

**REPORT FROM RUSSIA - ELECTROMAGNETIC FIELDS AND HUMAN HEALTH**  
By VLADIMIR H. BINHI FEBRUARY 2003

The following is a letter and report on RF activities in Russia from Dr. Vladimir N. Binhi, theoretical physicist and head of the Radiobiology Laboratory at the General Physics Institute of the Russian Academy of Sciences in Moscow. Dr. Binhi is a member of the Russian National Committee on Protection from Non-Ionizing Radiation and author of *Magnetobiology: Underlying Physical Problems* (Academic Press, 2002).

Mankind just relatively recently began to use wireless communication technologies in so dense a way. Therefore, we do not know and we cannot know now the remote consequences of such a Janus-like progress. We have not time enough to empirically observe the possible chronic electromagnetic effects. It takes presumably 20-30 years for the effects to reveal themselves. This depreciates the significance of any negative epidemiological studies. Laboratory studies regarding non-thermal biological effects (those arising from infinitesimal electromagnetic exposures) are difficult to replicate. However, this does not necessarily mean the absence or insignificance of those effects.

The power and frequency of electromagnetic waves, emitted, say, by cell phones, are similar to the brightness and colors of the optical radiation that human eyes discern. The eye sees the world colored, not gray. There is a great deal of scientific evidence for the "colored" perception of the electromagnetic waves by the human body. This means non-thermal effects are real.

Why don't we observe those effects always and everywhere in laboratories? Because it is a very problematic task in general to detect a 1% biological effect of electromagnetic fields in any scientific biostudy, given the great variance in any biostudy; yet, such an effect, being real, entails huge social consequences in people lost. Electromagnetic fields may be less evident but not less insidious than smoking.

From the other side, there is no recognized physical theory for those effects that could help to establish right electromagnetic safety standards. It means 50/50, pro and con, for cell-phone danger. And this situation will remain until a good physical theory is developed and full scientific knowledge is obtained for the EM biological effects.

The U.S. standards and those proposed by WHO are 100 times more lenient, depending on frequency range, than the Russian standards, which are based on the observed biological effects of chronic EM exposures. There are a lot of similar gaps in EM safety standards in other countries, too. It indicates that the standards should be harmonized; people are equal in their wish to be in a healthy environment.

Unfortunately, in many countries people are 100-fold exposed to electro magnetic fields in comparison to low-level standards, within the confines of the law and before the final scientific knowledge is obtained. "Harmonization implies common motion in a right direction. Which one is right is a purely scientific question and should not be considered in connection with trade interests. The only right idea to rely on is human health.

Sincerely yours,

Vladimir N. Binhi

## **The Third International Conference**

### **ELECTROMAGNETIC FIELDS AND HUMAN HEALTH – FUNDAMENTAL AND APPLIED RESEARCH**

Held in Moscow and St. Petersburg, Russia, September 17-25, 2002.

#### **Conference Organizers:**

- Russian Academy of Sciences (Department of a physicochemical biology)
- Russian Ministry of Health
- World Health Organization (WHO)
- Russian National Committee on Non-Ionizing Radiation Protection (RNCNIRP)
- State Research Center - Institute of Biophysics (Russian Ministry of Health)
- North-West Scientific Center of Hygiene and Public Health (Russian Ministry of Health)

#### **In co-operation with:**

- US Air Force Research Laboratory (AFRL)
- International Commission on Non-Ionizing Radiation Protection (ICNIRP)
- European BioElectromagnetics Association (EBEA)

#### **International Program Committee:**

- Repacholi M., Dr., Co-ordinator, Radiation and Environment Unit, WHO
- Onischenko G.G., the First Deputy Minister of Russian Ministry of Health
- Ilyin L.A., Director of the State Research Center-Institute of Biophysics, Moscow
- Kheifets L., Dr., WHO's International EMF Project, Head Radiation Program
- Murphy M., Dr., Chief, Radio Frequency Radiation Branch, US AFRL
- Klauenberg B. J, Ph.D., TG-002 Vice Chair, NATO
- Chashin V.P., Director of the North-West Scientific Center of Hygiene and Public Health
- Grigoriev Yu.G., Chairman of RNCNIRP

#### **Conference Organizing Committee:**

- Grigoriev Yu.G., Chairman
- Nikitina V.N., Co-Chairman
- Naidich V.I., Responsible Secretary
- Romanova N.P., Secretary
- Markov M.
- Rubtsova N.B.
- Pakhomov A.
- Vasin A.L.

#### **Topics:**

- Interaction mechanisms of EMF
- EMF effects in humans of acute and chronic exposure
- Experimental studies in vivo and in vitro
- Mobile communication: prospects of development and health of population
- EMF therapeutics

Working languages: Russian and English. There will be simultaneous translation during all meetings in Moscow and St. Petersburg.

2

Participants at the conference estimated the opportunity for carcinogenic action of EMF, biological effects of chronic EMF, a syndrome of hypersensitivity, as well as central nervous system and immune system effects. Of particular interest were reports on mechanisms of the biological action of EMF, where both experimental results and theoretical works were submitted.

