

Extremely low frequency/ electromagnetic fields

Human Health Risk	L
Ecological Risk	L
Socioeconomic Risk	M - L

Electromagnetic fields (EMF) are produced by the generation, transmission, and use of electrical energy. United States' standards for delivering electrical current place these fields in the extremely low frequency (ELF) range of 3 hertz (Hz) to 3,000 Hz. Magnetic fields exist in conjunction with electric charges. Major sources of ELF magnetic fields are transmission and distribution lines, transformers, house wiring, appliances, train lines, and facilities that do electrogalvanizing, metal refining, induction heating, foundry work, and degaussing (demagnetizing recorded information). Magnetic fields have been hypothesized to be involved in promotion of cancer, specifically childhood leukemia and chronic lymphocyte leukemia in adults. This, however, remains highly uncertain.

Who's at risk?

Statewide, nearly all of the population is exposed to ELF/EMF via overhead power lines and household wiring. Electrical utility workers receiving greater exposure may be at increased risk for certain types of cancer. It is possible that children may be at a small, increased risk for certain types of cancers if their homes are near high voltage transmission lines or heavily-loaded distribution lines.

What are the human health impacts in New Jersey?

Studies to date have provided weak evidence connecting occupational exposure to magnetic fields (EMF) with adult chronic lymphocytic leukemia. Childhood exposures to magnetic fields might result in an additional 4-13 cases of leukemia statewide per year. However, the potential for any cancer from EMF is unclear and the number of attributable cancers may be zero.

What are the ecological impacts in New Jersey?

Studies involving birds, honeybees, wild animals, livestock, and fish have returned varying results. Most animals have not shown negative effects after exposure to high voltage power lines. Birds appear to be in greater danger of being electrocuted than of suffering from electromagnetic field exposure. The conflicting results shown from livestock studies may have been a result of stray ground voltage, rather than EMF. Honeybees have shown some

decreased honey production and ability to survive in cold temperatures, however, researchers were unable to determine whether the results were due to EM fields or stray voltage. When the EM fields were shielded from the bees, their behavior returned to normal.

What are the socioeconomic impacts in New Jersey?

The socioeconomic impacts of EMF include the displeasure associated with viewing large metal structures along roadways and neighborhoods, concerns people have about unknown risk associated with EMF exposure, and concerns about reductions in property values. All New Jersey municipalities are affected by property value, worry, and aesthetic concerns. Approximately 240,000 acres of land are within 165 feet of overhead transmission wires. There is no quantifiable way to measure worry or aesthetic concerns. A general estimation of the reduction in property values due to close proximity of power lines is \$1 to \$2 billion. Costs of health care due to childhood leukemia may be several hundred thousand dollars.

What's being done?

Guidelines exist to restrict ELF electric fields at the edge of transmission line rights-of-way to 3 kilovolts per meter (kV/m).