**Lenzi, Chelsea**

| | |
|---|---|
| **From:** | Teresa <teresabc2002@yahoo.com> |
| **Sent:** | Tuesday, December 02, 2014 10:54 AM |
| **To:** | sbcob |
| **Subject:** | Fwd: Case Number: 13CUP-00000-00014, ATT MEGA TOWER |
| **Attachments:** | ADA.pdf; noi_epa_response, Norbet Hankin.pdf; epa_to_fcc_3nov_93 letter thomas_stanley.pdf; exhibit_a_richard.pdf; Letter to Santa Barbara County Board_Lutchyn copy.pdf; Impact of mobile phone on the density of Honey Bees.pdf |

Begin forwarded message:

**From:** Teresa <teresabc2002@yahoo.com>
**Subject: Case Number: 13CUP-00000-00014, ATT MEGA TOWER**
**Date:** December 2, 2014 at 1:38:05 AM PST
**Cc:** Mary O'Gorman <mogorman@countyofsb.org>
**To:** Janet Wolf <jwolf@sbcbos2.org>, SupervisorCarbajal@sbcbos1.org, dfarr@countyofsb.org, peter.adam@countyofsb.org, steve.lavagnino@countyofsb.org

Dear Board of Supervisor, please find attached my letter(titled ADA) regarding Case Number: 13CUP-00000-00014.

Additionally, please find attachments as part of the Appendix, below:

Search

Wireless Coverage

Store Locations

Wi-Fi Locations

## Wireless Coverage Type

### Domestic

Voice

Data

GoPhone® Service

### View Coverage by Device Type

- 4G LTE*

4G

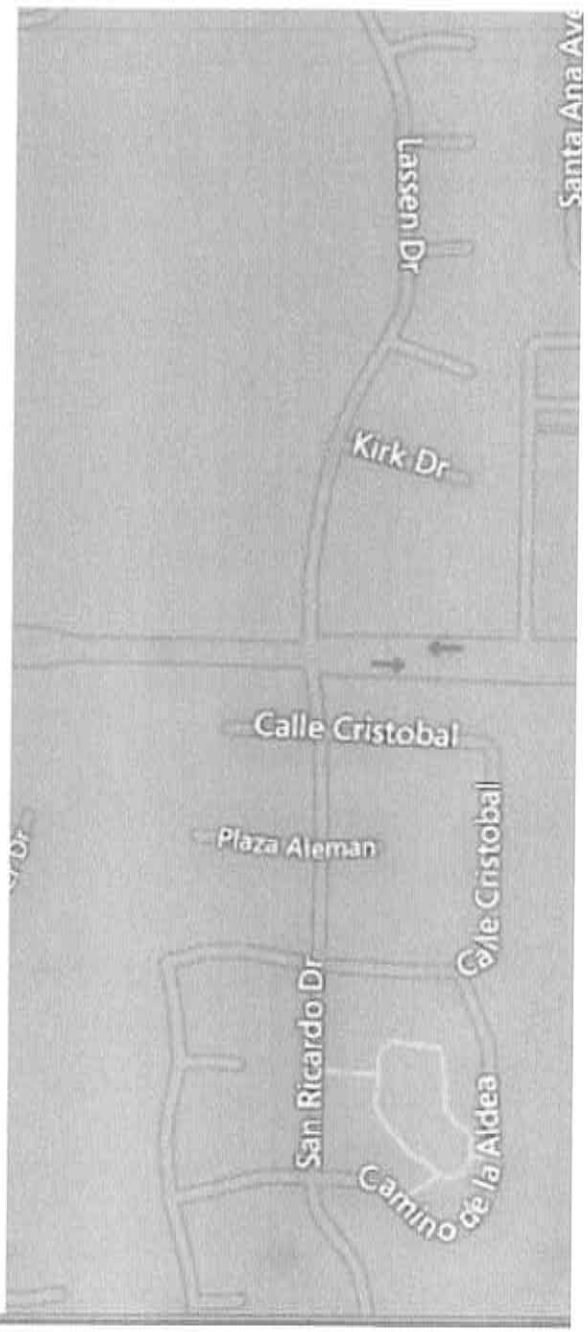
3G

2G

Compatible device required

### International

Voice




No Gap present in the area, AT&T Customer Coverage Map

Thank you for your consideration, here and tomorrow,

Teresa Caves
Resident, Sungate Ranch, HOA
Santa Barbara, CA

November 30, 2014

Santa Barbara County Board of Supervisors
105 Anapamu Street, Santa Barbara, CA 93101
Re: Case Number: 13CUP-00000-00014

Dear Board of Supervisors,

This letter is with regard to the AT&T project, Case No. 13CUP-00000-00014, located at 5073 Hollister Avenue, Christ the King(CTK) Church. I, strongly oppose this project as 1) Christ the King Church will be Noncompliant with ADA Accessibility Guidelines 2) Does Not Collaborate with the community, 3)Safety Guidelines provided by the FCC are "outdated" and "unjustified" 4)the Environmental Impact Report (EIR) is incomplete.

I live less than a 1000 feet away, however, I am only now learning of this project, during the appeal. The regulator system failed when a notice was not mailed to my address from the start. In addition, less than a block away from the CTK project, I am dealing with another Mega tower project, Verizon(12 antennas), at 4990 Hollister Avenue, near my home. I am concerned about the cumulative effect from electromagnetic radiation (EMR) from both mega towers.

1.) Christ the King Church will be Noncompliant with ADA Accessibility Guidelines

First, in 2002 an announcement in the Federal Register, "**Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities**" by the Architectural and Transportation Barriers Compliance Board (United States Access Board), that **Electromagnetic Sensitivities may be considered disabilities under the ADA** . As such the Christ the King Church must comply with ADA requirement. By installing any number of cell towers on top of the church or adjoining structures the Church would not be in compliance with ADA guidelines for buildings and facilities, thereby restricting people with Electromagnetic Sensitivity from access to the Church. Currently people with Electromagnetic Sensitivities can enjoy

access to the Church, without worries regarding their disability, as no Cell towers are present.

Additionally, in the 2005 report by the Congressionally-authorized National Institute of Building Sciences (NIBS) written in conjunction with the United States Access Board, acknowledges the existence of Electromagnetic Hypersensitivity(EHS)

2) **The project does not Collaborate with the Community:** The immediate surroundings are made up of residential, single and two story homes, Sungate Ranch HOA, Lane Farms 308 Walnut Lane, 5030 Hollister Avenue McCloskey Nursery, Montessori School(new project). As well this project will impact Lane Farms(Organic) San Marcos 4950 Hollister Avenue, San Marcos Growers 125 S San Marcos Road, El Camino School and San Marcos Court HOA. All of which the frequency report fails to include.

The AT&T, 12 Antennas cellular project will have direct impact on this community through chronic, electromagnetic radiation. This will further restrict people with Electromagnetic sensitivity, a disability recognized by ADA from the comfort of their own homes.

Furthermore, Bees needed by local farms for production of plants, are especially sensitive to electromagnetic radiation (EMR). EMR's have been linked to Colony Collapse Disorder (CDD), simply put, Bees forget to go back to their hives, disappear, and never return (see details in section 4).

It is alarming at the rate of speed in-which cell towers are proliferating near schools, homes, farms, with complete disregard for ADA compliance for individuals with Electromagnetic Sensitivity. They are being disguised as Bell towers, flag poles, lamp posts, trees, however, these guises do not protect the public from chronic electromagnetic radiation. Currently, there are no safe guidelines offered by FCC, only "out dated" and "misrepresented safety guidelines" used to approve projects next to peoples homes and elsewhere.

This project does not collaborate with residential homes, Schools, Farms

and nurseries in the area, nor does it belong on top of a church where people congregate in prayer thereby restricting people with Electromagnetic Sensitivity from access. There is "no GAP in service" at this location. AT&T's website which informs its potential and paying customers, lists this site as having full coverage in 4G LTE (see attachment in the appendix). Additionally, If one needs to make a 911 call, they have coverage and there is also redundancy in place via land lines and other carriers in the area. All 911 calls go through.

2) **Outdated FCC Safety Guidelines:** Projects are being approved with "outdated safety guidelines" provided by FCC which are not Safety Standards. The *BioInitiative 2012 report*, the most comprehensive report on Radio Frequency provides, alarming health impacts overlooked by current FCC guidelines. "*What has changed in 2012? In twenty-four technical chapters, the contributing authors discuss the content and implications of about **1800 new studies**. Overall, these new studies report abnormal gene transcription (Section 5); genotoxicity and single- and double-strand DNA damage (Section 6); stress proteins because of the fractal RF-antenna like nature of DNA (Section 7); chromatin condensation and loss of DNA repair capacity in human stem cells (Sections 6 and 15); reduction in free-radical scavengers, particularly melatonin (Sections 5, 9, 13, 14, 15, 16 and 17); neurotoxicity in humans and animals (Section 9); carcinogenicity in humans (Sections 11, 12, 13, 14, 15, 16 and 17); serious impacts on human and animal sperm morphology and function (Section 18); effects on the fetus, neonate and offspring (Section 18 and 19); effects on brain and cranial bone development in the offspring of animals that are exposed to cell phone radiation during pregnancy (Sections 5 and 18); and findings in autism spectrum disorders consistent with EMF/RFR exposure. This is only a snapshot of the evidence presented in the BioInitiative 2012 updated report*" http://www.bioinitiative.org/report/wp-content/uploads/pdfs/sec01_2012_summary_for_public.pdf A full copy of the report can be found at http://www.bioinitiative.org

Additionally, in 2002, Norbet Hankin, Centers for Science and Risk

Assessment, Radiation Protection Division, US EPA wrote a letter to Ms Janet Newton, Present of the EMR network, in reply to her concerns about the effects of non-thermal radio frequency (RF) radiation and the adequacy of the Federal Communications Commission's RF radiation exposure guidelines.

