

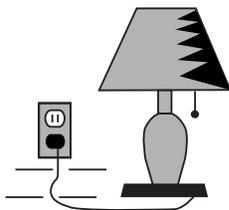
Understanding electric and magnetic fields

Everyday appliances, power lines all produce electric and magnetic fields

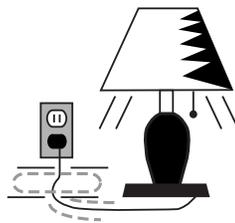
EMF and you

It is a fact of life that we all are exposed to electric and magnetic fields, or EMF. Any device that uses or carries alternating current, or AC, including everyday appliances, lighting and wiring, as well as power lines that serve your home creates electric and magnetic fields.

Electric fields are created by voltage (the flow of power). Magnetic fields (the force of power being discharged while electricity is moved) are created by alternating current. To illustrate, an electric field will be present around a lamp that is plugged in but not turned on. A magnetic field will be created when the switch is flipped and current flows to the lamp. When the lamp is on, EMF exists.



OFF: Electric field only.



ON: Electric and magnetic fields.



HVDC power lines produce static magnetic fields

High-voltage direct current transmission lines carry a steady flow of electricity. Because direct current, or DC, doesn't alternate as it does for an AC line, the fields produced by a DC line are referred to as static. Static magnetic fields from a DC line have the same characteristics as static fields that occur in the natural environment.

Currents running deep within the Earth's core produce natural static magnetic fields on the Earth's surface. The strength of this field ranges from 250 to 650 milligauss (mG), with the field strengths lowest at the equator and highest at the magnetic poles.

While the design and operating characteristics of the proposed Zephyr Project still are being developed, the range of levels that it will produce are similar to the Earth's natural magnetic field.

The strength of the magnetic fields produced diminishes quickly with distance. At the edge of the right-of-way, magnetic field levels will be less than 300 mG, and will decrease further to less than 130 mG at 300 feet from the line. Both of these levels are at or below the Earth's normal magnetic field.

By comparison, the levels of static magnetic fields produced by many battery operated appliances (3,000 to 10,000 mG) and medical devices (15,000,000 to 40,000,000 mG) are much higher.



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Can static magnetic fields affect my health?

National and international scientific agencies responsible for public health have convened multidisciplinary groups of scientists to evaluate the research and to determine if health effects are associated with exposure to DC electric and magnetic fields. These groups include the World Health Organization, the National Radiological Protection Board of Great Britain, and the International Agency for Research on Cancer. These organizations came to the following conclusion:

There are no known adverse health effects associated with low levels of static electric or magnetic fields such as those associated with DC transmission lines.

EMF and voltage conversion substations

The Zephyr project will include an AC/DC conversion substation at each end of the line. These stations will be a source of alternating electric and magnetic fields.

Many variables affect the strength of a magnetic field around an electric substation: the amount of electric current flowing and the configuration or arrangement of the substation. When it comes to EMF, the strength and intensity of electric and magnetic fields quickly decrease as you move away from their source. The converter stations will be located far away from residential or other areas used by the public, so the impact of EMF from each of the station will be negligible.

Additional resources

World Health Organization

www.who.int/peh-emf/en

Oak Ridge National Laboratory

www.ornl.gov/~webworks/cppr/y2001/rpt/92023.pdf

International Agency for Research on Cancer

<http://www.iarc.fr/> and type "static fields" in the search tool.

The National Institute of Environmental Health Sciences – National Institutes of Health

www.niehs.nih.gov and type "static fields" in the search tool.

National Research Council "Possible Health Effects of Exposure to Residential Electric and Magnetic Fields"

www.nap.edu and type "electric and magnetic fields" in the search tool to download a free PDF of this book.

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