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Date: January 17, 2006  
To: Mayor Tom Barrett and City Aldermen  
Regarding: upcoming vote on WiFi for the City of Milwaukee

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First let me introduce myself. I am an Associate Professor at Trent University and I have been doing research on electromagnetic pollution for the past 12 years. I understand that you are considering converting the City of Milwaukee into a wireless zone for the convenience of its residents and visitors.

Whatever decision you make should be based on the available scientific evidence. I expect that you have been told that this form of technology is safe as long as it remains below existing federal guidelines. Adverse biological effects have been documented below existing federal guidelines (based on **thermal effects**) and you should be aware that there are no federal guidelines for **non-thermal effects**.

WiFi simply hasn't been around long enough for us to know how these particular frequencies and intensities are likely to affect people who are exposed to them on a daily basis for years at a time. Milwaukee is on the forefront of a large population study with some unwilling participants.

Below I present some laboratory and epidemiological studies documenting the adverse effects of radio frequency radiation. Please make your decision wisely with the health of the population in mind and not just the convenience of this technology.

## **SUMMARY**

The success and widespread use of cellular phones has led to the rapid proliferation of cell phone antennas worldwide. These antennas are erected in residential areas, near schools, on churches, on high rise office buildings, on hill-tops facing cities with little regard for their combined radiation patterns and exposure of the surrounding population. There is no international consensus on exposure guidelines, which range orders of magnitude in different countries.

Guidelines for radio frequency radiation (RFR) are based on thermal effects, yet biological effects with non-thermal exposure occur below these guidelines. The United States does not have non-thermal guidelines for RFR and the existing thermal guidelines do not protect the public. The Public Health Office of the government of Salzburg recommended that levels for the sum total of all antennas at a particular site not exceed a power density of 1 microwatt/m<sup>2</sup> (0.1 milliwatts/cm<sup>2</sup>). These are much lower than the guidelines provided by the FCC in the US.

Municipal authorities approve antenna sites but once the antennas are erected government Ministries (Health, Environment, Occupational Health & Safety, Telecommunication) do not monitor the sites for compliance.

Biological effects have been documented and range from cancers to cognitive disorders and sleeping dysfunction among humans and abnormal behavior, reduced milk yield, miscarriages and premature death among farm animals. People who live near cell phone antennas have a higher risk of developing leukemia. An increasing number of individuals are also becoming sensitive to this form of radiation and exhibit signs of *electrical hypersensitivity* (EHS), which has been recognized as a disability in Sweden. This illness appears to be increasing and may already affect between 2% and 35% of the population.

Local governing bodies must be provided with scientific information on the biological effects of antennas so they can make intelligent decisions regarding siting of these antennas. It is critical that antennas not be placed near residential areas and near schools since children seem to be particularly vulnerable to this form of energy. Avoiding these areas would not be possible with WiFi technology.

## CELL PHONE ANTENNAS

Several studies have now documented the response of residents who live near mobile phone antennas in various countries. According to Dr. Grahame Blackwell, as of Feb 2005 all five epidemiological studies of people who live near such installations show ill health effects from the masts. These include studies in Spain, Netherlands, Israel and Germany. Two of those studies are presented below:

### ***Example #1: Symptoms experienced by people in the vicinity of cellular phone base station. [Santini 2001, La Presse Medicale]***

In this study the people who lived closest to the cellular antennas had the highest incidences of the following disorders: fatigue, sleep disturbances, headaches, feeling of discomfort, difficulty concentrating, depression, memory loss, visual disruptions, irritability, hearing disruptions, skin problems, cardiovascular disorders, and dizziness (See Figure 1).

Adverse health effects were reported at distances up to 300 meters. In this case, health is defined according to the World Health Organization definition as “*the state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity*”. Note that these symptoms are commonly referred to as electrical hypersensitivity (EHS).