In part, Mr. Hankin's reply:

" The current FCC guidelines currently used were adopted by FCC in 1996. The guidelines were recommended by the EPA, with certain reservations in a letter to Thomas P. Stanley, Chief Engineer, Office of Engineering and Technology, Federal Communications Commission, November 9, 1993, in response to the FCC request for comments on their Proposed Rule Making(NPRM), Guidelines for Evaluating the Environmental effects of Radio frequency Radiation.

FCC's current exposure guidelines, as well as those of the Institute of Electrical and Electronics Engineers(IEEE) and the International Commission on Non-ionizing Radiation Protection(ICNIRP), **are thermally based, and do not apply to chronic, non thermal exposure situations**. They are believed to protect against injury that may be caused by acute exposures that result in heating or electric shock and burn. The hazard feel (for frequencies generally at or greater than 3 MHZ) is based on a specific absorption dose-rate, SAR, associated with an effect that results from an increase in body temperature. The FCC's exposure guideline is considered protective of effect arising from a thermal mechanism but not from all possible mechanisms. **Therefore, the generalization by many that the guidelines protect human beings from harm by any or all mechanisms is not justified**"....Please see letters attached in the appendix at the end.

Additionally, the letter goes on to discuss the lack of safety guideline consideration for the special populations, children, the elderly, people with various debilitating physical and medical conditions. Furthermore, scientific reports after 1986 were not considered in developing the 1996

FCC Guidelines. Since then many reports have become available as witnessed by the BioInitiative 2012 report. The FCC guidelines are out of date and do not provide safety standards recognized by the Scientific International Community. This further demonstrates how FCC is not in compliance with **Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities in relations to Electromagnetic Sensitivities considered a disability by ADA.**

In a letter to Santa Barbara County Board of Architectural Review, regarding Case Number: 14BAR-00000-00217, Roman Lutchyn, PhD calculations, based on the frequency reports submitted to the Planning commission, demonstrates that the amount of "electro-magnetic radiation of 10-100 microwaves per square centimeter would provide a significant amount of radiation which can lead to serious health problems. EMR above 0.1 microwatts per square centimeter should be of extreme concern to the public (see http://hbelc.org/pdf/standards/sbm2008.pdf)". The numbers he calculated are 100 times larger that then recommended Standard. See Roman Lutchyn, PhD letter attached in the appendix. This case is similar in nature to the Christ the King Church, 12 cellular antennas. Roman Lutchyn, if given the opportunity, would be able to demonstrate actual amounts for the Christ the King Church.

4) **Environmental Impacts**: The earth's vegetation comprises of over 200,000 species of flowering plants and 85% of these are pollinated by Bees propagating through the formation of seeds and fruits. Since fruit trees and agricultural crops fall under this, it is not difficult to understand that bees are one of mankind's most important pollinators. Bees are especially sensitive to Electromagnetic Radiation (EMR). It has been linked to Colony Collapse Disorder (CCD) essentially, the bees disappear and never return back to the hive. It is thought that the EMR's are interfering with the bees ability to navigate. Even other animals, parasites and other bees that would normally raid the honey and pollen left behind when the colony dies, refuse to go anywhere near the abandoned hives.

In 2007, Bee-keepers in America reported 50-90 percent loss of bees through Colony Collapse Disorder. The remaining bees were reported to be so weak they could hardly produce any honey.

Ruzicka organized a survey through the magazine Der Bienenvater (2003/9):

- Is there a mobile radio antenna within 300 m of your beehives? - This was confirmed in 20 replies (100%).

- Are you observing increased aggressiveness of the bees compared to the time before the transmitters were in operation? - 37.5% confirmed this.

- Is there a greater tendency to swarm? – 25% confirmed.

- Are colonies inexplicably collapsing? - 65% confirmed.

Such colony collapses, heralded by "angry" swarming of the bees, were also reported in New Zealand (FIR- STENBERG, 2007).

The study by Sainudeen 2011, showed that after ten days the worker bees never returned to hives in the test colonies. It showed that cell towers and cell phones were having an impact on the bees ability to navigate. The total bee strength was significantly higher in the control colonies being nine comb frames, as compared to one in the test colony, at the end of the experiment. The thriving hives suddenly left with only queens, eggs and hive bound immature worker bees. The queens in the test colonies produced fewer eggs/day (100) compared to the control (350). Thus electromagnetic radiation (EMR) exposure provides a better explanation for Colony Collapse Disorder (CCD) than other theories. The path of CCD in India has followed the rapid development of cell phone towers and cell phones, which cause atmospheric electromagnetic radiation (IMPACT OF MOBILE PHONES ON THE DENSITY OF HONEY BEES ,Sainudeen Sahib, S. 2011) see attached.

Additional studies demonstrate the same, EMR's are impacting the ability for bees to function and survive. EMR's not only effect Bees, but Birds,bats,

mammals, amphibians, and plants as well. Responses vary from aversive behavioral responses, developmental anomalies, adverse effects genes and reproduction, and mortality. Additional information can be found below.

Report on possible Impacts of Communication Towers on Wildlife Including Birds and Bees http://apps.fcc.gov/ecfs/document/view?id=7520941959

Al Manville PhD, U.S. Fish and Wildlife Service, gives a presentation to Congress on radiation impacts on wildlife (2007) view his 2.32 minute video at the following link:
http://emfsafetynetwork.org/us-department-of-the-interior-warns-communication-towers-threaten-birds/

His slide show can be viewed at http://www.hese-project.org/hese-uk/en/papers/manville_wildlife_towers.pdf

Anthropogenic-related Bird Mortality Focusing on Steps to Address Human-caused Problems – a White Paper for the Anthropogenic Panel, 5th International Partners in Flight Conference, August 27, 2013, Snowbird, Utah Albert M. Manville, II, Ph.D., Senior Wildlife Biologist, Division of Migratory Bird Management (DMBM), U.S. Fish and Wildlife Service, 4401 N. Fairfax Dr.–MBSP 4107 Arlington, VA 22203; 703/358-1963; albert_manville@fws.gov

Collisions with communication towers may take 6.8 million birds a year in North America (Longcore et al. 2012)

http://www.sandiegocounty.gov/dplu/ceqa/Soitec-Documents/Record-Documents/2014-03-01-StephanVolker-Comment-Letter-Exhibit-16-Soitec-Solar-DPEIR.pdf

Impacts of radio-frequency electromagnetic field (RF-EMF) from cell phone towers and wireless devices on biosystem and ecosystem – a review, Biology and Medicine http://www.biolmedonline.com/Articles/Vol4_4_2012/Vol4_4_202-216_BM-8.pdf

I would love to go on but this information needs to be reviewed in an **EIR**. **Therefore I request an EIR be completed for this site as it is incomplete.** The current one sentence comment located within the Radio frequency Report does not do justice and is nothing short of disgraceful.

Two farms, Lane Farms 308 Walnut Lane and 5030 Hollister Avenue McCloskey Nursery will be directly impacted as well as Lane Farms(Organic) San Marcos 4950 Hollister Avenue, and San Marcos Growers 125 S San Marcos Road. Bees move around for pollen and nectar and are not site specific.

We the community need Safety Standards, not "out dated FCC guidelines". An Environmental report is needed, where there is none. Furthermore, AT&T's own website coverage maps indicate full coverage, no Gap in service for 4G LTE, they can't be lying to their customers. I request the Appeal be approved as the project cannot meet ADA **Accessibility Guidelines for Buildings and Facilities without restricting individuals with Electromagnetic Sensitivity considered a disability under ADA.**

I request this letter be included as formal record.

Sincerely,

Teresa Caves

resident of Sungate Ranch HOA,

Santa Barbara, CA

# APPENDIX

Thomas P. Stanley, Chief Engineer
Office of Engineering and Technology
Federal Communications Commission
Mail Stop 1300
1919 M Street, N.W.
Washington, D.C. 20554

Dear Dr. Stanley:

In accordance with its responsibilities under Section 309 of the Clean Air Act (CAA), the Environmental Protection Agency (EPA) is pleased to submit comments to the Federal Communications Commission (FCC) on the Notice of Proposed Rulemaking (NPRM), Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation, ET Docket No. 93-62. The CAA responsibilities have been delegated from the Office of Federal Activities to the Office of Radiation and Indoor Air for this specific review. This proposal, if adopted, would use the 1992 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE) standard to update and amend the FCC guidelines for evaluating the environmental effects of radiofrequency (RF) radiation emitted by FCC-regulated facilities on public health and safety.

The 1992 ANSI standard represents a significant revision of the earlier 1982 ANSI standard. Improvements with regard to protection are reflected in (1) the development of a 2-level exposure standard specifying maximum permissible exposure (MPE) limits for "controlled" and "uncontrolled" environments to replace the single-tier 1982 standard, and (2) the extension of the low frequency range from 300 kHz to 3 kHz to limit the possibility of low-frequency RF shock and burn. Other significant changes in the 1992 standard, however, are not improvements, in our view. Changes that allow for a two-fold increase in the MPE at high frequencies over the MPE permitted by the 1982 ANSI standard, and the application of the same MPE for both controlled and uncontrolled environments for frequencies from 15 GHz to 300 GHz are not improvements. Therefore, EPA recommends against adopting the 1992 ANSI/IEEE standard because it has serious flaws that call into question whether its proposed use is sufficiently protective of public health and safety.

