



## EMF

We all depend on electricity daily to meet basic needs such as heating, cooling and lighting our homes and businesses. Wherever we make use of electricity, EMF is present. EMF refers to two types of fields associated with electricity – electric and magnetic fields. EMF from electrical appliances and power lines are known as power frequency fields, which are categorized as extremely low frequency (ELF) EMF.

### At PSE, safety is our top priority

We rely on the findings of reputable, international and national scientific and public health organizations and agencies that have reviewed the research on EMF.

For more information and links to other sources, see the National Institute of Environmental Health Sciences page on electric and magnetic fields here:  
[niehs.nih.gov/health/topics/agents/emf/](http://niehs.nih.gov/health/topics/agents/emf/)

### Puget Sound Energy

Environmental Services: 425-456-2285  
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# Electric and magnetic fields



For your information



## Magnetic fields

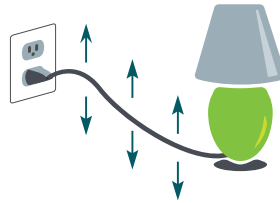
Magnetic fields are created whenever there is a flow of electric current. This can be thought of as the flow of water in a garden hose – the more current flowing through the wire, the stronger the magnetic field strength.

There are many different types of magnetic fields. For example, the earth has a natural magnetic field, which is a static or non-alternating field. Magnetic fields from electrical appliances in homes can be as high as or higher than magnetic fields people may experience under power lines, although the fields from most household appliances diminish rapidly with distance from the appliance. Magnetic field strength from power lines depends on many factors including the design of the line, the amount of current the line carries, and the distance away from the line. Magnetic fields are difficult to shield, which is why magnetic fields are found above most buried power lines.

## Electric fields

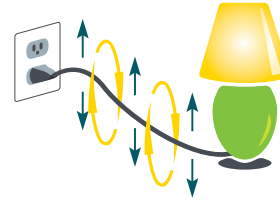
An electric field occurs wherever voltage is present. Electric voltage can be thought of as the pressure of water in a garden hose – the higher the voltage, the stronger the electric field strength. The strength of an electric field decreases rapidly as you move away from the source. Electric fields can also be shielded by many objects, such as trees or the walls of a building.

### Electric Fields



Lamp plugged in but turned off. Voltage produces an electric field.

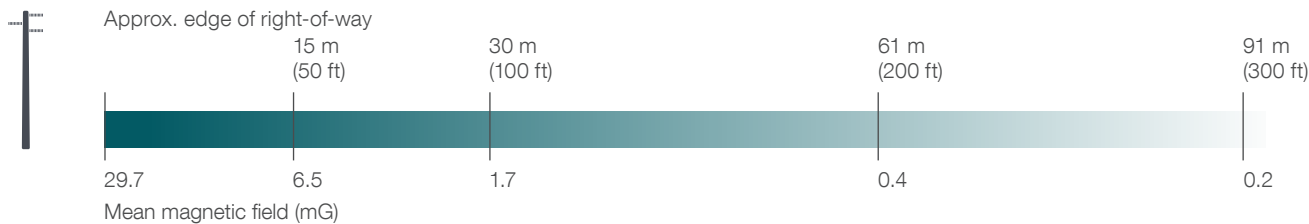
### Magnetic Fields



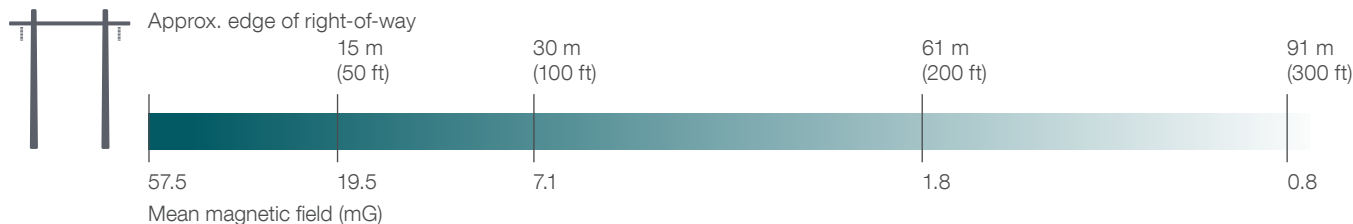
Lamp plugged in and turned on. Current now also produces a magnetic field.

## Magnetic fields decrease as distance from electricity sources increases

### 115 kV power line



### 230 kV power line



Source: National Institute of Environmental Health Sciences (NIEHS), EMF Questions and Answers. June 2002.

Source <sup>1</sup>	Median EMF reading in milligauss (mG)
Earth's magnetic field	250 - 650 mG
Video display terminals (VSTs) (distance 1')	5 mG
Electric range (distance 1')	8 mG
Dishwasher (distance 1')	10 mG
Copy machine (distance 1')	20 mG
Vacuum cleaner (distance 1')	60 mG
Electric shaver (distance 6")	100 mG
Hair dryer (distance 6")	300 mG

## Research on EMF

Over the past 30 years, there have been many scientific studies conducted on power frequency EMF. According to extensive reviews conducted by leading public health agencies such as the World Health Organization (WHO) and the U.S. National Institute of Environmental Health Sciences (one of the U.S. National Institutes of Health), this large body of research has not established that exposure to power frequency EMF causes adverse health effects in humans or animals. Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields.<sup>2</sup>

## Exposure limits

Neither the U.S. government nor the State of Washington have established limits on public exposure to power frequency EMF. Two international organizations have recommended limits on public exposure:

Established EMF exposure limits	
International Commission on Non-Ionizing Radiation Protection	2,000 mG
Institute of Electrical and Electronic Engineers	9,040 mG

<sup>1</sup> NIEHS, EMF Questions and Answers, June 2002.

<sup>2</sup> [who.int/peh-emf/publications/facts/fs322/](http://who.int/peh-emf/publications/facts/fs322/)