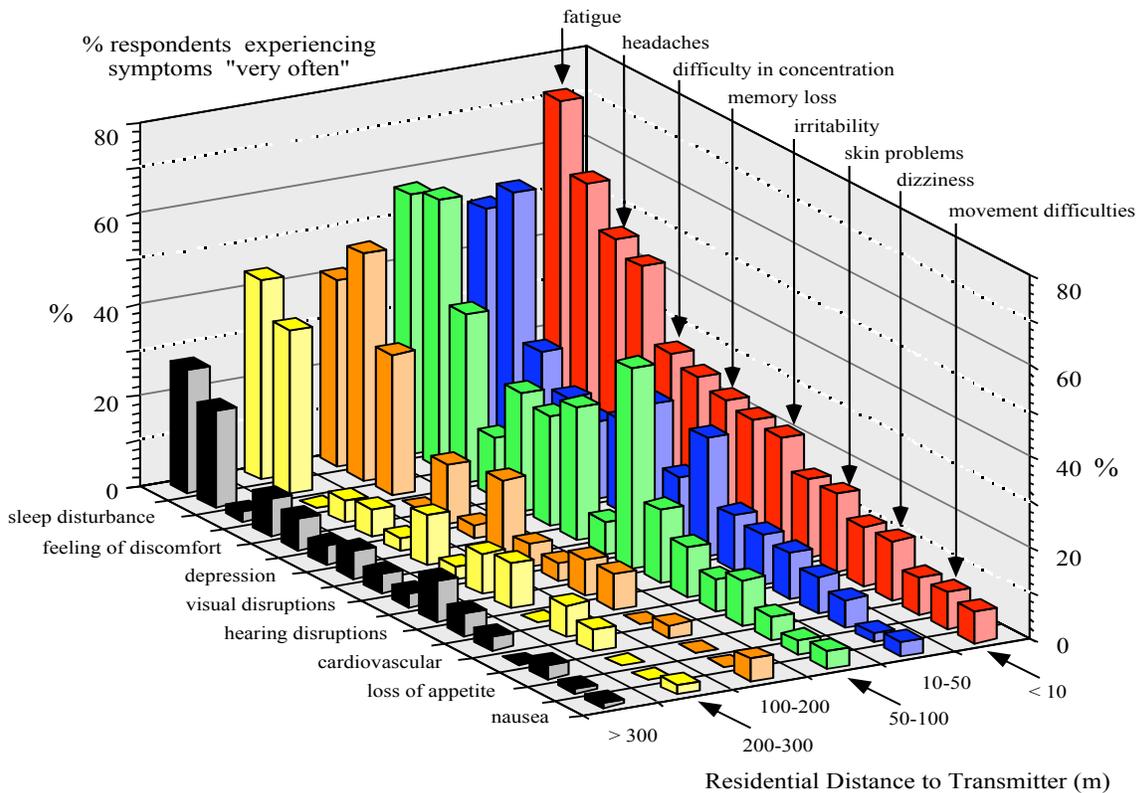


Figure 1. Response of residents living in the vicinity of a cellular phone base station in Spain (Santini 2001).

Electrohypersensitivity (EHS) is now recognized by the World Health Organization (WHO) and is defined as:

*“... a phenomenon where individuals experience adverse health effects while using or being in the vicinity of devices emanating electric, magnetic, or electromagnetic fields (EMFs). . . Whatever its cause, EHS is a real and sometimes a debilitating problem for the affected persons, while the level of EMF in their neighborhood is no greater than is encountered in normal living environments. Their exposures are generally several orders of magnitude under the limits in internationally accepted standards. [WHO International Seminar and Working Group meeting on EMF Hypersensitivity, Prague, October 25-27, 2004].*

EHS is classified as a disability in Sweden. Between 2% to 35% of the population may be sensitive to electromagnetic energy and this syndrome may be increasing. Symptoms include: cognitive dysfunction (memory, concentration, problem-solving); balance, dizziness & vertigo; facial flushing, skin rash; chest pressure, rapid heart rate; depression, anxiety, irritability, frustration, temper; fatigue, poor sleep; body aches, headaches; ringing in the ear (tinnitus) and are consistent with chronic fatigue and fibromyalgia.