To have a more protective public exposure standard, EPA recommends that the FCC instead adopt the exposure criteria

recommended earlier by the National Council on Radiation Protection and Measurements (NCRP) in their report entitled "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields (NCRP 1986)." The bases for this recommendation are noted below:

a. NCRP's RF radiation exposure limits consider both workers and the public.

b. Their exposure criteria are more protective at higher frequencies.

c. There are no substantive differences in the literature base supporting both standards, except for the literature on RF shocks and burns.

d. NCRP is chartered by the U.S. Congress to develop radiation protection recommendations and is recognized as one of the leading authorities in this area.

In addition, EPA recommends that the FCC consider including limits for induced and contact RF currents for the frequency range of 300 kHz to 100 MHz to protect against shock and burn along with the FCC proposal for low-power device exclusions as modified in the attachment to this letter. The Agency believes these recommendations provide a more protective alternative to the 1992 ANSI/IEEE standard. The basis for EPA's recommendations are provided in the detailed comments in the enclosure to this letter.

Furthermore, the Agency recommends that the FCC consider requesting the NCRP to revise its 1986 report and provide an updated, comprehensive report on the biological effects of RF radiation and recommendations for exposure criteria. EPA endorses such a request as reasonable and appropriate.

In summary, EPA recommends the following:

1. The FCC should not adopt the 1992 ANSI/IEEE standard. There are serious flaws in the standard that call into question whether the proposed use of the 1992 ANSI/IEEE is sufficiently protective. The following four points address several key Agency concerns.

a. The 1992 ANSI/IEEE allows a two-fold increase in the MPE at high frequencies above that permitted by the current FCC guideline.

b. The two-level revised standard is not directly applicable to any population group but is applicable to exposure environments called "controlled" and "uncontrolled" environments

that are not well defined and are discretionary. The Agency disagrees with this approach.

c. The 1992 ANSI/IEEE conclusion that there is no scientific data indicating that certain subgroups of the population are more at risk than others is not supported by NCRP and EPA reports.

d. The thesis that the 1992 ANSI/IEEE recommendations are protective of all mechanisms of interaction is unwarranted because the adverse effects level in the 1992 ANSI/IEEE standard is based on a thermal effect.

2. The FCC should consider the exposure criteria recommended by the NCRP in NCRP Report No. 86, "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," with the addition of:

a. the 1992 ANSI/IEEE limits for induced and contact RF currents, for the frequency range of 300 kHz to 100 MHz, to protect against shock and burn, and

b. the FCC proposal for low power device exclusions (FCC 93-142, pp. 7-8) as the standard for the public, where the definition of "public" includes all persons using these devices unless the user is operating a device as a concomitant of employment.

3. The FCC should consider requesting the NCRP to revise its 1986 report to provide an updated, comprehensive review of the biological effects on RF radiation and recommendations for exposure criteria.

More specific comments are enclosed for your consideration. We appreciate the opportunity to comment on the the FCC proposal. If you have any questions concerning EPA's comments, please feel free to contact Norbert Hankin in the Radiation Studies Branch at (202) 233-9235.

Sincerely,

Margo T. Oge
Director, Office of Radiation
and Indoor Air

Enclosure

**Environmental Protection Agency (EPA) Comments to the Federal Communications Commission (FCC) on FCC 93-142, April 1993, Notice of Proposed Rulemaking; Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation.**

Introduction

The FCC currently uses the 1982 ANSI (American National Standards Institute, Inc.) radiofrequency (RF) radiation guidelines for evaluating the environmental effects, particularly on public health and safety, of RF radiation emitted by FCC regulated facilities. In November 1992, ANSI adopted a revised standard now known as ANSI/IEEE C95.1-1992 (IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, IEEE C95.1-1991). The FCC now proposes to amend and update the guidelines and methods that it uses to evaluate the environmental effects of RF radiation by adopting the new ANSI/IEEE standard. The 1992 recommendations contain a number of significant changes when compared to the 1982 single-level guideline based on a 10-fold safety factor. The revised guideline is a two-level standard, i.e., it contains two sets of exposure limits, one for the controlled environment and one for the uncontrolled environment, incorporating safety factors of 10 and 50, respectively. Another change is the extension of the frequency range from 300 kHz - 100 GHz to 3 kHz - 300 GHz. In addition, 1992 ANSI/IEEE allows a two-fold increase in the MPE at high frequencies above that permitted by the 1982 ANSI standard.

EPA welcomes the opportunity to comment on the FCC proposal and to address the complexity and what we believe are the limitations of ANSI/IEEE C95.1-1992. EPA review of 1992 ANSI/IEEE leads us to believe that it is a standard with flaws that cast doubt about whether it is sufficiently protective of public health and safety, and its claim that "the recommended exposure levels should be safe for all."

EPA comments on the FCC proposed standard address: derivation of standards; the claim of protection for all persons from all interaction mechanisms; controlled and uncontrolled environments; database limitations; modulation; low-power devices; and, other contemporary exposure standards.

**Discussion**

Approach to Derivation of Standards

The rationale provided in ANSI/IEEE to explain fundamental characteristics of the 1992 ANSI/IEEE guidelines, in many cases, lacks explanation, consistency, and well-founded justifications. In addition, there is concern that the complexity of the 1992 ANSI/IEEE standard may make it difficult to comply with or effectively enforce.

No explanation is given for the decision to employ safety factors of 10 and 50; there is no discussion that supports the introduction of the standard for the "uncontrolled" environment. In fact, the stated conclusion that "the recommended exposure levels should be safe for all" (at the controlled environment working basis of 0.4 W/kg) and the support given for this conclusion in the standard's rationale constitute an argument for a single-tier, not a two-tier standard. The addition of the second level of protection for exposure in an

uncontrolled environment with the application of an additional safety factor is done without any justification.

When available, human data is preferable to laboratory animal data in standards development. Therefore we consider the 1992 ANSI/IEEE guidelines to be deficient in this area because reports published after 1986 that presented human data were not considered. We would expect that future efforts to develop or update RF radiation standards would include analysis of available human thermophysiological information and models.

Claim of Protection for All Persons from All Interaction Mechanisms

The new ANSI/IEEE standard states that the "intent was to protect human beings from harm by any mechanism, including those arising from excessive elevations of body temperature" (IEEE p.27), i.e., the 1992 ANSI/IEEE standard is purported to be protective of all persons and all interaction mechanisms. We believe that this position has not been supported, as shown by the following discussion.

In the 1992 ANSI/IEEE standard, as well as in the 1986 NCRP guidelines, the biological basis for maximum permissible exposure level varies with frequency. Ir the frequency range from 100 kHz to 6 GHz, maximum permissible exposure levels are based on whole-body averaged SAR (specific absorption rate expressed in watts per kilogram of body mass, W/kg). More specifically, the working threshold for unfavorable biological effects in human beings in the frequency range from 100 kHz to 6 GHz is defined as 4 W/kg. Safety factors of 10 and 50 were used to derive the maximum permissible exposures for controlled and uncontrolled environments, respectively.

This adverse effect level for human beings, 4 W/kg, is the threshold for a specific biological effect, i.e., behavioral disruption (work stoppage) in nonhuman primates that is associated with an increase in body temperature. Work stoppage, the failure of a food-deprived animal to perform a learned task to gain a food reward, is interpreted to result from thermal stress, caused by the absorption of RF energy, that is sufficiently severe to deter hungry animals from working for food.

Since the ANSI/IEEE hazard level is an SAR associated with an effect resulting from a known mechanism of interaction (RF heating) that is associated with an increase in body temperature (as is the NCRP hazard level), the ANSI/IEEE C95.1-1992 standard is based on a thermal effect of RF radiation and, by extension, is protective of effects arising from a thermal mechanism, but not from all possible mechanisms. Therefore, the generalization that 1992 ANSI/IEEE guidelines protect human beings from harm by any mechanism is not justified.

In contrast to the 1992 ANSI/IEEE standard, 1986 NCRP states that a response to RF radiation may have a "thermal basis, an athermal basis, or a combined basis," and that a "determination of which of these three classes of causation is operative in a given context rests upon appropriate experimentation and inference, not presumption." NCRP

also claims that there is "no intent to define exposure criteria solely in terms of SAR," and that "consideration is also given to other factors where appropriate." These factors include, among others, possible modulation- and carrier-frequency specific biological responses.

Exposure Environments - Controlled and Uncontrolled

EPA believes that the proper approach in defining exposure environments to which guidelines are applied should be in terms of the populations to be protected, i.e., the traditionally defined populations being workers and the public. However, the ANSI/IEEE standard takes a different approach.

The 1992 ANSI/IEEE standard recommends exposure limits for a controlled environment and an uncontrolled environment. Controlled environments are defined as locations where exposure may be incurred by persons who are aware of the potential for exposure or as the result of transient passage. Uncontrolled environments are locations where exposures may be incurred by persons who are unaware of the potential for exposure. In the uncontrolled environment, an additional safety factor is applied for exposure in the resonant frequency range and for low-frequency exposure to electric fields. As defined in the standard, controlled environments are discretionary, i.e., identification of controlled environments is at the discretion of the operator of a source (see IEEE, p. 9, footnote 1).

