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**From:** Energy Industry Issues Newsletter [ISSUEALERTHTML@HAWK.ATWK.COM] on behalf of IssueAlert@UTILIPOINT.COM

**Sent:** Wednesday, July 21, 2004 10:06 AM

**To:** ISSUEALERTHTML@HAWK.ATWK.COM

**Subject:** Transmission Debate Generates Concerns Over Illnesses

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## Transmission Debate Generates Concerns Over Illnesses

*By Ken Silverstein  
Director, Energy Industry Analysis*

If the debate now taking place in San Francisco between utilities and neighborhood groups is a precursor of things to come, new transmission lines may remain elusive despite increasing congestion along the nation's grid. Activists there and throughout the United States are concerned about electromagnetic fields that some studies say enhance the threat of childhood leukemia and adult brain cancer, as well as cause degeneration in nerve cells connected to the brain and spinal chord.

The evidence is inconclusive but researchers have left open the possibility that a connection does exist between electromagnetic fields (EMFs) that are produced by power lines and some illnesses. The apparent solution is to run lines far away from schools and hospitals as well as to consider deeper undergrounding and taller poles. Nevertheless, the concerns raised could not have come at a more precarious time, when the nation has placed an emphasis on electric reliability.

EMFs are invisible lines of force that surround any wire or conductor that carries electricity. That includes overhead and underground power distribution lines, interior structural wiring as well as many common electrical devices. EMFs related to transmission lines have grabbed the public's attention, although the EMFs generated from wiring and appliances within the home can exceed those generated from transmission lines. EMFs get weaker as the distance increases from their source, which has been used to support the argument that such lines must be re-routed away from sensitive locations.

Fear of EMFs was at a peak in the early 1990s. That was when lawyers



started filing lawsuits on the matter and when a well-publicized case in Italy broke, in which three top executives at utility ENEL were charged with manslaughter for managing power lines that allegedly caused threatening diseases. That heightened concern in this country over EMFs, although since the mid-1990s federal funding for research into EMFs has decreased. In fact, the DOE's \$10-million annual budget to research effects of EMFs was recently eliminated.

EMFs are found in all households that use electricity, either as result of electrical appliances or electrical circuits. EMFs are calculated in *teslas* and can be measured by a hand-held device. Homes with an average of 0.4 microteslas are thought by some experts to pose a risk, although most appliances in most homes add up to much less. North American households average 0.09 microteslas while those on continental Europe average less, mainly because electricity is supplied in North America at 110 volts—a bigger producer of EMFs than Europe's 220-volt system.

So, the danger comes—if at all—by having children and some adults exposed to more than 0.4 microteslas. About 5 percent of all homes in the United States are estimated to carry EMF levels above that amount.

### Real Conflicts

The conflicts are real: Much of the 157,810 miles of high-voltage wires, towers, transformers and substations that form North America's power grid comprises what is now considered to be an aging system. Meanwhile, new power plants have been added to the transmission system over the last three decades but upgrades in transmission infrastructure have not kept pace. The capacity of the transmission system of the United States as measured by MW-miles per MW peak demand has decreased by 16.2 percent from 1989 to 1998, says the Edison Electric Institute. Over the course of the next decade, however, demand is projected to increase by more than 20 percent while power line mileage is expected to grow by only 4.2 percent, it adds.

Southern California Edison's customers in Mission Viejo are discussing EMFs with regard to a proposed power line to be built there. And, so are customers of NStar Electric & Gas Corp. in Boston, who now demand that a 345,000-volt underground line be diverted.



"Our first concern is for the safety of our patients, our staff, and our neighbors living in this area," says a written statement by New England Sinai Hospital.

In the case of San Francisco, angry citizens want a 230,000 volt power line to be re-routed away from homes, schools and commercial enterprises. The California Public Utility Commission is sympathetic but it has still recently approved two transmission projects near Orange County and San Diego, although the 27-mile project near San Francisco remains in limbo. The utility board commissioned a study in December 2002 that suggested a link between EMFs and childhood leukemia, adult brain cancer and Lou Gehrig's disease.

But that conclusion is at odds with comprehensive research completed in 2001 by the National Radiological Protection Board. That's Great Britain's government watchdog on radiation, which said that the evidence is "inconclusive" as to whether power lines are tied to life-threatening illnesses, particularly leukemia with which EMFs are most often associated. It noted that the general risk of a child suffering from leukemia before the age of 15 is one in every 1,400 but that the hazard grew to two in every 1,400 if the home was close to a power line—too small of a jump to make any definitive statement.

### More Research

Still, that Great Britain study said that a link between terminal illnesses and EMFs could not be ruled out. If it did exist, however, it said that it could only happen after intense and prolonged exposure. It furthermore said that there was just as much "risk" associated with domestic appliances as there was from power lines. It reiterated that most homes had far less exposure than 0.4 microteslas—the threshold considered to be "hazardous" if there is any impact from EMFs on human health. More research is necessary, the board said, before any conclusions could be reached.

"EMFs are used in efforts to stop or realign transmission projects," says Paul Moreno, a Pacific Gas & Electric spokesman, in an interview with *Reuters*.

Furthermore, society must consider the alternatives. That is, are there



mortality risks associated with large-scale blackouts and is there a more effective way to spend finite resources to fight known carcinogens other than re-directing transmission lines? Meanwhile, citizens voluntarily expose themselves to health risks daily, such as smoking or eating highly processed foods—things that are not vital to their existence. None of the considerations obviate the need for more research but do point out that the decisions must be viewed in a greater context.

Community concerns along with regulatory rules and financing pressures have always provided obstacles to adding or enhancing the nation's infrastructure. Worries over EMFs certainly won't do anything to diminish the difficulty of the process—fears that have accelerated despite an equal and opposite determination to build more transmission lines to maintain reliability. Clearly, regulators must respect the concerns while comparing them with what expected future demand might be. Assuming that neither the fears nor the demand subsides, it then seems prudent to divert proposed lines away from homes, schools and hospitals or go deeper underground or use taller poles.



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