UNDERSTANDING ELECTRIC AND MAGNETIC FIELDS (EMF)

Questions have been raised about the possible health effects of exposure to 60-hertz (power frequency) electric and magnetic fields (EMF*), which are found wherever you have electric power. This brochure explains the research and provides simple ways to reduce exposure if you choose to do so.

Campos Eléctricos y Magnéticos (EMF): Si desea recibir información en español, comuníquese con Pacific Gas and Electric Company al **1-800-660-6789**.

What does research say about EMF and health?

Electric and magnetic fields (EMF) are present wherever electricity is used, including around household appliances, powerlines, schools, workplaces and homes.

Scientists have studied this topic for decades and have not established that typical residential exposure to EMF causes health effects.

Some studies have reported a possible association between EMF exposure and childhood leukemia, but results have been inconsistent and any relationship appears weak. Laboratory studies, including research designed to better understand how EMF might affect the body, have found little or no evidence to support a cause-and-effect relationship.

Research findings have been reviewed by international, national and California EMF research programs to better understand whether EMF poses a health risk. While some scientific uncertainty remains, medical and scientific experts have not been able to conclude that typical residential exposure to EMF causes health effects or identify a level of residential EMF exposure that is known to be either safe or harmful. Recent studies have not changed these conclusions.

*The term EMF in this publication refers to extremely low frequency (ELF) 60-hertz electric and magnetic fields associated with power delivered by electric utilities. It does not refer to radio frequency (RF) waves associated with wireless communications such as cell phones.

What the World Health Organization says about EMF

The World Health Organization (WHO) has reviewed research on extremely low-frequency EMF, including the types of EMF associated with electric power. In its review, WHO evaluated studies examining possible health effects from EMF exposure.**

Key findings

- Some studies have reported a possible association between EMF exposure and childhood leukemia.
- WHO concluded that the evidence is not strong enough to show that EMF causes childhood leukemia.
- Laboratory studies have found little evidence to support a cause-and-effect relationship between EMF exposure and health effects.
- For other diseases, WHO found little or no evidence of health effects from low-level EMF exposure.

WHO recommendations

To address ongoing scientific uncertainty, WHO recommends:

- Providing clear information so people can make informed decisions about EMF exposure.
- Considering practical, very low-cost ways to reduce EMF exposure when designing new facilities, equipment and appliances.
- Using established international guidelines when developing EMF exposure policies.
- Continuing research to improve scientific understanding of EMF and health effects.

To view the full report, visit **who.int/publications/i/item/9789241572385**.

**June 2007 report known as the *Extremely Low Frequency Fields, Environmental Health Criteria Monograph No. 238*.

Magnetic Fields Outside
(Maximum values may be lower for some California utilities)

Distribution Lines	**1 to 80 milligauss under the line**
Transmission Lines	**1 to 300 milligauss at the edge of the right-of-way**

Magnetic Fields at Home
(Measurements are in milligauss)

	1.2" away	12" away	36" away
Microwave Oven	750 to 2,000	40 to 80	3 to 8
Clothes Washer	8 to 400	2 to 30	0.1 to 2
Electric Range	60 to 2,000	4 to 40	0.1 to 1
Compact Fluorescent Bulb	0 to 32.8	0 to 0.1	0
Hair Dryer	60 to 20,000	1 to 70	0.1 to 3
LCD/Plasma TV	1.1 to 73.6	0 to 2.5	0 to 2.2

Source: Adapted from Gauger 1985 & EPRI Appliance Measurement Study 2010.

What you can do

In a situation of scientific uncertainty and public concern, WHO recommended that utilities explore “very low-cost” ways to reduce EMF exposure from new or upgraded facilities. PG&E and other California public utilities have been pursuing no-cost and low-cost measures to reduce EMF levels from new utility transmission lines and substation projects. You, too, may want to take no-cost and low-cost measures to reduce your EMF exposure at home and at work.

Simple ways to reduce EMF exposure

If you would like to reduce your EMF exposure, one of the easiest steps is to increase your distance from electrical appliances when they are in use.

You may also choose to:

- Place electric clocks and other devices farther away from your bed.
- Increase your distance from appliances such as televisions, computer monitors and microwave ovens.
- Limit the time you spend using personal appliances such as hair dryers, electric razors, heating pads and electric blankets.
- Reduce the amount of time you spend using electric cooking appliances.
- At work, spend break time in areas that are farther away from electrical equipment when practical.

Increasing your distance from an electrical appliance can reduce your EMF exposure. The farther away you are from the source, the lower your exposure level generally becomes.

Scientists have not reached a consensus on whether reducing EMF exposure provides health benefits, and it is not known whether these actions will affect your health. However, some people choose to take these simple steps as a personal preference.

For more information

Call PG&E for a free information package or home or business measurements at **1-800-743-5000**.

Additional information is also available at these links:

World Health Organization International EMF Project:
Visit **who.int/health-topics/electromagnetic-fields** for EMF information, including fact sheets, research and scientific journal articles.

National Institute of Environmental Health Sciences:
Visit **www.niehs.nih.gov/health/topics/agents/emf**

California Public Utilities Commission:
Visit **www.cpuc.ca.gov/industries-and-topics/electrical-energy/infrastructure/permitting-and-environmental-review/electric-magnetic-fields**

EMF information provided as required by the California Public Utilities Commission (CPUC) EMF policy.

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