The 1992 ANSI/IEEE standard states clearly that the distinction between the two exposure environments is based on the nature of the exposure environment and not on the population type (see IEEE 1991, p. 23). ANSI/IEEE does not allow for any variation in sensitivity to RF radiation. It states that there is no reliable evidence that certain subgroups of the population [such as infants, aged, ill and disabled, persons dependent on medication, persons in adverse environmental conditions (excessive heat and/or humidity), voluntary vs. involuntary exposure] are more at risk than others (IEEE 1991, p. 23). This conclusion is not in agreement with conclusions in the EPA report "Biological Effects of Radiofrequency Radiation" (EPA 600/8-83-026F, 1984) or in the NCRP Report No. 86, "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields" that the general population has groups of individuals particularly susceptible to heat.

Other contemporary guidelines agree with NCRP and EPA; the Food and Drug Administration (FDA) 1988, National Radiological Protection Board (NRPB) 1991, International Radiation Protection Association (IRPA) 1991, and the International Electrotechnical Commission (IEC) 1993, guidelines define groups of people who are less heat tolerant than others. These include the elderly, infants, pregnant women, and people who are obese, have hypertension, or take drugs such as diuretics, tranquilizers, sedatives, or vasodilators that decrease heat tolerance.

The basis for the ANSI/IEEE guideline in the frequency range of 0.1 MHz to 6.0 GHz, the frequency range in which most of FCC licensed transmitters operate, is an effect due to RF heating. Since, as mentioned above, the general population contains individuals

particularly susceptible to heat, we recommend against the use of controlled and uncontrolled environments and recommend consideration of 1986 NCRP as a means of avoiding this problem.

We strongly disagree with the use of the concepts of control and awareness in the discretionary manner presented in 1992 ANSI/IEEE. In the standard there are no firm rules given to differentiate between controlled and uncontrolled environments, and therefore the concept will be difficult to apply because people seldom agree on discretionary areas of exposure. The standard could be applied arbitrarily and inconsistently since ANSI/IEEE does not impose conditions to describe or create the state of awareness. An individual's degree of awareness could vary from complete understanding of RF sources to only a vague awareness that RF radiation exists in his controlled environment.

If awareness in a controlled environment can vary from complete knowledge to almost no knowledge, then the degree of control over safety is uncertain. Unspecified awareness in itself does not constitute a controlled situation. A controlled environment could be established with measures imposed to ensure strict adherence to the standard to prevent the possibility for exposure of any individual in the controlled environment to exposures greater than recommended by the standard. However, 1992 ANSI/IEEE does not recommend the actions that should be taken to establish a controlled environment, and if it would, it could not provide the authority for control. In our view, "awareness" is not equivalent to protection.

The FCC proposal (paragraph 13) presents a reasonable way to apply the guidelines to the public that is more consistent with traditional definitions of workers and the public. This is also the method used in the 1986 NCRP exposure criteria. NCRP recognizes that there is variability in human response, that there are categories of individuals with susceptibilities that place them at greater risk for potential harm, and that workers, who may be relatively well informed of potential hazards of RF radiation exposure, may have the opportunity to make personal decisions in regard to their exposure. Therefore it is appropriate for the FCC to adopt this approach to apply the more conservative guidelines where there is any question of possible exposure of the general public (which might also include nontechnical employees) to RF radiation, and to apply the more restrictive exposure limits to any transmitters and facilities that are located in residential areas or locations where the RF source may be accessible to the public. We suggest that the phrase "accessible to the public" replace the word "unrestricted" in the FCC proposal because the former phrase more accurately describes the locations.

Limitations of data

Availability of chronic exposure information

It is clear that the adverse effect threshold of 4 W/kg is based on acute exposures (measured in minutes or a few hours) that elevate temperature in laboratory animals including nonhuman primates, and not on long-term, low-level (non-thermal) exposure. Only a few chronic exposure studies of laboratory animals and epidemiological studies of human populations have been reported. The majority of these relatively

few studies indicate no significant health effects are associated with chronic, low-level exposure to RF radiation. This conclusion is tempered by the results of a small number of reports suggesting potentially adverse health effects (cancer) may exist (e.g., Szmigielski - Bioelectromagnetics 1982; Chou - Bioelectromagnetics 1992; Milham - NEJM 1982, Lancet 1985, Am. J Epid. 1988). A determination of the significance of such potential adverse effects awaits independent confirmation of the experimental results.

The limitations of the data used to define the adverse effect level in the 1992 ANSI/IEEE recommendations do not support the claim that the recommended MPEs in 1992 ANSI/IEEE are protective of all mechanisms and all people.

Publication Cut-off Date

The 1992 ANSI/IEEE standard is based on literature published before 1986, except for a few papers on RF shock and burn. The cut-off date for the literature review supporting the NCRP recommendations is 1982. Even though the 1992 ANSI/IEEE guidelines had more recent data for consideration than did 1986 NCRP, the recommendations are basically similar for the resonant frequency range in that both use work stoppage at 4 W/kg as the adverse effect basis for standard setting and also safety factors of 10 and 50 to establish two levels of MPE. Therefore it cannot be argued that the 1992 ANSI/IEEE standard is preferable because it is based on more recent information except for the recommendations on shock and burn. Although the Agency believes the ANSI/IEEE standard to be generally deficient, EPA concurs with the FCC proposal to adopt the 1992 ANSI/IEEE standard with respect to exposure limitations for shock and burn.

Extremely Low Frequency (ELF)-Modulated RF Radiation

As noted in the FCC proposal (paragraph 25), the NCRP guidelines include a special provision with respect to exposure of workers to RF carrier frequencies modulated at ELF frequencies. This recommendation is apparently based on experimental results showing neurophysiological effects of modulated fields. The modulation provision for workers in the NCRP guidelines is unique; no other RF exposure guideline contains such a provision. For certain modulation conditions, the exposure criteria for occupational exposures is the generally 10-fold more stringent general population exposure criteria.

While studies continue to be published describing biological responses to nonthermal ELF-modulated RF radiation, the effects information is not yet sufficient to be used as a basis for exposure criteria to protect the public against adverse human health effects.

Pulse-modulated vs. continuous-wave (CW) RF radiation

Many other studies provide evidence that nonthermal modulated-RF exposures produce effects that are not produced by CW (unmodulated) RF radiation. Meaningful studies of biological and health effects of nonthermal, pulse-modulated RF radiation exist including studies that show injury to the eye (Kues et al., Johns Hopkins Applied Physics Laboratory (JHAPL). The significance of these results, even at the early stages of this continuing research, was responsible for the

development and adoption of an RF radiation exposure standard by JHAPL (in 1984) for their personnel. The JHAPL MPE for frequencies from 30 MHz to 100 GHz is 0.1 $mW/cm^2$. This standard provided the basis for the 0.1 $mW/cm^2$ action level used to protect personnel from harm from RF radiation-generating equipment at the Hughes Aircraft Company. The JHAPL MPE is a factor of 100 times more stringent than the 1992 ANSI/IEEE MPE for controlled environments for the frequency range of 3.0 GHz and above.

Pulse-modulated RF radiation can produce a response that is called "microwave hearing". This effect seems well established and probably results from very rapid thermoelastic expansion of the brain, creating a sound wave in the head. Conditions under which the auditory effect can be invoked in people with normal hearing should be avoided according to the National Radiological Protection Board (NRPB) draft recommendations for workers and the public. In contrast to this recommendation, the 1992 ANSI/IEEE standard states that the human auditory effect is clearly not deleterious; it recommends a limit for pulsed radiation that is well above the threshold for the auditory effect.

Low-power Devices

We recommend that the two population groups, workers and the public, be used in the following suggested modifications to the FCC proposal regarding exposure to hand-held devices and amateur radio facilities (see FCC 1993, p.6, footnote 16). Non-users exposed to hand-held devices and amateur radio facilities should be considered as the public. Users of hand-held devices and amateur radio facilities should be considered as the public unless the user is operating a device as a concomitant of employment. This recommendation is based on the difficulty of differentiating between individuals who are cognizant or noncognizant of the potential for RF exposure and is consistent with the NCRP recognition of the two population groups, workers and the public. If NCRP is used, the problem of differentiating between cognizant workers and cognizant public would be avoided, and it would not be necessary to distinguish between users and non-users.

Other Contemporary Radiofrequency Radiation Guidelines

In addition to the differences identified and discussed between the 1992 ANSI/IEEE standard and the 1986 NCRP recommendations, there are significant differences between 1992 ANSI/IEEE and other contemporary RF radiation exposure guidelines, including those of the Food and Drug Administration (FDA), National Radiological Protection Board (NRPB), International Radiation Protection Association (IRPA), the International Electrotechnical Commission (IEC), and the Johns Hopkins Applied Physics Laboratory (JHAPL). The comments in this section address some of the differences.

The 1992 ANSI/IEEE guidelines are based on literature published before 1986 except for several papers on shock and burn. Other contemporary recommendations use more recent information and appear to be strongly influenced by clinical and modeling data describing thermoregulatory responses of patients and volunteers exposed in magnetic resonance imaging devices. As noted, the 1992 ANSI/IEEE adverse-effects level is based only on laboratory animal data.

