



Electric and Magnetic Fields (EMF)

Research conducted since the 1980s has, taken as a whole, shown no consistent association between electric or magnetic field exposure and increased risk of cancer or other disease.

Key Points

- Electric and magnetic fields are present wherever we use electricity.
- Electric fields exist wherever there is electricity present in a wire or appliance, even if it is not turned on for use.
- Magnetic fields occur when we have actual current flow, or when we are actively using or moving electricity.
- The strength of both fields quickly decreases as you move away from the source.
- Numerous epidemiological studies have been conducted since the 1980s to determine if there is any relationship between exposure to EMF and cancer or other diseases.
- These studies have not identified a cause and effect relationship between EMF and any disease.
- MREC member utilities provide on-site consultation and measurement for customers who have questions or site specific concerns about EMF in their homes and businesses.

Questions and Answers

What is EMF?

EMF is invisible fields of energy that exist around anything that carries or uses electricity. Power lines, electrical wiring and electrical equipment in our homes, businesses and farms all produce EMF. Common household appliances such as toasters and lamps produce EMF. So does office equipment such as computers, copiers and fax machines.

What is the difference between electric and magnetic fields?

Electric fields are related to the presence of voltage (the strength of an electrical charge on a wire) and will be present even when current is not flowing. Electric fields are measured

in volts per meter (V/m) and increase in strength as voltage increases or as you get closer to the energized wires. Even when an appliance or other electrical equipment is turned off, electric fields are present as long as the item is connected to a power source. Electric fields are easily shielded or weakened by materials that conduct electricity, even materials that conduct poorly such as trees and buildings.

Magnetic fields are only present when electrical current is flowing in a wire or conductor (when an appliance is turned on). These magnetic fields are measured in milliGauss (mG) and increase in strength as the current (or amperage) increases or as you get closer to the wires carrying current. Unlike electric fields, magnetic fields pass through most materials and are difficult to shield. Electrical equipment must be turned on (current must be flowing) for magnetic fields to be present.

What are the sources of EMF?

EMF is present in sources ranging from high voltage transmission lines to a single light bulb. The strength of these fields varies with the amount of voltage and current, and the distance from the source of the EMF, and quickly decreases as you move away from the source.

Is EMF harmful to humans?

In the early 1970s, electric fields attracted attention because of the tingling that can sometimes be felt near high voltage transmission lines. Studies conducted by the government and utility industry showed that strong electric field exposure produces some recognizable effects (such as tingling), but no studies have proven electric fields are harmful to human health at the levels we are exposed to during our normal daily routines.

We cannot feel magnetic fields and they pass directly through the body. Since the early 1980s, scientists have conducted several significant epidemiological studies (research that relies on statistics to show associations between the occurrence of disease and potential causes.)



These initial studies suggested some association between magnetic field exposure and certain types of cancer, primarily leukemia and brain cancer. Scientists generally agree that epidemiological studies, taken as a whole, show no consistent association between magnetic field exposure and an increased risk of cancer. In October 1996, a National Research Council report concluded that existing evidence did not link exposures to residential EMF with cancer, adverse neurobehavioral effects, or reproductive and developmental impacts. In 1999, a National Institute of Environmental Health Sciences report also concluded that evidence is “weak” that exposure to magnetic fields raises the risk of cancer and other human disease.

What is the electric utility industry doing?

The electric industry continues to support research on EMF. The Electric Power Research Institute (EPRI), which is supported by several of the MREC member utilities, funds human health related studies and improved transmission and distribution designs. Working in conjunction with state Public Services/Utilities Commissions and transmission companies, utilities have applied EPRI’s research to establish responsible siting policies for new electrical facilities that minimize human exposure to EMF.

What are MREC member utilities doing?

Many states do not have specific EMF regulations or standards in place. Recognizing that our customers may be concerned about EMF, we are prepared to take measurements and advise concerned customers on how they may reduce their EMF exposure, or to place EMF into perspective with other everyday risks. We continue to maintain and monitor our electrical generation and distribution systems, and are prepared to modify our existing EMF policies and safety standards based on the state of the science. Finally, we provide free, on-site EMF measurements upon request.

How can I obtain more information?

If you have specific questions about electric or magnetic fields, contact your electric utilities directly or visit our website at www.mrec.org.

What is the MREC?

The MREC is a membership organization of energy suppliers, energy service professionals and Land Grant Universities whose mission is to support outreach, education and research on rural energy issues for the benefit of:

- Farms and other rural energy consumers
- Rural energy suppliers
- Farm organizations and agricultural trade associations
- Electrical equipment and allied industries
- Government and regulatory agencies

