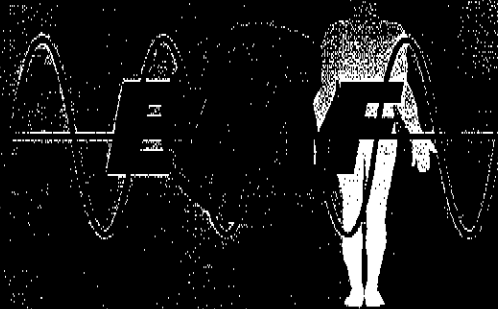


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# International EMF Project

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Health effects  
of static and time  
varying electric  
and magnetic fields

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**Second International Advisory Committee  
Minutes of Meeting 2-3 June, 1997  
WHO, Geneva**

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**Office of Global and Integrated Environment Health  
World Health Organization, Geneva 1997**

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# THE INTERNATIONAL EMF PROJECT

## *HEALTH AND ENVIRONMENTAL EFFECTS OF EXPOSURE TO STATIC AND TIME VARYING ELECTRIC AND MAGNETIC FIELDS*

**Minutes of the Second International Advisory Committee Meeting  
2-3 June 1997, Geneva.**

### **OPENING**

Dr Kreisel, Executive Director (Health and Environment) of WHO opened the meeting by welcoming delegates from the new member countries: Austria, Belgium, Bulgaria, Croatia, Israel, South Korea, and the Russian Federation. He also thanked current members for attending this most important meeting of the Project. The full text of Dr Kreisel's opening statement to the meeting is given in Annex 1.

### **1. ELECTION OF CHAIR, VICE-CHAIR, RAPPORTEUR/AGENDA/PARTICIPANTS**

Mr J. Neil from Australia was elected to Chair the meeting and Professor Yu. Grigoriev of the Russian Federation as Vice-Chair. Dr T. McManus agreed to be Rapporteur for the meeting.

The agenda for the meeting had been circulated prior to the meeting and was adopted. A copy of the agenda is attached as Annex 2. The list of participants attending the meeting is given as Annex 3.

### **2. PROJECT ORGANIZATION**

Dr T. Kjellstrom provided an overview of the organization of the International EMF Project for the new members. The document addressing this issue is given in Annex 4.

### **3. UPDATE OF PROJECT ACTIVITIES**

Dr M. Repacholi advised of the appointment of Professor B. Greenebaum as Project Consultant. He also welcomed the International Electrotechnical Council as a new international collaborating organization, and the National Institute of Environmental Health Sciences (NIEHS) and National Institute of Occupational Safety and Health in the United States and the Karolinska Institute in Sweden as new WHO scientific collaborating institutions for the Project.

Dr Repacholi also provided a draft progress report that would be reviewed by the IAC members. Briefly, the following had been achieved during the year:

(i) An international seminar entitled *Biological effects of non-thermal pulsed and amplitude modulated RF electromagnetic fields and related health hazards* was held in Munich-Neuherberg at the Bundesamt für Strahlenschutz from 20 to 22 November 1996. The proceedings have been published in June 1997 (see Section 7. "Publication of Reports"). The seminar was sponsored jointly by the World Health Organization (WHO), the International Commission on Non-Ionizing Radiation Protection (ICNIRP), the German Federal Ministry of Environment, Nature Protection and Nuclear Safety, and the Austrian Ministry of Health and Consumer Protection. It was concluded that, although hazards from exposure to high-level (thermal) RF fields were established, no known health hazards were associated with exposure to RF sources emitting fields too low to cause a significant temperature rise in tissue. Biological effects from low-level RF exposure were identified that needed replication and further study.

Research recommended in this report will now be encouraged and the results followed closely by the International EMF Project. One of the goals of the Project is to ensure that high quality research is conducted so that the results can contribute unambiguously to the database of scientific knowledge that is used in making health risk assessments. It was recommended that independent scientists join independent research review panels to assess proposed research projects, advise on the best researchers to conduct the studies, monitor progress of studies, provide advisory first-stage review of the research results, and urge that the results are published by the researchers.

This report will be published in the Bioelectromagnetics journal the first issue of 1998. The reference is: Repacholi, M.H. (ed.) *Low-level exposure to radiofrequency fields: Health effects and research needs*. Bioelectromagnetics (1998) 19:(in press).

