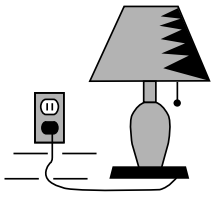
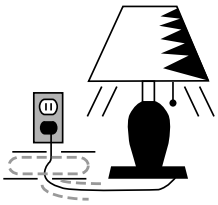
ELECTRIC AND MAGNETIC FIELDS

It is a fact of life that we all are exposed to electric and magnetic fields. Any device that uses or carries electricity creates electric and magnetic fields, including everyday appliances, lighting and wiring, as well as electric power lines and equipment. Electric fields are created by voltage, and magnetic fields are created by 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.



OFF: Electric field only.



ON: Electric and magnetic fields.

A considerable amount of research has focused on whether magnetic fields from power lines adversely affect the health of those living near the lines. The research findings have been inconclusive. The associations between exposure and increased risk are weak, and it is not clear whether this represents a cause-and-effect relationship.

STRENGTH OF EMF

Electric and magnetic fields can be measured. EMF emitted from transmission lines falls in the extremely low frequency range of the electromagnetic spectrum. The most powerful fields are produced by gamma rays and X-rays, such as those emitted by a medical X-ray machine. Many variables affect field strength: the amount of current flowing, distance from the wires, and how the wires are placed in relation to one another. Magnetic field levels are measured in milligauss and become weaker with distance, whether from appliances or power lines.

Typical Magnetic Field Strength of Transmission Lines

Measured in milligauss (mG)

Voltage*	Under wires	Edge of right-of-way	At 100 feet
69 kilovolts	20-25	5-10	.5-12
138 kilovolts	35-40	15-20	.5-12
345 kilovolts	85-100	50-60	.5-12

** Assumes normal current flow*

At a distance of 300 feet, magnetic fields are similar to typical background levels found in most homes.

Typical Magnetic Field Strength of Common Appliances

Measured in milligauss (mG)

Appliance	At one foot	Working distance
Microwave	17-236	5-28
Electric Range	1.8-3.0	.4-10
Television	3.5-19	.9-10
Hair Dryer	1-700	1-700
Computer Terminal	7-20	7-20
Ceiling Fan	.3-49.5	.0-6

ELECTRIC SUBSTATIONS

In general, the EMF levels found around the outside of a substation are dominated by EMF levels produced by the power lines entering and leaving the station. The equipment within the station produces EMF levels that generally drop off to background levels beyond the fence or wall.

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REGULATORY OVERSIGHT

The Public Service Commission of Wisconsin has monitored the EMF issue since 1989 and has established requirements for utilities that propose new electric facilities. Among other things, ATC is required to consider the number of persons and homes along proposed transmission line routes, calculate the field strengths associated with the new line, and look at EMF levels under various line configurations. There are no federal regulations related to EMF levels.

RESEARCH IS INCONCLUSIVE

The energy industry also has been monitoring developments on this issue for more than 20 years. While studies of magnetic fields have produced little conclusive data regarding health effects, scientists generally agree that the studies taken as a whole show no consistent association between exposure and health risks.

A six-year federally mandated study that concluded in 1999 reported the following findings:

"The scientific evidence suggesting that [EMF] exposure poses any health risk is weak … the probability that EMF exposure is truly a health hazard is currently small. The weak epidemiological association and lack of any laboratory support for these associations provide only marginal scientific support that exposure to this agent is causing any degree of harm." (National Institute of Environmental Health Sciences, June 15, 1999)

From a report from the International Agency for Research on Cancer (IARC):

"The association between childhood leukemia and high levels of magnetic fields is unlikely to be due to chance, but it may be affected by bias. In particular, selection bias may account for part of the association…. It cannot be excluded that a combination of selection bias, some degree of confounding and chance could explain the results. If the observed relationship were causal, the exposure-associated risk could also be greater than what is reported." (IARC, 2002)

At ATC, we are committed to protecting the health and safety of the public, and to providing safe, reliable electric service. We will continue to monitor the EMF science and will answer questions you may have about this issue.

RESOURCES FOR MORE INFORMATION

There is a considerable amount of misinformation about EMF on the Internet. The following list includes credible, third-party sources that provide balanced information.

National Cancer Institute

www.cancer.gov/cancertopics/factsheet/risk/magnetic-fields

National Institute of Environmental Sciences, National Institute of Health

www.niehs.nih.gov/health/topics/agents/emf/

Public Service Commission of Wisconsin

http://psc.wi.gov/utilityinfo/electric/construction/emf.htm

World Health Organization's International EMF Project

www.who.int/peh-emf/en/

Green Masters Program

ATC is a member of the Green Masters Program, a recognition and assessment program for Wisconsin businesses interested in improving and being recognized for their sustainability initiatives

Information current as of June 2017

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