The 1992 ANSI/IEEE standard claims that the recommendations protect against harm by any mechanism, that is, both thermal and nonthermal. It contends that chronic exposure data and information on nonthermal interactions are not meaningful for standards development. While there is general, although not unanimous, agreement that the data base on low-level, long-term exposure is insufficient to provide a basis for standards development, some contemporary guidelines state explicitly that their adverse-effect level is based on an increase in body temperature (NRPB 1993). Furthermore, they do not claim that the exposure limits protect against both thermal and nonthermal effects. EPA does not agree with the claim that the 1992 ANSI/IEEE guidelines protect against effects of any mechanism; we believe that the only claim that can be made is that the 1992 ANSI/IEEE standard applies only to thermal effects and electric shock.

Although several mechanisms of interaction of RF radiation with living systems have been proposed, the established and noncontroversial mechanism for acute exposures is heating. This is reflected in several guidelines for protection of patients from the physiological consequences of an increase in temperature due to exposure to RF radiation during magnetic resonance imaging procedures. These guidelines include: the 1988 FDA guidance, 1991 NRPB guidelines, the 1991 IRPA guidelines, and the 1993 draft IEC standard.

The 1993 NRPB draft recommendations for workers and the public state that restrictions on acute exposure to RF radiation of frequencies greater than 100 kHz are intended to avoid adverse effects resulting from whole-body and partial-body heating, and adverse effects resulting from pulsed RF radiation.

The 1992 ANSI/IEEE standard recommends limits for controlled and uncontrolled environments, using as its basis the position that the it is the nature of the exposure environment, not population type, that is important. This position is based partially on the conclusion that no reliable scientific data exists indicating that certain subgroups of the population are more at risk than others. However, other contemporary guidelines state the opposite conclusion. The FDA (1988), NRPB (1991), IRPA (1991), and the IEC (1993) guidelines define groups of people who are less heat tolerant than others. This information should be considered in development of an exposure standard.

## Summary of EPA Recommendations

1. The FCC should not adopt the 1992 ANSI/IEEE standard. There are serious flaws in the standard that call into question whether the proposed use of 1992 ANSI/IEEE is sufficiently protective. The following four points address some of our concerns.

a) 1992 ANSI/IEEE allows a two-fold increase in the MPE at high frequencies above that permitted by the current FCC guideline.

b) The two-level revised standard is not directly applicable to any population group but is applicable to exposure environments called controlled and uncontrolled environments that are not well defined and are discretionary. We disagree with this approach.

c) The 1992 ANSI/IEEE conclusion that there is no scientific data indicating that certain subgroups of the population are more at risk than others is not supported by NCRP and EPA reports.

d) The thesis that the 1992 ANSI/IEEE recommendations are protective of all mechanisms of interaction is unwarranted because the adverse effects level in the 1992 ANSI/IEEE standard is based on a thermal effect.

2. The FCC should consider the exposure criteria recommended by the National Council on Radiation Protection and Measurements (NCRP) in NCRP Report No. 86, "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," with the addition of

(a) the 1992 ANSI/IEEE limits for induced and contact RF currents, for the frequency range of 300 kHz to 100 MHz, to protect against shock and burn, and

(b) the FCC proposal for low power device exclusions (FCC 93-142, pp. 7-8) as the standard for the public, where "public" includes all persons using these devices unless the user is operating a device as a concomitant of employment.

EPA recommends consideration of 1986 NCRP for the following reasons.

a) 1986 NCRP recommends RF radiation exposure limits specifically for both workers and the public.

b) 1986 NCRP is more protective than 1992 ANSI/IEEE at higher frequencies.

c) There are no substantive differences in the literature base supporting 1986 NCRP and 1992 ANSI/IEEE except for the literature on RF shocks and burns.

In addition, NCRP is chartered by the U.S. Congress to develop radiation protection recommendations.

3. The FCC should consider requesting that the NCRP revise its 1986 report to provide an updated, critical, and comprehensive review of the biological effects on RF radiation and recommendations for exposure criteria.

## References


EPA 1984. EPA-600/8-83-026F, Biological Effects of Radiofrequency Radiation, U.S. Environmental Protection Agency, September 1984.

FCC 1993. Notice of Proposed Rulemaking; Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation, FCC 93-142, April 1993.

FDA 1992. Current FDA Guidance for MR Patient Exposure and Considerations for the Future, T.W. Athey, In Biological Effects and

Safety Aspects of Nuclear Magnetic Resonance Imaging and Spectroscopy, R.L. Magin, R.P. Liburdy and B. Persson, Editors, Annals of the New York Academy of Sciences 649: 242-257, 1992.

IEC 1993. Medical Electrical Equipment, Part 2: Particular Requirements for the Safety of Magnetic Resonance Equipment for Medical Diagnosis, International Electrotechnical Commission (IEC), Sub-Committee 62B Standard (Draft), March 1993, 61 pages.

IEEE 1991. IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, IEEE C95.1-1991, Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, NY 10017, April 27, 1992.

IRPA 1991. Protection of the Patient Undergoing a Magnetic Resonance Examination, International Non-ionizing Radiation Committee of the International Radiation Protection Association (IRPA), Health Physics 61: 923-928, 1991.

JHAPL 1984. APL Standard for Exposure to Radio-Frequency Radiation, APL Safety Memo No. 15, Johns Hopkins Applied Physics Laboratory, October 19, 1984.

NCRP 1986. Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields, National Council on Radiation Protection and Measurements (NCRP), 7910 Woodmont Av, Bethesda, MD 20814, NCRP Report No. 86, April 2, 1986.

NRPB 1992. Limits on Patient and Volunteer Exposure During Clinical Magnetic Resonance Diagnostic Procedures, In Biological Effects and Safety Aspects of Nuclear Magnetic Resonance Imaging and Spectroscopy, R.L. Magin, R.P. Liburdy and B. Persson, Editors, Annals of the New York Academy of Sciences 649: 376-398, 1992.

NRPB 1993. Restrictions on Exposure to Static and Time-Varying Electromagnetic Fields and Radiation, National Radiological Protection Board (NRPB), Draft Proposal, March 1993, 14 pages.

Santa Barbara County Board of Architectural Review

123 Anapamu Street

Santa Barbara, CA 93101

Re: Case Number: 14BAR-00000-00217

November 13, 2014

Dear Members of the Board,

As a resident of the Sungate Ranch Community whose house is located within 300 feet of the proposed cellular tower structure, I would like to express my deepest concerns regarding this development in our community. I have a doctoral degree in Physics, and based on the publicly disclosed information I was able to make some estimates of the projected amount of radiation emitted by the antennas. My conclusions are alarming, and I want to voice my strongest objection to the proposed Verizon's plans. I ask you to consider the following concerns:

1. **Health concerns:** According to the proposed plan by Verizon Communications, the approximate maximum radiation power near the base is 30kW. By making a few assumptions (omnidirectional isotropic antennas, distances), I have estimated that max power density of electro-magnetic radiation (EMR) near the fence of Sungate Ranch Community would be 10-100 microwatts per square centimeter. This is a significant power of radiation which can lead to serious health problems. Indeed, recently there has been mounting concern about the possibility of adverse health effects resulting from exposure to radiofrequency electromagnetic fields. According to the International Institute for building biology testing methods (Austria), EMR above 0.1 microwatts per square centimeter should be of extreme concern to the public (see http://hbelc.org/pdf/standards/sbm2008.pdf). The numbers I have estimated are at least 100 times larger! According to International Agency for Research on Cancer (http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf), EMR is possibly carcinogenic to humans. For the aforementioned reasons, I would like to ask the board to seriously consider potential hazards due to constant emission of EMR and its effect on the residents of Sungate Ranch Community, as well as children attending schools nearby. In this context, I have a number of questions to the board:

    a) Given the large number of existing cellular antennas in 1 mile radius (including the proposed structure), I am wondering what would be the cumulative effect

of EMR on the residents and what are the actual numbers measured close to the residential houses. Please also take into account that another construction of cellular towers is proposed at 5073 Hollister Avenue.

b) Given the proximity of residential homes and four schools (El Camino, Girl Inc., Montessori, San Marcos), I would like to know what is the rationale for putting cellular antennas at the Verizon's Hollister facility.

2. **Property value:** After consulting with several real estate agents and a lawyer, I am of the opinion that real estate property in close proximity to the cellular antennas will significantly depreciate in value since most people would not want to buy a house next to the cellular towers. I personally would not want to live in a house with such a high level of electromagnetic radiation - the aforementioned radiation estimate is equivalent to **thousands** of Wi-Fi routers within one meter distance (typical EMR power of a Wi-Fi router is 30 milliwatts which is equivalent to 0.2 microwatts per square centimeter at one meter distance).

3. **Local landscape and architecture:** In my opinion, the 76-foot high false tree-pole with 12 antennas would not fit into local landscape consisting mostly of the agricultural fields. This structure would have an environmental effect on a large population of birds as well as other inhabitants of the agricultural fields.

Please take into account the seriousness of such an impactful decision which would affect local residents, children attending the nearby schools, local flora and fauna. From multiple meetings and conversations with my neighbors, I know that members of the Sungate Ranch community are truly alarmed by the negative health, financial and environmental ramifications of the Verizon's plans for building cellular towers in our neighborhood. We strongly oppose to it, and are willing to take this matter to the public attention, as well as seek legal counseling and protection.

Thank you for your consideration.