(ii) An international seminar entitled *Biological effects of static and ELF electric and magnetic fields and related health hazards* has been organized to take place in Bologna from 4 to 6 June 1997. The seminar will be sponsored jointly by the World Health Organization (WHO), the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and the German Federal Ministry of Environment, Nature Protection and Nuclear Safety. Identification of gaps in knowledge and research recommendations will result from this meeting and be published in the scientific literature.

(iii) An International Seminar entitled *Risk perception, risk communication and its application to EMF exposure* is to be held in Vienna from 22 to 23 October 1997 to discuss the science of risk perception, risk communication and risk management, and their application to the EMF field concerns. This will be followed by working group meetings to progress two reports on this topic. Specialists from the areas of public health, the media, psychology, risk management, and other appropriate disciplines will finalize the reports. It is intended that cultural differences be fully addressed, and therefore, representatives with a wide range of ethnic backgrounds will be invited to participate in the development of the drafts. The final outputs from this activity will include an Environmental Health Criteria (EHC) monograph on EMF risk perception, risk communication, risk management, public and occupational health policy. This document will

address only the EMF risk issues and will also include recommendations for governments and other institutions on policy for managing the EMF issue.

(iv) Much of the research conducted in the former Soviet Union is published in Russian and generally unavailable or unseen by scientists in other countries. The International EMF Project values the contributions from these scientists and wants to have it evaluated along with the rest of the world's scientific literature. An international seminar will be held in Moscow 18-22 May 1998, to allow Eastern European scientists to give a summary of their work covering the frequency range 0-300 GHz. It is also intended that rationales for current EMF standards is explained. Especially important will be the scientific basis for the recently established standard for mobile telephones. The seminar will be coordinated in collaboration with Prof. Nikolay Izmerov, Director of the Russian Academy of Medical Science's Institute of Occupational Health, Professor Nikolay Bochkov, Vice-President, Department of Medical Genetics, Moscow Medical Academy, and Professor Yuri Grigoriev, General Director of the Centre of Bioelectromagnetic Compatibility within the Institute of Biophysics.

(v) At the International Advisory Committee held in May 1996, it was recommended that there should be a separate study conducted on health effects that a person experiences when they perceive there is a health risk from EMF exposure. Such psychosocial health effects can be experienced in many forms, and much data has already been accumulated following the effects reported by residents in areas contaminated by the Chernobyl accident. Depending on the amount and quality of data that can be obtained, it was recommended that a separate publication on these effects be investigated. Contacts have been made with the WHO Collaborating Centre on Psychosocial Medicine in Stockholm to further investigate this issue. In addition, the European Commission contracted a study on the "so-called" electrosensitivity to electricity concern. A meeting to compile a database and investigate what further action is necessary has tentatively been planned for late 1998.

(vi) A home page on the Internet world wide web has been established. Its address is <http://www.who.ch/emf/>. It provides details of the organization and scientific structure of the Project, an update on current events, copies of news releases and reports of IAC and scientific meetings, publications and their availability, and details of future meetings.

(vii) A simple brochure will be published, written in lay terms, in which the Project and its activities will be described. This has not yet been prepared, but is scheduled to be completed in 1998.

(viii) A series of informative fact sheets and brochures have been drafted that provide general information about EMF. Separate drafts have been prepared for NIR, RF fields, mobile phones, radars, ELF fields, static magnetic fields and video display units (VDUs). These are now available for review.

#### 4. ROUNDTABLE OF NATIONAL CONCERNS

In the tour-de-table national concerns were everywhere similar - mobile phone masts, electricity transmission lines, and in some countries hypersensitivity to EMF. The views of the collaborating institutions likewise addressed these matters. The main highlights to emerge were:

- New EMF legislation has been adopted recently in Germany and Slovenia. In Austria, Croatia and Switzerland, EMF legislation is being introduced. Israel and Italy are also giving consideration to introducing new standards.
- Most of the countries mentioned above favour standards based on the ICNIRP guidelines, with only Croatia considering the adoption of CENELEC recommendations. In regard to CENELEC a number of delegates considered it inappropriate for a technical body to be involved in the setting of health standards.
- Substantial funds are being invested in new EMF research projects in Australia and Japan. Important initiatives were being undertaken in Germany (EMF exposure measurements throughout Bavaria), in Korea (a major EMF conference), the Russian Federation (co-ordination of EMF research by Professor Grigoriev of the Russian Academy of Sciences), and in Sweden (a major life-style survey of 500 000 anti-cancer campaigners).

