



## **ELECTRIC AND MAGNETIC FIELDS (EMF) SafetyNet #100**

During recent years, questions have been raised about the possible health effects of 60-hertz (power frequency) electric and magnetic fields (EMF), which are found wherever you have electricity.

**Electric Fields** are produced by the voltage (electrical “pressure”) in a wire, such as when an appliance is plugged in (but not turned on), and can be blocked or partially shielded.

**Magnetic Fields** are created by the current (flow of electricity) through a wire, such as when an appliance is turned on, and can pass through most objects.

Electric and magnetic fields (EMF) are present wherever electricity flows--around appliances and power lines, and in offices, schools, and homes. On October 31, 1996, the National Research Council (NRC) announced that “after examining more than 500 studies spanning 17 years of research, there is no conclusive evidence the electromagnetic fields play a role in the development of cancer, reproductive and developmental abnormalities, or learning and behavioral problems.” In addition, the NRC has stated that “researchers have found no evidence to show that EMFs can alter the functions of cells at levels of exposure common in residential settings. Only at levels between 1,000 and 100,000 times stronger than residential fields have cells shown any reaction at all to EMF exposure, and even these changes -- mainly in the chemical signals that cells send to each other -- are not a clear indication of the potential for adverse health effects. In fact, exposure may actually help the body in some subtle ways, for example, by speeding up the healing process after a bone is broken.

Most important, there has been no case in which even tremendously high exposure to EMFs has been shown to affect the DNA of the cell, damage to which is believed to be essential for the initiation of cancer. Similarly, no animal experiments have shown that EMFs, even at high doses, can act as a direct carcinogen or can affect reproduction, development, or behavior in animals.”

Thus, the studies of EMF have not shown that people need to change the way they use electric appliances or equipment. But, **if you feel reducing your EMF exposure would be beneficial**, you can increase your distance from electric appliances and/or limit the amount of time you use appliances at home or at work. Both electric and magnetic fields get weaker with distance from their source. For instance, you can place telephone answering machines and electric clocks away from the head of your bed. Increasing your distance from these and other appliances such as televisions, computer monitors, and microwave ovens can reduce your EMF exposure. You can also reduce your EMF exposure by limiting the time you spend using personal appliances such as hair dryers, electric razors, heating pads, and electric blankets. You may also want to limit the time you spend using electric cooking appliances. You can locate sources of EMF in your work environment and spend break time in lower-field areas.

For more information or exposure monitoring, contact EH&S at 530-752-1493. Also, additional information is available by contacting the California Department of Health Services at 510-450-3818, the United States Environmental Protection Agency EMF Infoline at 800-363-2383 or the National Research Council, Office of News and Public Information at 202-334-2138.

## Magnetic Field Measurements

<b>Magnetic Fields at Home</b> (Measurements are in milligauss.)			
	<b>1.2" away</b>	<b>12" away</b>	<b>39" away</b>
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
Fluorescent Lamp	400 to 4,000	5 to 20	0.1 to 3
Hair Dryer	60 to 20,000	1 to 70	0.1 to 3
Television	25 to 500	0.4 to 20	0.1 to 2
Source: Adapted from Gauger 1985.			
<b>Magnetic Fields Outside</b> (Maximum range in California utilities will vary.)			
Distribution Lines	1 to 80 milligauss under the line		
Transmission Lines	1 to 300 milligauss edge of right-of-way		

This information was modified from information provided by PG&E and The National Research Council News Release dated October 31, 1996. Call PG&E for a free information package or home/business measurements at 800-743-5000. Pre-publication copies of **Possible Health Effects of Exposure to Residential Electric and Magnetic Fields** are available from the National Academy Press at the mailing address in the letterhead; tel. 202-334-3313 or 800-624-6242. They can also be contacted through their website at <http://www.nap.edu>. The cost of the report is \$39.96 (prepaid) plus shipping charges of \$4.50.