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About Electric and Magnetic Fields (EMF)

What is EMF?

Electric and magnetic fields (EMF) are invisible lines of force that are present wherever electricity flows — around appliances and power lines, and in offices, schools and homes. **Electric fields** are created by voltage and shielded by most materials, such as lead, soil and concrete. **Magnetic fields** are created by current and are not shielded by most materials. Both electric and magnetic field strengths diminish with distance.

These fields are low energy, extremely low frequency fields. They are not to be confused with high energy or ionizing radiation such as x-rays and gamma rays.

Why is EMF a Concern?

In recent years, concerns have been raised about the possible link of exposure to EMF and adverse health conditions. Some EMF studies have reported a weak association between estimates of exposure to magnetic fields and certain types of cancer. However, other studies have reported no effects. Laboratory experiments have shown that exposure levels typically well above those normally found in residences can produce changes in cells, but there is little or no evidence that these changes constitute a health risk.

What Conclusions Have the Experts Drawn?

Thousands of studies on this subject have been conducted throughout the world, with results that are often hard to interpret and sometimes conflicting. A number of internationally recognized scientific organizations and independent regulatory advisory groups have conducted scientific reviews of the EMF research literature.¹ Without exception, these major reviews have reported that the body of data, as large as it is, does not demonstrate that exposure to power-frequency magnetic fields causes cancer or other health risks, although the possibility cannot be dismissed. Most reviews recommend further research, and, appropriately, research is ongoing worldwide.

¹ Recent reviews: World Health Organization (2007), National Radiological Protection Board (NRPB), United Kingdom (January 2004); California Department of Health Services (June 2002); Health Council of the Netherlands (HCN) (January 2004); International Agency for Research on Cancer, France (June 2001); HCN (May 2001); NRPB (March 2001); National Research Council, National Academy of Sciences (October 1996); Virginia Department of Health (February 1996); American Cancer Society (January/February 1996).

Have State or Federal Exposure Standards Been Established?

There are no California or Federal standards regulating environmental levels of magnetic field exposure. The panels of experts charged with recommending exposure limits for electric and/or magnetic fields have concluded that no meaningful experimental data exists on which to base standards or limits to which the public is exposed.

What is SDG&E Doing?

SDG&E is committed to providing safe, reliable and environmentally sound gas and electric service for its customers, as well as a safe work place for its employees. We share the concerns of our customers and employees over the possibility that electric and/or magnetic fields (EMF) might adversely affect health. Until research and the scientific community can provide greater direction, SDG&E will continue its efforts to inform the public and support on-going research through the following measures:

- Maintaining an EMF Center staffed with informed representatives available to talk with customers and employees about EMF issues.
- Conducting free home and office magnetic field measurements for customers requesting this service.
- Providing objective EMF health literature to the public and notifying customers of research milestones as this information becomes available.
- Educating employees on EMF issues.
- Supporting, funding and monitoring EMF research.
- Implementing low-cost and no-cost measurements, where appropriate, to reduce EMF associated with new construction projects.
- Participating in communication forums and regulatory proceedings to remain current on all EMF related issues.

For More Information

More EMF information is available at SDG&E's EMF website at <http://sdge.com/safety/electric-and-magnetic-fields/cmf-issue>

To request a free home or office measurement of magnetic fields, please contact SDG&E at 1-800-411-SDGE (7343), or by the internet at <http://sdge.com/node/1755>

SDG&E EMF Services



UNDERSTANDING ELECTRIC AND MAGNETIC FIELDS

AN OVERVIEW

► What is EMF?

Electric and magnetic fields (EMF) are invisible lines of force that are present wherever electricity flows—around appliances and power lines, and in offices, schools and homes. Electric fields are created by voltage and are shielded by most materials, such as lead, soil and concrete. Magnetic fields are created by current and are not shielded by most materials. Both electric and magnetic field strengths diminish with distance.

These fields are low energy, extremely low frequency fields. They are not to be confused with high energy or ionizing radiation such as x-rays and gamma rays.

► Why is EMF a Concern?

Concerns have been raised about a possible link between exposure to EMF and adverse health conditions. Some EMF studies have reported a weak association between estimates of exposure to magnetic fields and certain types of cancer. However, other studies have reported no effects. Laboratory experiments have shown that exposure levels typically well above those normally found in residences can produce cellular responses, but there is little or no evidence that these responses constitute a health risk.