The following provides a brief summary of the individual presentations by delegates:

##### **National Representatives:**

**Australia (J. Neil):** New legislation deregulates RF communications, but allows government-imposed health and safety regulations. Present standards are thermally-based in the absence of substantiated evidence of lower-level effects, though the government has issued a disclaimer that not everything is known. The government has both a research and a public risk-communication programme; both emphasize RF questions.

**Austria (J. Hohenberg):** January 1998 is the target date for bill to be drafted concerning regulation of EMF's. A review of the EMF literature is now under way.

**Belgium (M. Hinsenkamp):** Research in EMF was initiated by a multidisciplinary team at Brussels University in 1974. Since then, 15 research centres have been very active in Belgium investigating the biological effects from ELF and weak RF fields. Beneficial as well as hazardous effects have been researched from basic physics to clinical and epidemiological studies. These centres are actively participating in COST 244. At present, the Government Departments officially involved are the Federal Office for Scientific Technical and Cultural Affairs and the Ministry of Social Affairs, Public Health and the Environment. Among the national initiative one of the main sponsor for research is the electrical company "Electrabel". Research topics were cited.

**Bulgaria (M. Israel):** National standards, generally similar to the German standards, have been adopted. Research emphasizes developing instrumentation and assessing exposure to all types of NIR. In addition, the following activities are carried out: compiling databases on sources of EMR; conducting epidemiological studies in various occupations in EMR conditions; assessing of EMR; developing and standardizing measurement methods.

**Croatia (D. Simunic):** Parliament is considering draft legislation that incorporates CENELEC standards. European standards would be welcome. Six research groups were cited, which widely collaborate with other European laboratories. They work primarily but not exclusively on RF. Epidemiology, some in vitro cell-level research, and dosimetry projects were cited.

**Finland (M. Hietanen):** Most research and public concern is about RF mobile telephone base stations. There is also research on ELF power lines and railway equipment and on industrial uses of RF. Specific projects cited emphasized RF dosimetry, experiments on RF effects in the telephone users' heads, and rodent experiments using both RF and ELF exposures.

**France (L. Miro):** Public concern over ELF is relatively low and stable in recent months. RF concern is just appearing. Heart pacemaker interference is the main ELF regulatory concern. In addition, to promote a better assessment of EMF risk, the French National Research and Safety Institute (INRS) has created, jointly with the Occupational Medicine Departments of French Universities, a network to compile data on chronic and acute EMF exposures at all frequencies. This database will allow analyses of EMF risk in the population.

**Germany (A. Boettger):** A law took effect on 1 January 1997 covering field exposure from commercial use of frequencies over 10 MHz, the 50 Hz power transmission system, and the electric rail system. It is based primarily on ICNIRP standards. Germany's active international cooperation in refining standards will require amendments to the law. Research was not discussed.

**Indonesia (S. Soesanto):** Responding to growing public concern, agencies are sponsoring meetings of scientists to assess and build a knowledge base and a capacity for research. Projects have begun that will compile and disseminate existing information concerning health effects of EMF. International standards or statements would be most welcome.

**Ireland (T. McManus):** Amid growing public concern over exposure from mobile telephone base stations and other RF emitters, the latest legislation enables agency monitoring of exposure. There is little research on EMF. There are no published national standards but ICNIRP standards are applied to all new developments on an ad hoc basis.

**Israel (S. Diamant):** In licensing RF transmitters, field strengths are both evaluated theoretically and measured using IRPA standards. Heart pacemakers are a particular concern. Standardizing measurement technique is an issue. Other parts of the NIR spectrum are also under the purview of the environment ministry.

**Italy (P. Vecchia):** In spite of over 20 years of active research at many centres, the current controversy over ELF and mobile telephone exposure is proceeding without much scientific

input. Many agencies and public groups are involved in a very political process. Active RF and ELF research programmes continue, mostly working in vitro or on dosimetry. The pilot for a childhood cancer epidemiological study is near completion.