Many works were devoted to EMFs at the radio-frequency range, given EMF use in cellular communication. Today it is difficult to estimate the real danger or safety of systems of cellular communication. There is not yet clarity in understanding the relationship between accumulated EMF bioeffects from cellular communications and the remote consequences of this influence.

At the session entitled "Diagnostics and therapy with application of electromagnetic fields," the modern use of pulsing magnetic fields in biology and medicine in the USA, medical use of transcranial magnetic stimulation in neurology and neurosurgery, and approaches to treating epilepsy with EMF were covered. Medical and therapeutic application of EMF is a prospective and effective direction for research.

At the modern scientific level, the EMF normalization of cellular communications, magnetic fields of industrial frequency for the population, and office technology should be thought of as unresolved problems.

One of the major problems is the question of harmonization of standards for EMF. Now differences of maximum permissible levels in the various countries vary 100-fold. This occurred, first of all, because of various approaches to the definition of adverse biological effects of EMF, and also because of non-recognition of the presence of a non-thermal mechanism of EMF action.

In view of Russia's preparation for introduction into the World Trade Organization (WTO), the question of harmonization of standards is the governmental task. One of the primary goals of the conference was to review and present the results and descriptions of experiments underlying the Russian standards to the foreign scientists and experts of the WHO. Two days of conference were devoted to their analysis and discussion within the framework of the "round table on harmonization" in St. Petersburg.

At a session of the "round table", results of health research on the biological action of EMF in the radiofrequency range (RF) which were used in the 1970s to substantiate the EMF/RF guidelines in the USSR, were submitted and examined. Retrospective analysis of the submitted materials showed opportunity for the development of adverse reactions in an organism when chronically exposed to EMF/RF at a power flux density of 50-500 microW/cm<sup>2</sup>. Taking into account the criteria for defining maximum permissible levels of EMF previously formulated in the USSR, 50 microW/cm<sup>2</sup> (and for the population, 10 microW/cm<sup>2</sup>) have been established as the limit of permissible levels. It is obviously necessary within the framework of the WHO program to perform specific work on harmonization of EMF standards.

The Russian scientists and experts do not doubt the validity of their approach to an establishment of maximum permissible levels. The researches underlying the Russian electromagnetic safety standards were executed at a high contemporary technical and methodological level. The results were used in developing the norms of the CIS countries, including many countries of the former eastern block and some others

Over the last 20 years, the scientific methods and technical equipment of the research centers have changed, as well as the character of EMF sources and their distribution. In this connection, replication of some key research studies is possible and expedient within the framework of joint international

3

research projects under the supervision of the Ministry of Health of Russia on the one hand, and the WHO on the other hand.

Through the "round table," the Russian scientists have offered prime steps which are necessary for undertaking the successful realization of the program on harmonization of EMF standards.

The steps are:

- To find a coordinated formulation of the concept "a maximum permissible level" for EMF.
- To recognize the need for obligatory accounting of results from chronic EMF irradiation in order to define permissible limits. These materials, along with effects of short-term irradiation, should be an integral part of substantiating permissible limits.
- **To recognize officially the presence of a non-thermal mechanism of biological action of EMF RF at low intensities of less than 1milliW/cm<sup>2</sup>.**
- To develop accessible means of radiation control of radiating electromagnetic conditions, which would allow corresponding local services of supervision (in Russia, the regional sanitary-epidemiological stations) operatively to estimate and supervise observance of the accepted specifications (EMF RF standards).

The basic conclusions resulting from the work of the conference are:

- The involvement of Russia in the international process of harmonization of standards on EMF is necessary.
- Research must continue on the role of modulation in the formation of biological effects in pulsed modes of irradiation.
- It is necessary to carry out additional research on chronic EMF exposures including an estimation of cumulative effects and development of long-term effects.
- Development of methods of EMF measurement is necessary with the purpose of controlling the conditions of electromagnetic pollution.
- It is reasonable to continue a search for effective methods of treatment for some diseases using EMF.

#### THE NEXT SESSION

The next session of the Russian National Committee on Protection from Non-Ionizing Radiation will take place on March, 12, 2003, at 10:30 a.m., at the Institute of Biophysics, Ministry of Health, Russian Federation.

The agenda:

- EMF normalization of various frequencies for professionals (a history and results). N.B. Rubtsova's report devoted to the 50th anniversary of the EMF laboratory of the Occupational Health Institute, Russian Academy of Medical Sciences.
- Situational chronic stress of the population. Grigorjev Yu.G.
- Informational programs for populations living under conditions of chronic EMF exposure introduced by a wide variety of sources. Bicheldej E.P.
- Substantiation and Sanitary Norms and Rules project "Protection of professional workers from the influence of electromagnetic pulses". Gavrish N.N.