► Research

Over the past 30 years, hundreds of epidemiology and laboratory studies on the subject of EMF have been conducted throughout the world, with results that are often hard to interpret and sometimes conflicting.

■ **Epidemiological studies** look for associations between the exposure of a group of people to an agent (possible risk factor) and the occurrence of disease in that group. **Epidemiology** deals with people in their natural environment, so exposures cannot be controlled or limited to the factors being studied. Thus, epidemiology addresses associations with disease outcomes; generally, it does not establish whether a particular agent causes disease.

■ **Laboratory studies** make use of controlled conditions to attempt to assess effects from exposure to electric and magnetic fields on cells, tissue cultures, and animals. Most of the laboratory studies have involved exposures which are hundreds to thousands of times higher than those typically found in residential backgrounds and some occupational settings.

► What Conclusions Have the Experts Drawn?



To assess potential health risks from an environmental agent such as power frequency EMF, numerous internationally recognized scientific organizations and independent regulatory advisory groups have conducted scientific reviews, bringing together experts from a variety of disciplines to review the full body of research on this complex issue. Without exception, these major reviews have reported that the body of data, as large as it is, does not demonstrate that exposure to power-frequency magnetic fields causes cancer or other health risks, although the possibility cannot be dismissed. The weakness of the reported associations, the lack of consistency and the severe limitations in exposure assessment in the epidemiology studies together with the lack of support from laboratory studies were key considerations in the findings of the scientific reviews. Most reviews recommend further research, and, appropriately, research is ongoing worldwide.

► **Conclusions from Recent Expert Panel Reviews**

- ◆ World Health Organization (WHO), *Extremely Low Frequency Fields, Environmental Health Criteria Monograph No. 238* [June 2007]:

“Given the weakness of the evidence for a link between exposure to extremely low frequency [which, includes power frequency] magnetic fields and childhood leukemia and the limited potential impact on public health, the benefits of exposure reduction on health are unclear and thus the cost of reducing exposure should be very low.”

The report classifies EMF as a “possible” cause of cancer because they found that some statistical studies provide “limited” evidence of an association between EMF and childhood leukemia, but that controlled laboratory studies do not provide support for that association. The evidence does not warrant a classification of EMF as a “probable” or “known” carcinogen because “virtually all” of the experimental evidence fails to support a causal association for childhood leukemia. For all other childhood and adult diseases, the WHO finds there is “inadequate” evidence for a classification of even “possible.”

- ◆ National Radiological Protection Board (NRPB), *Review of the Scientific Evidence for Limiting Exposure to Electromagnetic Fields (0–300 GHz)* [U.K., 2004]:

“It is concluded that currently the results of these [epidemiological and experimental] studies on EMFs and health, taken individually or as collectively reviewed by expert groups, are insufficient either to make a conclusive judgment on causality or to quantify appropriate exposure restrictions.”

- ◆ Health Council of the Netherlands, *Electromagnetic Fields Annual Update 2003* [January, 2004]:

“The [Health Council of the Netherlands] Committee, like the IARC [see World Health Organization bullet below] itself, points out that there is no evidence to support the existence of a causal relationship here. Nor has research yet uncovered any evidence that a causal relationship might exist. Nevertheless, new suggestions for possible mechanisms ... are regularly put forward. However, none of these hypotheses can presently explain how ELF magnetic fields exposure might lead to cancer. Is this statement by the IARC sufficient reason to recommend that steps be taken to, for example, limit children’s long-term exposure to ELF magnetic fields? Since the conclusion of the IARC is not different from that of the Committee, it adheres to its previously expressed view that, on the basis of the current level of knowledge, there is no reason to take such action.”

- ◆ California Department of Health Services, *EMF Risk Evaluation Report* [June, 2002]:

As with previous scientific data reviews, the CDHS report did not conclusively associate or find direct causation of disease or cancer as a result of exposure to EMFs. However, counter to all other reviews, the three CDHS epidemiologists who wrote the report stated that:

“...to one degree or another...” they “...were inclined to believe that EMFs can cause some degree of increased risk of childhood leukemia, adult brain cancer, Lou Gehrig’s Disease, and miscarriage.”

The opinions expressed by the CDHS reviewers are controversial and have been criticized by members of the Department’s own Science Advisory Panel of experts.

► **Have State or Federal Exposure Standards Been Established?**





There are no California or Federal standards regulating environmental levels of magnetic field exposure for workers or the general public. The panels of experts charged with recommending exposure limits for electric and/or magnetic fields have concluded that no meaningful experimental data exist on which to base standards or limits to which the public is exposed.

