



## Federal-Provincial-Territorial Radiation Protection Committee – Canada

### **Position Statement for the General Public on the Health Effects of Power-Frequency (60 Hz) Electric and Magnetic Fields – Issued on January 20, 2005**

1. Electric and magnetic fields (EMFs) are produced by the generation, transmission, distribution and use of electrical energy at power frequencies (60 Hz in Canada). People are exposed to these fields while in close proximity to power lines and other electrical facilities, as well as electrical wiring, equipment and appliances in homes, schools and workplaces.
2. Studies to investigate the health effects of these fields have taken place around the world for more than thirty years. These studies include laboratory research into effects on cells and animals, as well as epidemiological (human health) studies looking at possible associations between exposures and diseases in the population. Short- and long-term scientific investigations have been conducted and are continuing.
3. Laboratory research has shown that power-frequency EMFs can interact with biological systems; however, results to date have not provided conclusive evidence that these fields cause adverse health effects, such as cancer. Epidemiological studies have not established an association between exposure to power-frequency EMFs and the development of cancer in adults. The evidence associating cancer in children with exposure to power-frequency EMFs remains inconclusive.
4. After a recent evaluation of the scientific data, the International Agency for Research on Cancer classified extremely-low-frequency (ELF) magnetic fields as "possibly carcinogenic to humans" based on studies of childhood cancer (<http://monographs.iarc.fr>). "Possibly carcinogenic to humans" is a classification used to denote an agent for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence for carcinogenicity in experimental animals. In the case of ELF fields, the evidence is not strong enough to conclude that they cause cancer in children. More studies are needed to draw firm conclusions.
5. Immediate biological effects can result from direct exposure but only at field strength levels well above those typically found in living environments. Peripheral nerve and muscle stimulation can be caused by intense magnetic fields and hair stimulation by intense electric fields. Minor shocks may be caused by touching poorly-grounded, conducting (metallic) objects located under some high voltage lines, as a result of electrical charge induced by high intensity electric or magnetic fields.

6. Based on the available scientific evidence to date, the Federal Provincial Territorial Radiation Protection Committee (FPTRPC) concludes that adverse health effects from exposure to power-frequency EMFs, at levels normally encountered in homes, schools and offices, have not been established. Protection of the public against acute effects, such as minor shocks that may occur from contact with conducting objects under high voltage power lines, can be achieved through awareness initiatives undertaken by the electrical power industry.
  7. There have been increasing requests from concerned citizens that the precautionary principle (PP) be used in a number of areas, including exposure to EMFs. It should be noted that the extent of PP covers a variety of measures ranging from moderate methods such as monitoring scientific developments and providing information, through participation in the process of acquiring new knowledge by carrying out research, to stronger measures such as lowering exposure limits. Since there is no conclusive evidence that exposure to EMFs at levels normally found in Canadian living and working environments is harmful, FPTRPC is of the opinion that moderate measures and participation in the process of acquiring new knowledge are sufficient. These types of activity are consistent with the Canadian government framework on precaution.
  8. The FPTRPC will continue to monitor scientific research relating to the health effects of power-frequency EMFs and will reassess its position periodically as new information becomes available.
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Notes:

- (a) This Position Statement replaces the previous Position Statement (first released by the FPTRPC in November 1998 and updated in October 2002).
- (b) This Position Statement is not intended to provide direction on health and safety aspects of electromagnetic interference by EMFs with medical electronic devices, including cardiac pacemakers. Electromagnetic interference with such devices requires different considerations from those used in the evaluation of human health effects.