

ELECTROMAGNETIC FIELDS (EMFs)

Electromagnetic Fields, commonly referred to as **EMFs**, are a form of energy made up of both electric fields and magnetic fields. Like other forms of energy, these fields travel in a wave form, and the unit of measurement, Hz, refers to the number of cycles per second the wave travels. EMFs differ from other types of energy such as x-rays, microwaves, and ionizing radiation. For example, x-rays can break up molecules such as the DNA which makes up our genetic material. Microwaves are absorbed by water in body tissue, and heats it up, as a microwave does to food. EMFs do not cause these types of reactions. Furthermore, due to the low energy level associated with EMFs, they do not form ionizing radiation. When studying EMFs associated with electrical currents, we focus on a frequency of 60 Hz (Hertz), since in the U.S., 60 Hz alternating current (AC) passes through our power supplies.

Who Is Exposed To EMFs?

Everyone is exposed to EMFs. Electric and magnetic fields are part of life's natural environment. The Earth itself constantly generates a magnetic field which is substantially more intense than those found in most workplaces or residences. Electrical and magnetic fields are continuously generated by the human body during the transmission of messages through our nervous systems.

Wherever there is electric current, there are also electric and magnetic fields, which are created by the electric charges; therefore, all household appliances, televisions and other home electronics, as well as electrical industrial equipment, generate electric and magnetic fields. Unlike the Earth's and the human body's continuous emission, magnetic fields artificially generated may "switch" (ex. AC current) or "pulse" (ex. computer and video screens).

As one can see, we are constantly surrounded by EMFs, and as we continue to rely more and more upon lives full of electrically powered conveniences, potential EMF exposure will likely increase.

What Is Known And Unknown About Effects Of EMFs?

During recent years the interest in EMFs and their effect upon the human body have been on the rise. Studies have been conducted by scientists around the world, addressing potential relationships between EMF exposure and effects on the human body. As one can expect, major media emphasis has been upon the relationship between EMF exposure and cancer formation (including leukemia).

As of yet, there is no clear consensus among researchers regarding the hazards of EMFs. Over a half dozen studies which evaluated the relationship between living close to high - power lines and development of child hood leukemia have generated somewhat contradictory results. On the other hand, researchers have consistently found no increased risk among adults living close to power lines. Some studies have implied that men working in electrical jobs, such as electricians and telephone linemen, are at higher risk of brain tumors and other cancers. However, since these workers have been exposed to chemical carcinogens, such as benzene, it is difficult to determine the root cause. Studies conducted thus far have not indicated that EMFs

have measurable effects upon the nervous system (including psychological changes). Additional studies continue to be underway.

Laboratory experiments have shown that magnetic fields can cause biologic changes in living cells, such as oscillation (a back and forth motion), but we are not sure whether there is any risk to human health associated with such activity. That is, because EMFs can produce such cell activity, does not necessarily mean that (1) damage to the human body will occur, (2) that damage will be noticeable (cause disease or disability), or (3) that damage will be permanent.

Studies to date have failed to demonstrate any type of dose-response relationship. That is, as the dose increases, more cases result. Such relationship is what we typically see with chemicals. If there is a relationship between EMFs and damage to the human body, it is likely to be minimal considering the fact that electricity is such a significant part of everybody's lives, and our exposure to EMFs via electrical appliances, tools, hair dryers, etc. is ongoing, and no epidemic of effects are being noted.

How Are EMF Exposures Controlled/ Minimized?

To date, the U.S. has no regulatory standard (i.e., exposure limit) for EMFs. There is still much research to be completed before standard setting can be addressed.

Electric fields may be blocked by objects such as earth, trees or buildings, whereas magnetic fields are generally not blocked by such objects, and overall, are extremely difficult to block. Increasing the distance between the source and receiver results in a significant reduction in magnetic field strength. In fact, most electric and magnetic fields generated by appliances are virtually nil at distances of 3 to 5 feet. This same principle also applies to more powerful sources such as high voltage lines. Therefore, the best way to minimize EMF exposure is through increasing the distance between the source and the receiver (you and me).