► Magnetic Fields In and Around the Home

Source: Adapted from Gauger 1985

Units: milligauss (mG)

Home Appliances	at 1.2"	at 12"	at 39"
Microwave Oven	750 to 2,000 mG	40 to 80 mG	3 to 8 mG
Clothes Washer	8 to 400 mG	2 to 30 mG	0.1 to 2 mG
Electric Range	60 to 2,000 mG	4 to 40 mG	0.1 to 1 mG
Fluorescent Lamp	400 to 4,000 mG	5 to 20 mG	0.1 to 0.3 mG
Hair Dryer	60 to 20,000 mG	1 to 70 mG	0.1 to 3 mG
Television	25 to 500 mG	0.1 to 20 mG	0.1 to 2 mG
 Distribution Power Lines (< 50 kilovolts)	1 to 80 mG (under the line)		
 Transmission Power Lines (≥ 50 kilovolts)	1 to 300 mG at edge of right-of-way		

Magnetic fields are measured in units of milligauss (mG) or microtesla (μT). One mG = 0.1 μT .

A survey of nearly 1,000 residences across the U.S. showed that middle-of-room averages of magnetic fields can range from 0.1 mG to 6.6 mG, and sometimes higher. (Zaffanella, 1993)

Sources of magnetic fields inside homes or offices can be outside power lines or electrical equipment, interior building wiring and plumbing, and appliances.

Power line magnetic fields can be measured over a range of a few feet to several hundred feet, depending upon the amount of power being used at any given time and the construction features of the line or lines.

► California, Federal and International EMF Activities

■ The California Department of Health Services (CDHS) EMF Program



California
EMF
Program

From 1993 to 2002, the California Department of Health Services (CDHS) managed the California EMF Program of research and information that was established by the 1993 California Public Utilities Commission (CPUC) Decision 93-11-013 and funded by the utility ratepayers. The goal of the program was to assess the potential health effects from exposure to electric and magnetic fields and report the findings to the CPUC. In October 2002, the CDHS issued its final EMF Risk Evaluation report. Fundamentally, it agrees with other national and international agency evaluations in that all of the reports find that an EMF health risk has not been scientifically demonstrated, although the possibility of a small risk cannot be ruled out. The CDHS report is controversial because of the increased likelihood it places on the possibility of an actual EMF risk. The report can be viewed on the CDHS web site at:

<http://www.dhs.ca.gov/ps/deodc/ehib/emf/RiskEvaluation/riskeval.html>

■ The California Public Utilities Commission (CPUC)



1993: The CPUC's 1993 EMF Decision 93-11-013 recognized that research had "not concluded that an EMF health hazard actually exists" and that "[i]t is not appropriate to adopt any specific numerical standard in association with EMFs." Acknowledging public concern, the CPUC directed California's regulated electric utilities to:

- ◆ Take no-cost and low-cost steps to reduce EMF levels for new and upgraded transmission or substation projects.
- ◆ Develop EMF design guidelines for implementing the no-cost and low-cost steps.
- ◆ Implement uniform residential and workplace EMF measurement programs.
- ◆ Provide credible, meaningful, consistent, and timely EMF information to electric utility customers, employees, and the public.

Decision 93-11-013 can be viewed online at [ftp://ftp.cpuc.ca.gov/gopher-data/cwiron/d9311013.doc](http://ftp.cpuc.ca.gov/gopher-data/cwiron/d9311013.doc).

2006: In January, the CPUC updated its EMF policy in Decision 06-01-042. The CPUC reaffirmed that health risks have not been demonstrated and that numeric exposure limits are inappropriate, and directed the utilities to continue to use no-cost and low-cost mitigation measures. Decision 06-01-042 can be viewed online at:

http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/53181.htm.

■ U.S. Federal EMF Activities

EMF RAPID

Electric and Magnetic Fields
National Institute of Environmental Health Sciences

The U.S. Federal Government's \$45-million EMF Research And Public Information Dissemination (RAPID) Program, managed by the National Institute of Environmental Health Sciences (NIEHS), submitted its final report to the U.S. Congress in 1999, concluding that: "[t]he scientific evidence suggesting that EMF exposures pose any health risk is weak;" and that "EMF exposures cannot be recognized as entirely safe because of weak scientific evidence that exposures may pose a leukemia hazard."

NIEHS also suggested "that the power industry should continue its current practice of siting power lines to reduce exposures and continue emphasis on educating both the public and providers of electricity about ways to reduce exposure;" and "... passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures."