MEETING OF THE HEAD OF THE EMF DEPARTMENT OF THE WORLD HEALTH ORGANIZATION MICHAEL REPACHOLI, AND THE RUSSIAN SCIENTISTS IN MOSCOW

On December, 11, 2002, representatives of the Russian National Committee on Protection from Non-Ionizing Radiation met with the coordinator of the Radiation Department of WHO, Dr. M.Repacholi.

Dr. Repacholi was in Moscow to participate in the IX International Scientific - Practical Meeting of the Cooperating Centers of the WHO "Readiness for rendering medical aid at radiating failures"  
<http://www.srcibph.ru/Page/rempan9.html>.

The purpose of the meeting, which occurred under warm, friendly conditions, was to discuss the state of protection of the Russian population from EMF influences, and also to allow for the participation of Russian experts in the international WHO program "EMF and Health" and the process of international harmonization of EMF standards.

Upon termination of the meeting, Dr. M. Repacholi and Professor Yu.G. Grigorjev provided a joint interview with a correspondent from the newspaper "Vedomosti" (see No.234 (797) from December, 25 2002).

### **OPINION**

#### **OF THE RUSSIAN NATIONAL COMMITTEE ON NON-IONIZING RADIATION PROTECTION ABOUT THE QUESTION OF BIOLOGICAL EFFECTS OF THE ELECTROMAGNETIC FIELDS OF CELL PHONES**

At the session on September 19, 2001, the Russian National Committee on Non-Ionizing Radiation Protection (RNCNIRP) discussed and for the first time approved the recommendations for the population and organizations of the cellular communications industry:

1. Supporting the Precautionary Principle of the World Health Organization, relying on the published data of foreign studies, scientific generalizations, opinions of the international scientific organizations, and **expert opinions of members of the RNCNIRP**, to distribute on behalf of the RNCNIRP the following information for the population about the key safety and hygienic rules regarding use of cell phones:
  - 1.1. Non-use of cell phones by children under the age of 16.
  - 1.2. Non-use of cell phones by pregnant women.
  - 1.3. Non-use of cell phones by persons suffering from neurological conditions or diseases, including neurasthenia or dysthymic disorders, mental disorders, neuroses, intellectual and memory impairment, sleep disorders, epilepsy, and epileptic predisposition.
  - 1.4. Limiting the duration of phone calls to a maximum of three minutes, and allowing a period between calls of a minimum of 15 minutes. Preferred use of headsets and hands-free systems.
2. The cell phone manufacturers and retailers should include the following information to accompany engineering specifications:
  - 2.1 All of the above recommendations regarding use.
  - 2.2 Data and conclusions on relevant health and epidemiological testing on cell phones, measured EMFs, and the name of the test lab.

## SUMMARY

More than 120 scientists took part in the conference, including 40 from foreign countries (Argentina, Belarus, Belgium, Bulgaria, Brazil, Great Britain, Germany, Italy, China, Poland, USA, Turkey, Ukraine, Finland, France, Switzerland, Sweden).

Taking part in the opening and work of the conference were M.Repacholi, head of the WHO department of ionizing and non-ionizing radiation; Onishchenko G.G., the First Deputy Minister of Public Health Services and main state health officer of the Russian Federation; L. Kheifets, the head of the international WHO program "Electromagnetic fields and human health". Conference submissions included both experimental and theoretical reports on the following:

- Problems of research on the influence of electromagnetic fields (EMF) on the health of the population
- Mechanisms of biological effects of EMF exposure.
- Somatic effects of EMF exposure.
- Estimation of EMF dangers inherent in cellular communication devices.
- Health problems from EMF.
- Dosimetry and estimation of the absorbed doses.
- Problems of EMF safety.
- Normalization and harmonization of standards.
- Diagnostics and therapy with EMF applications.

The primary goals of the conference were to:

- Generalize the latest results of scientific research in various aspects of the EMF/health problem; and
- Involve Russian scientists and experts in the international process of harmonization of standards on EMF.

More than 140 reports were heard at conference sessions. Resulting from the conference was a collection of fundamental and applied research studies on electromagnetic fields and the health of the person.

Special attention was given to reports on the research and activity of scientists within the framework of the WHO project "EMF and Health," and also to the principles of and introduction of a precautionary policy. Under present conditions where there is, as yet, insufficient understanding of the mechanisms of biological action as well as the remote consequences of EMF action, experts recommend being guided by a precautionary policy, with prevention of even the most minimal damage to human health when possible. This is very important in view of the changes occurring in the structure and characteristics of EMF sources in recent years.

The wide distribution of low-power sources of EMF and their proximity to places where populations spend continuous time was noted. This concerns cellular facilities and other kinds of wireless communications, personal computers, office technology, sources of uninterrupted power supply, and electrical power distribution systems. The structure of functional industrial sources varies also. A smaller role is played by transmitters distributed earlier of long- and middle -wave range; however, the number of ultrashort-wave transmitters, TV broadcast transmitters, navigation control sources, and satellite communications is growing sharply.

Thus, there is a completely new situation when there is no acute radiation exposure of the population, but more than a third of population of a country is exposed to a constant chronic influence of EMF at low levels