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Supplemental Material

For

City of Sacramento

Planning Commission

Agenda Packet

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For the Meeting of: August 12, 2010

☒ Additional Material

☐ Revised Material

TITLE: FAQ'S REGARDING CELL TOWERS

Contact Information:

Please include this supplemental material in your agenda packet. This material will also be published to the City's Internet. For additional information, contact the City Clerk Department at Historic City Hall, 915 I Street, First Floor, Sacramento, CA 95814-2604, (916) 808-7200.

FAQ’s on Cell Towers

The difficult thing when discussing the EMF of cell towers is that each tower is of course unique. Depending on the height, location and positioning the measurements will vary slightly. However, in general it is safe to say the EMF from most towers is only 1 to 2 % of the limits set by federal regulation. This information is available at a host of public websites but I have summarized some of that information below. Let me know what more specifics you may need.

My best

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How do cellular phone towers work?

Cell phone base stations may be free standing towers or mounted on existing structures, such as trees, water tanks, or tall buildings. The antennas need to be located high enough so they can adequately cover the area. Base stations usually range in height from 50-200 feet.

Cell phones communicate with nearby cell towers mainly through radiofrequency (RF) waves, a form of energy in the electromagnetic spectrum between FM radio waves and microwaves. Like FM radio waves, microwaves, visible light, and heat, they are forms of non-ionizing radiation. This means they cannot cause cancer by directly damaging DNA. RF waves are different from stronger types of radiation such as x-rays, gamma rays, and ultraviolet (UV) light, which can break the chemical bonds in DNA.

At very high levels, RF waves can heat up body tissues. (This is the basis for how microwave ovens work.) **But the levels of energy used by cell phones and towers are much lower.**

When a person makes a cell phone call, a signal is sent from the phone's antenna to the nearest base station antenna. The base station responds to this signal by assigning it an available radiofrequency channel. RF waves transfer the voice information to the base station. The voice signals are then sent to a switching center, which transfers the call to its destination. Voice signals are then relayed back and forth during the call.

How are people exposed to the energy from cellular phone towers?

As people use cell phones to make calls, signals are transmitted back and forth to the base station. The RF waves produced at the base station are given off into the environment, where people can be exposed to them.

The energy from a cellular phone tower antenna, like that of other telecommunication antennas, is directed toward the horizon (**parallel to the ground),** with some downward scatter. Base station antennas use higher power levels than other types of land-mobile antennas, **but much lower levels than those from radio and television broadcast stations**. **The amount of energy decreases rapidly with increasing distance from the antenna. As a result, the level of exposure to radio waves at ground level is very low compared to the level close to the antenna.**

Public exposure to radio waves from cell phone tower antennas is slight for several reasons. The power levels are relatively low, the antennas are mounted at high above ground level, and the signals are transmitted intermittently, rather than constantly.

At ground level near typical cellular base stations, the amount of RF energy is thousands of times less than the limits for safe exposure set by the Federal Communication Commission (FCC) and other regulatory authorities. It is very unlikely that a person could be exposed to RF levels in excess of these limits just by being near a cell phone tower.

When cellular antennas are mounted on rooftops, it is possible that a person on the roof could be exposed to RF levels greater than those typically encountered on the ground. But even then, exposure levels approaching or exceeding the FCC safety guidelines are only likely to be found very close to and directly in front of the antennas. If this is the case, access to these areas should be limited.

The level of RF energy inside buildings where a base station is mounted is typically much lower than the level outside depending on the construction materials of the building. Wood or cement block reduces the exposure level of RF radiation by a factor of about 10. The energy level *behind* an antenna is hundreds to thousands of times lower than in front. Therefore, if an antenna is mounted on the side of a building, the exposure level in the room directly behind the wall is typically well below the recommended exposure limits.

Do cellular phone towers cause cancer?