■ The International EMF Project



The World Health Organization's (WHO) International EMF Project collaborates with a number of international agencies and organizations. WHO is pooling resources and knowledge concerning possible effects of exposure to EMF and making a concerted effort to identify gaps in knowledge, recommend focused research, conduct improved health risk assessments, and work toward international consensus and resolution on EMF health concerns. In June 2007, the International EMF Project published its report, *Extremely Low Frequency Fields, Environmental Health Criteria Monograph No. 238*. The report is consistent with the conclusions of the California Public Utilities Commission's (CPUC) review of EMF research and policy. The document can be viewed at

http://www.who.int/peh-emf/publications/elf_elfc/en/index.html

► What Is SDG&E Doing?

SDG&E is committed to providing safe, reliable and environmentally sound gas and electric service for its customers, and a safe work place for its employees. We recognize and share the concerns of our customers and employees over the possibility that electric and/or magnetic fields might adversely affect health. Until research and the scientific community provide greater direction, SDG&E's commitment includes the following measures:

- ◆ Maintain an EMF Center staffed with informed representatives available to talk with customers about EMF issues, and provide free magnetic field measurements on request.
- ◆ Provide objective EMF health literature to the public.
- ◆ Support, fund and monitor EMF research and participate in discussion forums and regulatory proceedings to remain current on all EMF-related issues.
- ◆ Implement low-cost and no-cost measures, where appropriate, to reduce fields associated with new and upgraded construction projects, in accordance with the rules of the CPUC Decisions.

► Additional Resources:

To request a more detailed EMF information packet or free home or business magnetic field measurements, call SDG&E at 1-800-411-SDGE (7343), or make an online request at <http://sdge.com/node/1755>. For more information, visit <http://sdge.com/safety/electric-and-magnetic-fields/emf-issue> or these resources:

California EMF Program: <http://www.efhb.org/cmff/>

CPUC EMF Policy Page: <http://www.cpuc.ca.gov/PLIC/electric/Environment/ElectroMagneticFields/action.htm>

Health Protection Agency (UK): <http://www.hpa.org.uk/Topics/Radiation/UnderstandingRadiation/UnderstandingRadiationTopics/ElectromagneticFields/>

National Cancer Institute: <http://www.cancer.gov/cancertopics/factsheet/Risk/magnetic-fields>

U.S. Federal RAPID EMF Q&A: http://www.niehs.nih.gov/health/assets/docs_p/z/results_of_emf_research_emf_questions_answers_booklet.pdf

U.S. Federal RAPID Program (see above): <http://www.niehs.nih.gov/health/topics/agents/emf/>

WHO International EMF Project (English): <http://www.who.int/peh-emf/project/en/>

WHO International EMF Project (Spanish): <http://www.who.int/peh-emf/project/es/>



**World Health
Organization**

Electromagnetic fields and public health

Base stations and wireless technologies

Backgrounder
May 2006

Mobile telephony is now commonplace around the world. This wireless technology relies upon an extensive network of fixed antennas, or base stations, relaying information with radiofrequency (RF) signals. Over 1.4 million base stations exist worldwide and the number is increasing significantly with the introduction of third generation technology.

Other wireless networks that allow high-speed internet access and services, such as wireless local area networks (WLANs), are also increasingly common in homes, offices, and many public areas (airports, schools, residential and urban areas). As the number of base stations and local wireless networks increases, so does the RF exposure of the population. Recent surveys have shown that the RF exposures from base stations range from 0.002% to 2% of the levels of international exposure guidelines, depending on a variety of factors such as the proximity to the antenna and the surrounding environment. This is lower or comparable to RF exposures from radio or television broadcast transmitters.

There has been concern about possible health consequences from exposure to the RF fields produced by wireless technologies. This fact sheet reviews the scientific evidence on the health effects from continuous low-level human exposure to base stations and other local wireless networks.

Health concerns

A common concern about base station and local wireless network antennas relates to the possible long-term health effects that whole-body exposure to the RF signals may have. To date, the only health effect from RF fields identified in scientific reviews has been related to an increase in body temperature ($> 1\text{ }^{\circ}\text{C}$) from exposure at very high field intensity found only in certain industrial facilities, such as RF heaters. The levels of RF exposure from base stations and wireless networks are so low that the temperature increases are insignificant and do not affect human health.