Sincerely,

Roman Lutchyn, PhD

Resident and homeowner of 5004 Sungate Ranch Road, Santa Barbara, CA 93111

PS. Unfortunately, I will not be able to attend the meeting on December 5th, 2014. I would like BAR Secretary to speak on my behalf and present my opinion regarding this matter.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 8 2002

OFFICE OF
AIR AND RADIATION

Janet Newton
President
The EMR Network
P.O. Box 221
Marshfield, VT 05658

Dear Ms. Newton:

Thank you for your letter of January 31, 2002, to the Environmental Protection Agency Administrator Whitman, in which you express your concerns about non-thermal effects of radiofrequency (RF) radiation and the adequacy of the Federal Communications Commission's RF radiation exposure guidelines. The Administrator has asked us to critically examine the issues you bring to our attention, and we will be responding to you shortly.

We appreciate your interest in the matter of non-thermal RF exposure, possible health risks, and Federal government responsibility to protect human health.

Sincerely,

Frank Marcinowski, Director
Radiation Protection Division

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUL 16 2002

OFFICE OF
AIR AND RADIATION

Ms. Janet Newton
President
The EMR Network
P.O. Box 221
Marshfield, VT 05658

Dear Ms.Newton:

This is in reply to your letter of January 31, 2002, to the Environmental Protection Agency (EPA) Administrator Whitman, in which you express your concerns about the adequacy of the Federal Communications Commission's (FCC) radiofrequency (RF) radiation exposure guidelines and nonthermal effects of radiofrequency radiation. Another issue that you raise in your letter is the FCC's claim that EPA shares responsibility for recommending RF radiation protection guidelines to the FCC. I hope that my reply will clarify EPA's position with regard to these concerns. I believe that it is correct to say that there is uncertainty about whether or not current guidelines adequately treat nonthermal, prolonged exposures (exposures that may continue on an intermittent basis for many years). The explanation that follows is basically a summary of statements that have been made in other EPA documents and correspondence.

The guidelines currently used by the FCC were adopted by the FCC in 1996. The guidelines were recommended by EPA, with certain reservations, in a letter to Thomas P. Stanley, Chief Engineer, Office of Engineering and Technology, Federal Communications Commission, November 9, 1993, in response to the FCC's request for comments on their Notice of Proposed Rulemaking (NPRM), Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation (enclosed).

The FCC's current exposure guidelines, as well as those of the Institute of Electrical and Electronics Engineers (IEEE) and the International Commission on Non-ionizing Radiation Protection, are thermally based, and do not apply to chronic, nonthermal exposure situations. They are believed to protect against injury that may be caused by acute exposures that result in tissue heating or electric shock and burn. The hazard level (for frequencies generally at or greater than 3 MHz) is based on a specific absorption dose-rate, SAR, associated with an effect

that results from an increase in body temperature. The FCC's exposure guideline is considered protective of effects arising from a thermal mechanism but not from all possible mechanisms. Therefore, the generalization by many that the guidelines protect human beings from harm by any or all mechanisms is not justified.

These guidelines are based on findings of an adverse effect level of 4 watts per kilogram (W/kg) body weight. This SAR was observed in laboratory research involving acute exposures that elevated the body temperature of animals, including nonhuman primates. The exposure guidelines did not consider information that addresses nonthermal, prolonged exposures, i.e., from research showing effects with implications for possible adversity in situations involving chronic/prolonged, low-level (nonthermal) exposures. Relatively few chronic, low-level exposure studies of laboratory animals and epidemiological studies of human populations have been reported and the majority of these studies do not show obvious adverse health effects. However, there are reports that suggest that potentially adverse health effects, such as cancer, may occur. Since EPA's comments were submitted to the FCC in 1993, the number of studies reporting effects associated with both acute and chronic low-level exposure to RF radiation has increased.

While there is general, although not unanimous, agreement that the database on low-level, long-term exposures is not sufficient to provide a basis for standards development, some contemporary guidelines state explicitly that their adverse-effect level is based on an increase in body temperature and do not claim that the exposure limits protect against both thermal and nonthermal effects. The FCC does not claim that their exposure guidelines provide protection for exposures to which the 4 W/kg SAR basis does not apply, i.e., exposures below the 4 W/kg threshold level that are chronic/prolonged and nonthermal. However, exposures that comply with the FCC's guidelines generally have been represented as "safe" by many of the RF system operators and service providers who must comply with them, even though there is uncertainty about possible risk from nonthermal, intermittent exposures that may continue for years.

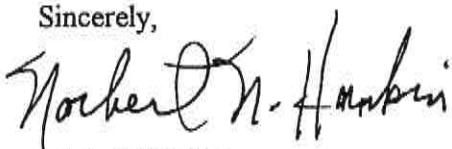
The 4 W/kg SAR, a whole-body average, time-average dose-rate, is used to derive dose-rate and exposure limits for situations involving RF radiation exposure of a person's entire body from a relatively remote radiating source. Most people's greatest exposures result from the use of personal communications devices that expose the head. In summary, the current exposure guidelines used by the FCC are based on the effects resulting from whole-body heating, not exposure of and effect on critical organs including the brain and the eyes. In addition, the maximum permitted local SAR limit of 1.6 W/kg for critical organs of the body is related directly to the permitted whole body average SAR (0.08 W/kg), with no explanation given other than to limit heating.

I also have enclosed a letter written in June of 1999 to Mr. Richard Tell, Chair, IEEE SCC28 (SC4) Risk Assessment Work Group, in which the members of the Radiofrequency Interagency Work Group (RFIAWG) identified certain issues that they had determined needed to be addressed in order to provide a strong and credible rationale to support RF exposure guidelines.

Federal health and safety agencies have not yet developed policies concerning possible risk from long-term, nonthermal exposures. When developing exposure standards for other physical agents such as toxic substances, health risk uncertainties, with emphasis given to sensitive populations, are often considered. Incorporating information on exposure scenarios involving repeated short duration/nonthermal exposures that may continue over very long periods of time (years), with an exposed population that includes children, the elderly, and people with various debilitating physical and medical conditions, could be beneficial in delineating appropriate protective exposure guidelines.

I appreciate the opportunity to be of service and trust that the information provided is helpful. If you have further questions, my phone number is (202) 564-9235 and e-mail address is hankin.norbert@epa.gov.

Sincerely,



Norbert Hankin
Center for Science and Risk Assessment
Radiation Protection Division

Enclosures:

1) letter to Thomas P. Stanley, Chief Engineer, Office of Engineering and Technology, Federal Communications Commission, November 9, 1993, in response to the FCC's request for comments on their Notice of Proposed Rulemaking (NPRM), Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation
2) June 1999 letter to Mr. Richard Tell, Chair, IEEE SCC28 (SC4) Risk Assessment Work Group from the Radiofrequency Radiation Interagency Work Group

DEPARTMENT OF HEALTH AND HUMAN SERVICES Public Health Service

National Institute for Occupational
Safety and Health
Robert A. Taft Laboratories
4676 Columbia Parkway
Cincinnati OH 45226-1998
June 17, 1999

Mr. Richard Tell
Chair, IEEE SCC28 (SC4)
Risk Assessment Work Group
Richard Tell Associates, Inc.
8309 Garnet Canyon Lane
Las Vegas, NV 89129-4897

Dear Mr. Tell:

The members of the Radiofrequency Interagency Work Group (RFIAWG) have identified certain issues that we believe need to be addressed to provide a strong and credible rationale to support RF exposure guidelines. I am writing on behalf of the RFIAWG members to share these ideas with you and other members of the IEEE SCC28, Subcommittee 4 Risk Assessment Work Group. Our input is in response to previous requests for greater participation on our part in the SCC28 deliberations on RF guidelines. The issues, and related comments and questions relevant to the revision of the IEEE RF guidelines, are given in the enclosure. No particular priority is ascribed to the order in which the issues are listed.

The views expressed in this correspondence are those of the members of the Radiofrequency Interagency Work Group and do not represent the official policy or position of the respective agencies.

The members of the RFIAWG appreciate your consideration of our comments and welcome further dialog on these issues. Feel free to contact me or any member of the RFIAWG directly. A list of the members of the RFIAWG is enclosed, with contact information for your use.

Sincerely yours,

W. Gregory Lotz

W. Gregory Lotz, Ph.D.
Chief, Physical Agents Effects Branch
Division of Biomedical and
Behavioral Science

Enclosures (2)
cc: N. Hankin
J. Elder
R. Cleveland
R. Curtis
R. Owen
L. Cress
J. Heale

**RF Guideline Issues**

*Identified by members of the federal RF Interagency Work Group*, June 1999

Issue: Biological basis for local SAR limit

The C95.1 partial body (local) exposure limits are based on an assumed ratio of peak to whole body SAR; that is, they are dosimetrically, rather than biologically based. Instead of applying a dosimetric factor to the whole body SAR to obtain the local limits, an effort should be made to base local SAR limits on the differential sensitivity of tissues to electric fields and temperature increases. For example, it seems intuitive that the local limits for the brain and bone marrow should be lower than those for muscle, fat and fascia; this is not the case with the current limits which implicitly assume that all tissues are equally sensitive (except for eye and testicle). If no other data are available, differential tissue sensitivity to ionizing radiation should be considered.

If it is deemed necessary to incorporate dosimetric factors into the resulting tissue-specific SAR limits these should be based on up-to-date dosimetric methods such as finite-difference time-domain calculations utilizing MRI data and tissue-specific dielectric constants. For certain exposure conditions FDTD techniques and MRI data may allow better simulation of peak SAR values. Consideration should be given to the practical tissue volume for averaging SAR and whether this volume is relevant to potential effects on sensitive tissues and organs.