***Example #2: Naila Study, Germany (November 2004); Report by five medical doctors.***

The aim of this study was to examine whether people living close to cellular transmitter antennas were exposed to a heightened risk of taking ill with malignant tumors. What the researchers found was that the proportion of newly developing cancer cases was significantly higher among those patients who had lived during the past ten years at a distance of up to 400 metres from the cellular transmitter site, which has been in operation since 1993, compared to those patients living further away, and that the patients fell ill on average 8 years earlier. After five years' operation of the transmitting installation, the relative risk of getting cancer had trebled for the residents of the area in the proximity of the installation compared to the inhabitants of Naila outside the area.

## **SITING OF CELL PHONE ANTENNAS**

Many jurisdictions worldwide are struggling with siting of cell phone base stations. They have yet to be confronted with WiFi antennas.

***Example #3:*** The International Association of Fire Fighters (IAFF) ratified Resolution 15 in Boston, August 2004. Resolution 15 states that *"The IAFF oppose the use of fire stations as base stations for antennas and towers for the conduction of cell phone transmissions until such installations are proven not to be hazardous to the health of our members."* Evidence in California indicates that fire fighters in a fire hall with a cell phone antenna on the roof have abnormal brain activity.

***Example #4:*** United Kingdom:

Belfast City Council ratified decisions of its Development Committee (Aug 18, 1999) that no transmitter masts should be permitted on any Council Property, due to unknown risk and substantial public concern.

Wyre Borough Council, Lancashire believed it was unsuitable to site telecommunication towers 190 m from primary school and 40 m from houses.

Scotland Planning Authorities adopted "Precautionary Policy" due to "perceived inadequate official advice from Government Departments"

In England & Wales, the Local Government Association (LGA) advised member authorities to adopt "Precautionary Approach". This decision making process was based on the concept that waiting for "conclusive scientific evidence" before acting is potentially flawed.

## **EVIDENCE THAT RADIO FREQUENCY RADIATION IS HARMFUL.**

### ***Example #5: Laboratory Studies***

A number of laboratory studies with rodents support the claim that RFR is genotoxic. Lai and Singh (2005) reported single- and double-strand breaks in the brains cells of microwave-exposed rats (at cell phone frequencies of 2450 MHz, continuous wave) compared with sham-exposed

animals. [Lai and Singh. 2005. *Interaction of Microwaves and a Temporally Incoherent Magnetic Field on Single and Double DNA Strand Breaks in Rat Brain Cells. Electromagnetic Biology and Medicine (formerly Electro- and Magnetobiology) Volume 24, Number 1 / 2005 Pages: 23 - 29*]. This energy has the potential to initiate tumors in cells.

***Example #6: A Review of the Potential Health Risks of Radiofrequency Fields from Wireless Telecommunication Devices 1999. An Expert Panel Report prepared at the request of The Royal Society of Canada for Health Canada***

According to this expert panel there is a growing body of scientific evidence which suggests that exposure to RF fields at intensities far less than levels required to produce measurable heating can cause effects in cells and tissues. These biological effects include alterations in the activity of the enzyme ornithine decarboxylase (ODC), in calcium regulation, and in the permeability of the blood-brain barrier. Some of these biological effects brought about by non-thermal exposure levels of RF could potentially be associated with adverse health effects.

## **PRECAUTIONARY PRINCIPLE**

Until appropriate guidelines can be introduced a number of international and national agencies, including the US National Institute of Environmental Health Sciences, are recommending adoption of the Precautionary Principle that was presented at the Rio Conference on Environment and Development in Brazil in 1992.

The Precautionary Principle (PP) states that: *“In order to protect the environment, the precautionary approach shall be widely applied by States according to their capability. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”*

The overarching Considerations include:

1. Scientific Basis for Application
2. Transparency, Accountability & Public Involvement
3. Cost-Effectiveness
4. Legal Issues
5. International Considerations

I strongly urge all levels of government to adopt this principle to ensure protection of the populations living immediately around existing cell phone antenna installations and to place new antennas at a sufficient distance to minimize human and animal exposure. Similar advice relates to WiFi antennas.

*Respectfully submitted, January 17, 2006  
Magda Havas, B.Sc., Ph.D.*