The strength of RF fields is greatest at its source, and diminishes quickly with distance. Access near base station antennas is restricted where RF signals may exceed international exposure

limits. Recent surveys have indicated that RF exposures from base stations and wireless technologies in publicly accessible areas (including schools and hospitals) are normally thousands of times below international standards.

In fact, due to their lower frequency, at similar RF exposure levels, the body absorbs up to five times more of the signal from FM radio and television than from base stations. This is because the frequencies used in FM radio (around 100 MHz) and in TV broadcasting (around 300 to 400 MHz) are lower than those employed in mobile telephony (900 MHz and 1800 MHz) and because a person's height makes the body an efficient receiving antenna. Further, radio and television broadcast stations have been in operation for the past 50 or more years without any adverse health consequence being established.

While most radio technologies have used analog signals, modern wireless telecommunications are using digital transmissions. Detailed reviews conducted so far have not revealed any hazard specific to different RF modulations.

Cancer: Media or anecdotal reports of cancer clusters around mobile phone base stations have heightened public concern. It should be noted that geographically, cancers are unevenly distributed among any population. Given the widespread presence of base stations in the environment, it is expected that possible cancer clusters will occur near base stations merely by chance. Moreover, the reported cancers in these clusters are often a collection of different types of cancer with no common characteristics and hence unlikely to have a common cause.

Scientific evidence on the distribution of cancer in the population can be obtained through carefully planned and executed epidemiological studies. Over the past 15 years, studies examining a potential relationship between RF transmitters and cancer have been published. Those studies have not provided evidence that RF exposure from the transmitters increases the risk of cancer. Likewise, long-term animal studies have not established an increased risk of cancer from exposure to RF fields, even at levels that are much higher than produced by base stations and wireless networks.

Other effects: Few studies have investigated general health effects in individuals exposed to RF fields from base stations. This is because of the difficulty in distinguishing possible health effects from the very low signals emitted by base stations from other higher strength RF signals in the environment. Most studies have focused on the RF exposures of mobile phone users. Human and animal studies examining brain wave patterns, cognition and behaviour after exposure to RF fields, such as those generated by mobile phones, have not identified adverse effects. RF exposures used in these studies were about 1000 times higher than those associated with general public exposure from base stations or wireless networks. No consistent evidence of altered sleep or cardiovascular function has been reported.

Some individuals have reported that they experience non-specific symptoms upon exposure to RF fields emitted from base stations and other EMF devices. As recognized in a recent WHO fact sheet "Electromagnetic Hypersensitivity", EMF has not been shown to cause such symptoms. Nonetheless, it is important to recognize the plight of people suffering from these symptoms.

From all evidence accumulated so far, no adverse short- or long-term health effects have been shown to occur from the RF signals produced by base stations. Since wireless networks produce generally lower RF signals than base stations, no adverse health effects are expected from exposure to them.

Protection standards

International exposure guidelines have been developed to provide protection against established effects from RF fields by the International Commission on Non-Ionizing Radiation Protection (ICNIRP, 1998) and the Institute of Electrical and Electronic Engineers (IEEE, 2005).

National authorities should adopt international standards to protect their citizens against adverse levels of RF fields. They should restrict access to areas where exposure limits may be exceeded.

Public perception of risk

Some people perceive risks from RF exposure as likely and even possibly severe. Several reasons for public fear include media announcements of new and unconfirmed scientific studies, leading to a feeling of uncertainty and a perception that there may be unknown or undiscovered hazards. Other factors are aesthetic concerns and a feeling of a lack of control or input to the process of determining the location of new base stations. Experience shows that education programmes as well as effective communications and involvement of the public and other stakeholders at appropriate stages of the decision process before installing RF sources can enhance public confidence and acceptability.

Conclusions

Considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak RF signals from base stations and wireless networks cause adverse health effects.

WHO Initiatives

WHO, through the International EMF Project, has established a programme to monitor the EMF scientific literature, to evaluate the health effects from exposure to EMF in the range from 0 to 300 GHz, to provide advice about possible EMF hazards and to identify suitable mitigation measures. Following extensive international reviews, the International EMF Project has promoted research to fill gaps in knowledge. In response national governments and research institutes have funded over \$250 million on EMF research over the past 10 years.

While no health effects are expected from exposure to RF fields from base stations and wireless networks, research is still being promoted by WHO to determine whether there are any health consequences from the higher RF exposures from mobile phones.