Issue: Selection of an adverse effect level

Should the thermal basis for exposure limits be reconsidered, or can the basis for an unacceptable/adverse effect still be defined in the same manner used for the 1991 IEEE guidelines? Since the adverse effect level for the 1991 guidelines was based on acute exposures, does the same approach apply for effects caused by chronic exposure to RF radiation, including exposures having a range of carrier frequencies, modulation characteristics, peak intensities, exposure duration, etc., that does not elevate tissue temperature on a macroscopic scale?

Selection criteria that could be considered in determining unacceptable/adverse effects include:

a) adverse effects on bodily functions/systems
b) minimal physiological consequences
c) measurable physiological effects, but no known consequences

If the adverse effect level is based on thermal effects in laboratory animals, the literature on human studies (relating dose rate to temperature elevation and temperature elevation to a physiological effect) should be used to determine if the human data could reduce uncertainties in determination of a

safety factor.

Issue: Acute and chronic exposures

There is a need to discuss and differentiate the criteria for guidelines for acute and chronic exposure conditions. The past approach of basing the exposure limits on acute effects data with an extrapolation to unlimited chronic exposure durations is problematic. There is an extensive data base on acute effects with animal data, human data (e.g. MRI information), and modeling to address thermal insult and associated adverse effects for acute exposure (e.g., less than one day). For lower level ("non-thermal"), chronic exposures, the effects of concern may be very different from those for acute exposure (e.g., epigenetic effects, tumor development, neurologic symptoms). It is possible that the IEEE RF radiation guidelines development process may conclude that the data for these chronic effects exist but are inconsistent, and therefore not useable for guideline development. If the chronic exposure data are not helpful in determining a recommended exposure level, then a separate rationale for extrapolating the results of acute exposure data may be needed. In either case (chronic effects data that are useful or not useful), a clear rationale needs to be developed to support the exposure guideline for chronic as well as acute exposure.

Issue: One tier vs two tier guidelines:

A one tier guideline must incorporate all exposure conditions and subject possibilities (e.g., acute or chronic exposure, healthy workers, chronically ill members of the general public, etc.). A two tier guideline, as now exists, has the potential to provide higher limits for a specific, defined population (e.g., healthy workers), and exposure conditions subject to controls, while providing a second limit that addresses greater uncertainties in the data available (about chronic exposure effects, about variations in the health of the subject population, etc.). A greater safety factor would have to be incorporated to deal with greater uncertainty in the scientific data available. Thus, a two-tier guideline offers more flexibility in dealing with scientific uncertainty, while a one-tier guideline would force a more conservative limit to cover all circumstances including the scientific uncertainties that exist.

Issue: Controlled vs. uncontrolled (applicability of two IEEE exposure tiers)

The current "controlled" and "uncontrolled" definitions are problematic, at least in the civilian sector, particularly since there are no procedures defined in the document to implement the "controlled" condition. The new guidelines should offer direction for the range of controls to be implemented and the training required for those who knowingly will be exposed (e.g. workers), along the lines of the existing ANSI laser safety standards. This essential element needs to be included for whatever limits are defined, be they one-tier or two-tier.

For example, the OSHA position is that the "uncontrolled" level is strictly an "action" level which

indicates that there is a sufficiently high exposure (compared to the vast majority of locations) to merit an assessment to determine what controls and training are necessary to ensure persons are not exposed above the "controlled" limit. Many similar "action" levels are part of OSHA and public health standards. Should this interpretation be incorporated into the IEEE standard as a means to determine the need to implement a safety plan? [The laser standard has a multi-tiered (Class I, II, III, IV) standard which similarly requires additional controls for more powerful lasers to limit the likelihood of an excess exposure, even though the health effect threshold is the same.]

On the other hand, if it is determined that certain populations (due to their health status or age) are more susceptible to RF exposures, then a multi-tiered standard, applicable only to those specific populations, may be considered.

The ANSI/IEEE standard establishes two exposure tiers for controlled and uncontrolled environments. The following statement is made in the rationale (Section 6, page 23): "The important distinction is not the population type, but the nature of the exposure environment." If that is the case, consideration should be given to providing a better explanation as to why persons in uncontrolled environments need to be protected to a greater extent than persons in controlled environments. An uncontrolled environment can become a controlled environment by simply restricting access (e.g., erecting fences) and by making individuals aware of their potential for exposure. After such actions are taken, this means that the persons who previously could only be exposed at the more restrictive uncontrolled levels could now be exposed inside the restricted area (e.g., inside the fence) at controlled levels.

What biologically-based factor changed for these people? Since the ostensible public health reason for providing greater protection for one group of persons has historically been based on biological considerations or comparable factors, it is not clear why the sentence quoted above is valid.

Issue: Uncertainty factors

The uncertainties in the data used to develop the guideline should be addressed. An accepted practice in establishing human exposure levels for agents that produce undesirable effects is the application of factors representing each area of uncertainty inherent in the available data that was used to identify the unacceptable effect level. Standard areas of uncertainty used in deriving acceptable human dose for agents that may produce adverse (but non-cancer) effects include

(1) extrapolation of acute effects data to chronic exposure conditions,
(2) uncertainty in extrapolating animal data to humans in prolonged exposure situations,
(3) variation in the susceptibility (response/sensitivity) among individuals,

(4) incomplete data bases,
(5) uncertainty in the selection of the effects basis, inability of any single study to adequately address all possible adverse outcomes.

If guidelines are intended to address nonthermal chronic exposures to intensity modulated RF radiation, then how could uncertainty factors be used; how would this use differ from the historical use of uncertainty factors in establishing RF radiation guidelines to limit exposure to acute or sub-chronic RF radiation to prevent heat-related effects?

There is a need to provide a clear rationale for the use of uncertainty factors.

Issue: Intensity or frequency modulated (pulsed or frequency modulated) RF radiation

Studies continue to be published describing biological responses to nonthermal ELF-modulated and pulse-modulated RF radiation exposures that are not produced by CW (unmodulated) RF radiation. These studies have resulted in concern that exposure guidelines based on thermal effects, and using information and concepts (time-averaged dosimetry, uncertainty factors) that mask any differences between intensity-modulated RF radiation exposure and CW exposure, do not directly address public exposures, and therefore may not adequately protect the public. The parameter used to describe dose/dose rate and used as the basis for exposure limits is time-averaged SAR; time-averaging erases the unique characteristics of an intensity-modulated RF radiation that may be responsible for producing an effect.

Are the results of research reporting biological effects caused by intensity-modulated, but not CW exposure to RF radiation sufficient to influence the development of RF exposure guidelines? If so, then how could this information be used in developing those guidelines? How could intensity modulation be incorporated into the concept of dose to retain unique characteristics that may be responsible for a relationship between exposure and the resulting effects?

Issue: Time averaging

Time averaging of exposures is essential in dealing with variable or intermittent exposure, e.g., that arising from being in a fixed location of a rotating antenna, or from moving through a fixed RF field. The 0.1 h approach historically used should be reassessed, but may serve this purpose adequately. Time averaging for other features of RF exposure is not necessarily desirable, however, and should be reevaluated specifically as it deals with modulation of the signal, contact and induced current limits, and prolonged, or chronic exposure. These specific conditions are discussed in a little more detail elsewhere.

If prolonged and chronic exposures are considered to be important, then there should be a

reconsideration of the time-averaging practices that are incorporated into existing exposure guidelines and used primarily to control exposure and energy deposition rates in acute/subchronic exposure situations.

Issue: Lack of peak (or ceiling) limits for induced and contact current

A recent change in the IEEE guidelines allows for 6 minute, rather than 1 second, time-weighted-averaging for induced current limits. This change increases the concern about the lack of a peak limit for induced and contact currents. Will the limits for localized exposure address this issue, i.e., for tissue along the current path?

Issue: Criteria for preventing hazards caused by transient discharges

The existing IEEE recommendation states that there were insufficient data to establish measurable criteria to prevent RF hazards caused by transient discharges. If specific quantitative criteria are still not available, can qualitative requirements be included in the standard to control this hazard (e.g., metal objects will be sufficiently insulated and/or grounded, and/or persons will utilize sufficient insulating protection, such as gloves, to prevent undesirable transient discharge.)?

ISSUE: Limits for exposure at microwave frequencies

Concerns have been expressed over the relaxation of limits for continuous exposures at microwave frequencies above 1500 MHz. The rationale provided in the current guideline (Section 6.8) references the fact that penetration depths at frequencies above 30 GHz are similar to those at visible and near infrared wavelengths and that the literature for skin burn thresholds for optical radiation "is expected to be applicable." The rationale then implies that the MPE limits at these high frequencies are consistent with the MPE limits specified in ANSI Z136.1-1986 for 300 GHz exposures. This is apparently the rationale for "ramping up" to the MPE limits for ***continuous*** exposure of 10 $mW/cm^2$ at frequencies above 3 GHz (controlled) or 15 GHz (uncontrolled). The rationale should be given as to why this ramp function has been established at relatively low microwave frequencies (i.e., 1500 MHz and above), rather than being implemented at higher frequencies that are truly quasi-optical. For example, one option could be two ramp functions, one beginning at 300 MHz, based on whole- or partial-body dosimetry considerations, and another at higher frequencies (say 30-100 GHz) to enable consistency with the laser standard. Such a revision should help reduce concern that the standard is not restrictive enough for continuous exposures at lower microwave frequencies where new wireless applications for consumers could make this an issue in the future.