Some people have expressed concern that living, working, or going to school near a cell phone tower might increase the risk of cancer or other health problems. At this time, there is very little evidence to support this idea. In theory, there are some important points that would argue against cellular phone towers being able to cause cancer.

First, the energy level of radiofrequency (RF) waves is relatively low, especially when compared with the types of radiation that are known to increase cancer risk, such as

gamma rays, x-rays, and ultraviolet (UV) light. The energy of RF waves given off by cell phone towers is not enough to break chemical bonds in DNA molecules, which is how these stronger forms of radiation may lead to cancer.

A second issue has to do with wavelength. RF waves have long wavelengths, which can only be concentrated to about an inch or two in size. This makes it unlikely that the energy from RF waves could be concentrated enough to affect individual cells in the body.

Third, even if RF waves were somehow able to affect cells in the body at higher doses, the level of RF waves present at ground level is very low -- well below the recommended limits. **Levels of energy from RF waves near cell phone towers are not significantly different than the background levels of RF radiation in urban areas from other sources, such as radio and television broadcast stations**.

For these reasons, most scientists agree that cell phone antennas or towers are unlikely to cause cancer.

Studies done in the lab

Laboratory studies have looked at whether the types of RF waves used in cell phone communication can cause DNA damage. Most of these studies have supported the idea that the RF waves given off by cell phones and towers don't have enough energy to damage DNA directly.

What expert agencies say

The 3 expert agencies that usually classify cancer-causing exposures (carcinogens) -- the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), and the US Environmental Protection Agency (EPA) -- have not classified cell phone towers as to their cancer-causing potential.

According to the World Health Organization:

> 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.

In commenting on cell phone towers near homes or schools, the Federal Communications Commission states:

> Radiofrequency emissions from antennas used for cellular and PCS [personal communications service] transmissions result in exposure levels on the ground that are typically thousands of times below safety limits. These safety limits were adopted by the FCC based on the recommendations of expert organizations and endorsed by agencies of the Federal Government responsible for health and

safety. Therefore, there is no reason to believe that such towers could constitute a potential health hazard to nearby residents or students.

Do cellular phone towers cause any other health problems?

While high levels of RF waves can cause a warming of body tissues, the energy levels on the ground near a cell phone tower are far below the levels needed to cause this effect. Thus far, there is no evidence in published scientific reports that cell phone towers cause any other health problems.

Can I limit my exposure?

Cell phone towers are not known to cause any health effects. But if you are concerned about possible exposure from a cell phone tower near your home or office, you can ask a government agency or private firm to measure the RF field strength near the tower to ensure that it is within the acceptable range.

Additional resources

More information from your American Cancer Society

The following related information may also be helpful to you. These materials may be viewed on our Web site or ordered from our toll-free number, at 1-800-227-2345.

Cellular Phones

Known and Probable Human Carcinogens

Radiation Exposure and Cancer

National organizations and Web sites*

In addition to the American Cancer Society, other sources of information and support include:

Environmental Protection Agency
Home page: www.epa.gov
Understanding radiation: www.epa.gov/radiation/understanding-radiation-overview.html

Federal Communications Commission
RF Safety Program, Office of Engineering and Technology
Web site: www.fcc.gov/oet/rfsafety

Food and Drug Administration
Home page: www.fda.gov
Radiation-emitting products: Cell phones: www.fda.gov/Radiation-

EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/CellPhones/default.htm

National Cancer Institute
Toll-free number: 1-800-422-6237 (1-800-4-CANCER)
Home page: www.cancer.gov
Cellular telephone use and cancer risk: www.cancer.gov/cancertopics/factsheet/Risk/cellphones

National Institute of Environmental Health Sciences
Home page: www.niehs.nih.gov
Electric and magnetic fields: www.niehs.nih.gov/health/topics/agents/emf/index.cfm

World Health Organization
Electromagnetic fields and public health: base stations and wireless technologies
Web site: www.who.int/mediacentre/factsheets/fs304/en/index.html

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