Radio Frequency Safety



*Office of Engineering and
Technology*

Human Exposure To Radio Frequency Fields

Primary antennas for cellular and PCS transmissions are usually located outside on towers, water tanks and other elevated structures like rooftops and sides of buildings. The combination of antenna towers and associated electronic equipment is referred to as a "cellular or PCS cell site." Typical heights for cell site towers are 50-200 feet. Antennas are usually arranged in groups of three with one antenna in each group used to transmit signals to mobile units, and the other two antennas used to receive signals from mobile units.

At a cell site, the total RF power that could be transmitted from each transmitting antenna depends on the number of radio channels (transmitters) that have been authorized by the Federal Communications Commission (FCC) and the power of each transmitter. Although the FCC permits an effective radiated power (ERP) of up to 500 watts per channel (depending on the tower height), the majority of cellular sites in urban and suburban areas operate at an ERP of 100 watts per channel or less.

An ERP of 100 watts corresponds to an actual radiated power of 5-10 watts, depending on the type of antenna used. In urban areas, an ERP of 10 watts per channel or less is commonly used. For PCS cell sites, even lower radiated power levels are normally used. As with all forms of electromagnetic energy, the power density from a cellular or PCS transmitter rapidly decreases as one moves away from the antenna. Consequently, normal ground-level exposure is much less than the exposure that might be encountered if one were very close to the antenna and in its main transmitted beam. Measurements made near typical cellular and PCS cell sites have shown that ground-level power densities are well below limits recommended by RF/microwave safety standards used by the FCC.

Guidelines

The FCC has authorized cellular and PCS carriers to provide service in various service areas around the country. In 1996, the FCC adopted updated guidelines for evaluating human exposure to radiofrequency (RF) fields from fixed transmitting antennas such as those used for cellular radio and PCS cell sites. The FCC's guidelines for cellular and

PCS cell sites are identical to those recommended by the National Council on Radiation Protection and Measurements (NCRP), a non-profit corporation chartered by Congress to develop information and recommendations concerning radiation protection. The FCC's guidelines are also similar to the 1992 guidelines recommended by the American National Standards Institute (ANSI), a non-profit, privately-funded, membership organization that coordinates development of voluntary national standards in the United States, and the Institute of Electrical and Electronics Engineers (IEEE), a non-profit technical and professional engineering society.

In the case of cellular site transmitters, the FCC's RF exposure guidelines recommend a maximum permissible exposure level to the general public of approximately 580 microwatts per square centimeter. This limit is many times greater than RF levels typically found near the base of cellular towers or in the vicinity of other, lower-powered cell site transmitters.

Calculations corresponding to a "worst-case" situation (all transmitters operating simultaneously and continuously at the maximum licensed power) show that in order to be exposed to levels near the FCC's limits for cellular frequencies, an individual would essentially have to remain in the main transmitting beam and within a few feet from the antenna for several minutes or longer. This makes it extremely unlikely that a member of the general public could be exposed to RF levels in excess of these guidelines from cellular site transmitters. For PCS cell site transmitters, the same type of analysis holds.

When cellular and PCS antennas are mounted at rooftop locations, it is possible that RF levels could be higher than desirable on the rooftop itself. This might become an issue if the rooftop were accessible to maintenance personnel or others. However, exposures exceeding the safety guidelines are only likely to be encountered very close to, and directly in front of, the antennas. Even if RF levels were higher than desirable on a rooftop, appropriate restrictions could be put in place in each case to avoid exposure in excess of the guidelines. Factoring in the time-averaging aspects of safety standards could also be used to reduce potential exposure for persons working on the roof. Excessive exposure conditions on rooftops are even less likely because rooftop cellular and PCS antennas usually operate at lower power levels than antennas on free-standing towers. Those living or working within the building are not at risk.

The deadline for licensees to comply with the FCC's RF exposure guidelines was September 1, 2000. The FCC may further investigate specific complaints where there is credible evidence of violations of these guidelines.

For additional information on exposure to radio frequency fields, you can visit www.fcc.gov/oet/rfsafety. For general information on other telecommunications-related issues, you can contact the FCC's Consumer & Governmental Affairs Bureau, www.fcc.gov/cgb, in the following ways:

E-Mail: fccinfo@fcc.gov

Telephone: 1-888-CALL-FCC (1-888-225-5322) voice; 1-888-TELL-FCC (1-888-835-5322) TTY

OET's RF Safety Line: 202-418-2464

Address: Federal Communications
(see address below)

To receive information on this and other FCC consumer topics through the Commission's electronic subscriber service, click on www.fcc.gov/cgb/emailservice.html.