Issue: Replication/Validation

Published peer-reviewed studies that have been independently replicated/validated should be used to establish the adverse effects level from which exposure guidelines are derived. The definition of "replicated/validated" should not be so restrictive to disallow the use of a set of reports that

are scientifically valid but are not an exact replication/validation of specific experimental procedures and results.

Peer-reviewed, published studies that may not be considered to be replicated/validated, but are well done and show potentially important health impacts provide important information regarding uncertainties in the data base used to set the adverse effect level (e.g., incomplete data base).

Issue: Important Health Effects Literature Areas:

Documentation should be provided that the literature review process included a comprehensive review of the following three areas:

1) long-term, low-level exposure studies (because of their importance to environmental and chronic occupational RFR exposure);
2) neurological/behavioral effects (because of their importance in defining the adverse effect level in existing RFR guidelines); and
3) micronucleus assay studies (because of their relevance to carcinogenesis).

Issue: Compatibility of RFR guidelines

Compatibility of national and international RFR guidelines remains a concern. It is important for the IEEE Committee to address this issue by identifying and discussing similarities and differences in a revised IEEE guideline and other RFR guidelines. Compatibility/noncompatibility issues could be discussed in the revised IEEE guideline or as a companion document distributed at the time the revised IEEE guideline is released to the public.

# IMPACT OF MOBILE PHONES ON THE DENSITY OF HONEY BEES

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**[Sainudeen Sahib, S.** 2011. Impact of mobile phone on the density of Honey Bees. Munis Entomology & Zoology, 6 (1): 396-399]

ABSTRACT: Apiculture has developed in to an important industry in India as honey and bee-wax have become common products. Recently a sharp decline in population of honey bees has been observed in Kerala. Although the bees are susceptible to diseases and attacked by natural enemies like wasps, ants and wax moth, constant vigilance on the part of the bee keepers can overcome these adverse conditions. The present plunge in population (< 0.01) was not due to these reasons. It was caused by man due to unscientific proliferation of towers and mobile phones.

KEY WORDS: Electromagnetic radiation, Apiculture, Colony collapse disorder.

Bees and other insects have survived and evolved complex immune system on this planet over a span of millions of years. It is not logical that they would now suddenly die out now due to diseases and natural parasites. This suggests another factor has been introduced to their environment that disrupts their immune system. This man made factor is the mobile towers and mobile phones.

The public is not being informed of the threat due to deliberate attempts on the part of mobile phone makers to mask the direct causal relationship. Over the past several months a cadre of scientists, funded by the deep pockets of the mobile phone industry, has suggested viruses, bacteria, and pesticides are to blame for the unprecedented honey bee decline. Rather than critically assessing the problem, the industry is dealing with it as a politics and public relation problems thus manipulating perception of the appropriate remedy. Sadly, this deceptive practice is business as usual for the mobile phone industry.

If the reason behind the population decrease were biological or chemical there would be a pattern of epidemic spread. Observers would be able to trace the spread of bee disappearance from a source similar to the spread of SARS a few years ago. This pattern did not occur, however mobile towers and mobile phones meet the criterion.

New experiments suggest a strong correlation between population decline and cellular equipment. The massive amount of radiation produced by towers and mobile phones is actually frying the navigational skills of the honey bees and preventing them from returning back to their hives. The thriving hives suddenly left with only queens, eggs and hive bound immature worker bees. Thus electromagnetic radiation exposure provides a better explanation for Colony Collapse Disorder (CCD) than other theories. The path of CCD in India has followed the rapid development of cell phone towers, which cause atmospheric electromagnetic radiation.

Insects and other small animals would naturally be the first to obviously be affected by this increase in ambient radiation since naturally they have smaller bodies and hence less flesh to be penetrated by exposure to microwaves. The behavioral pattern of bees alters when they are in close proximity to mobile phones and towers. The vanished bees are never found, but thought to die singly far from home. Bee keepers told that several hives have been abruptly abandoned.

If towers and mobile phones increase the honey bees might be wiped out in ten years. Radiation of 900 MHz is highly bioactive, causing significant alternation in the physiological function of living organisms [7].

## MATERIALS AND METHODS

Six colonies of honeybees (*Apis mellifera*) were selected. Three colonies were selected as test colonies ($T_1$, $T_2$ & $T_3$) and the rest were as control ($C_1$, $C_2$ & $C_3$). The test colonies were provided with mobile phones in working conditions with frequency of 900 MHz for 10 minutes for a short period of ten days. EMF (Electromotive field) power density was measured with the help of RF Power density meter. The control colonies had not provided with mobile phones. Queen prolificacy was calculated in terms of egg laying rate of the queen [1]. Flight activity and returning ability were measured as number of worker bees leaving and returning respectively to the hives per minute: before exposure, during exposure and after exposure.

## RESULTS

The results of the studies are presented in Table. The present study showed that after ten days the worker bees never returned hives in the test colonies. The massive amount of radiation produced by mobile phones and towers is actually frying the navigational skills of the honey bees and preventing them from returning back to their hives [1-4]. It was shown that the total bee strength was significantly higher in the control colonies being nine comb frames as compared to one in the test colony at the end of the experiment. The thriving hives suddenly left with only queens, eggs and hive bound immature worker bees. The queens in the test colonies produced fewer eggs/day (100) compared to the control (350). It has previously been reported that there is low egg laying rate in queens exposed to high voltage transmission lines [5] or exposure of the queen bees to cell phone radiation stimulated her to produce only drones [6]. Thus electromagnetic radiation (EMR) exposure provides a better explanation for Colony Collapse Disorder (CCD) than other theories. The path of CCD in India has followed the rapid development of cell phone towers and cell phones, which cause atmospheric electromagnetic radiation.

## DISCUSSION

Some countries have sought to limit the proliferation of mobile towers with strict rules. But in India no such rules have been formulated or implemented. Given the proliferation of mobile phone towers and their vital role in communications, solutions to the problem will not be as simple as eliminating the towers. One possibility is shielding the bee hives with EMR resistant materials.

Another solution would be granting local communities the ability to control whether or not to install mobile towers. On one hand, community members would be able to exert some control over their environment and determine whether the benefits outweigh the costs and risks. On the other, it is highly susceptible to manipulation by powerful influences, especially since the bee keepers have significantly less influence, power and wealth than the mobile phone companies.

However, Indians could risk losing even this right to self determination if the cellular providers can impose a country wide mandate prohibiting regulation against them, similar to the Telecommunications Act of 1996 in the United States.

The Act prohibited local governments from making sitting decisions based on the perceived health impacts of wireless facilities. Indian advocates are concerned that such regulations might be upheld in India as they were in the United States in order to "eliminate service gapes in its cellular telephone service area."

In Kerala there are about 600,000 beehives and over 100,000 workers are engaged in Apiculture. A single hive may yield 4-5 kg of honey. Moreover, the destruction of bee hives could be a major environmental disaster. Honeybees are responsible for pollinating over 100 commonly eaten fruit and vegetable crops and without bees the food system would be in serious trouble. Rural village dependent on locally grown foods would be most vulnerable. The need of the hour is to check unscientific proliferations of mobile phone towers. More research is essential on how to protect the bee hives from the electromagnetic exposure, but perhaps more to study the impacts on humans.

All mobile phone towers emit microwave radiations, which is in the radio frequency radiation (RFR), part of the spectrum of electromagnetic waves. Though RFR, like Ultra-violet (UV) and Infra-red light, is a source of non-ionizing radiation, these radiations, together with ionizing electromagnetic radiations such as X- rays, gamma rays make up the electromagnetic spectrum. Radio frequency of the electromagnetic waves ranged from 100 kilo hertz (KHz) to 300 Giga hertz (GHz). Radio frequency radiation is a source of thermal energy and in adequate doses, has all the known effects of heating on biological systems [7].

Despite a growing number of warnings from scientists, like me, the Government has done nothing to protect people and the environment. Steps must be taken to control the installations of mobile phone towers by imposing restrictions. Installation of towers should be regulated near thickly populated areas, educational institutions, hospitals etc. Sharing of towers by different companies should be encouraged, if not mandated. To prevent overlapping high radiations fields, new towers should not be permitted within a radius of one kilometer of existing towers.

More must also be done to compensate individuals and communities put at risk. Insurance covering diseases related to towers, such as cancer, should be provided for free to people living in 1 km radius around the tower. Independent monitoring of radiation levels and overall health of the community and nature surrounding towers is necessary to identify hazards early. Communities need to be given the opportunity to reject cell towers and national governments need to consider ways of growing their cellular networks without constantly exposing people to radiation.

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Table. Change in colony status of honeybees exposed to mobile phones.

| Parameter | Control ( mean ± SD) | Treated (10 mts. exposure for 10 days). |
|---|---|---|
| ( No. of worker bees leaving the hive entrance/ minute) | | |
| Before exposure | 40.7±15 | 38.2±12 |
| During exposure | 41.5±14 | 18.5±13 |
| After exposure | 42.4±14 | Nil |
| **Returning ability** | | |
| Before exposure | 42.5±15 | 39.5±14 |
| During exposure | 43.6±14 | 15.6±13 |
| After exposure | 44.6±13 | Nil |
| **Bee strength** | | |
| Before exposure | 9 Frame | 9 Frame |
| During exposure | 9 Frame | 5 Frame |
| After exposure | 9 Frame | I Frame |
| **Egg laying rate of queen /day** | | |
| Before exposure | 365.25 | 355.10 |
| During exposure | 362.15 | 198.60 |
| After exposure | 350.15 | 100.00 |