritative review panels and government inquiries have found no concrete scientific evidence to demonstrate that there is a health hazard from power lines. Notwithstanding this, in recognition of the concern expressed by members of the public, the issue will continue to be monitored and any necessary measures will be implemented to ensure provision of electricity in a way that protects the health and safety of both the public and employees.

At present, there are over 150 studies underway world-wide covering the effects of electric and magnetic fields. The situation will be closely reviewed by CLP Power to ensure that any concerns raised on the operation of the Project will be fully considered in the light of the data available from scientific research studies and assessments compiled by recognised research bodies, government and state authorities.