**Japan (C. Ohkubo):** Agencies divide ELF and RF responsibilities. 1990 RF protection guidelines are being updated for equipment used close to the body, e.g., mobile telephones. ELF guidelines are restricted to limiting induced current. The on-going research programme using rats is studying reproductive, teratogenic, and cancer effects.

**Korea (Y-S Kim):** A 400000 KY research project into EMF health effects is just beginning. Mobile phones and transmission lines near residences are the chief concerns at this stage. In May 1997 the first EMF health effects workshop was held where 50 papers were presented.

**Malaysia (A. Mohd Jais):** In the absence of legislation governing NIR, the board overseeing ionizing radiation has monitored ELF and RF field levels. An interagency study committee has been formed, but no legislation is proposed due the absence of scientific agreement or international standards. Meetings are being held among scientists to build a basis for research and to improve public understanding.

**Netherlands (E. Van Rongen):** Construction of power transmission, cellular telephone and broadcast radio facilities brings out strong public health concerns. A report to the four ministries involved recommends science-based standards, and interagency coordination is beginning. A research project into exposure of telephone users' heads and a study of inconsistencies in international recommendations concerning optical exposures are underway.

**Russia (Yu. Grigoriev):** The national structure for EMF research and the types of work done in twelve laboratories with up to 25 years of experience were presented. The laboratories' capabilities include epidemiology, medical and health aspects of EMF's, laboratory research both theoretical and field dosimetry, risk evaluation.

**Slovenia (P. Gajsek):** A Government ordinance on EMF in the living and natural environment was prepared by the Ministry of Environment and implemented in 1996. The limit values of field strengths of various frequencies (0-300 GHz) in the environment are based on the IRPA/INIRC guidelines and CENELEC pre-standards ENV 50166. While the scientific database is insufficient in developing limits of exposure, this ordinance does not exclude other steps of reducing exposure on new installations. The Ministry of Health is preparing an act on NIR protection which will focus on surveillance on the humans exposed to various NIR sources. This project calls for a coordinated programme of work, based on an international consensus. Broad environmental monitoring is continuing. National concerns include the research priorities needed to improve public communication and better criteria for standardized measurement for the whole NIR spectrum.

**Sweden (E. Kivisakk):** Agencies may issue binding regulations concerning NIR. They have determined that the science has not shown risk at the necessary threshold of "beyond a reasonable doubt" for issuing binding regulations. However, considering the fact that several studies have indicated serious health risks from ELF magnetic fields, the Swedish agencies

have recommended a policy of "prudent avoidance" of such fields and have published information on the subject, including cost data for decision makers. Hypersensitivity is often claimed as a health problem, though provocation studies have failed to confirm cases of hypersensitivity due to ELF or VDT fields. Concern over mobile telephones, which are covered by thermally-based standards, is relatively low; though base stations are beginning to meet opposition.

**Switzerland (V. Mercier):** EMF regulation now comes under general environmental laws that exclude harmful or annoying effects. Below these levels, further reductions are required when economically acceptable. Swiss Telecom PTT sponsors four GSM-related research projects; a study of ELF hypersensitivity and sleep is also under way.

**United Kingdom (A. Barrett):** Emphasis in public questions about risk is shifting from ELF to RF, primarily mobile telephones. Government laboratories are studying ELF dosimetry, maternal exposure in childhood leukaemia, and magnetic field exposure from motorized appliances in the workplace. A strategy paper posing key questions needing answers for risk assessment was issued in 1997.

**United States (J. Klauenberg):** The report described research at the defence department's RF laboratory. Most projects are in the thermal region, including thermoregulatory experiments on humans, calculations of SAR's and induction of circulatory shock. Blood-brain barrier integrity and mammary tumour production in mice are being studied at lower power levels. The laboratory is cooperating with IEEE and the International EMF Project on a literature review.

## 5. PROBLEM ELABORATION FROM THE COLLABORATING INSTITUTIONS

**National Radiological Protection Board (NRPB, UK: A. McKinlay):** In-house activities include ELF epidemiology, studies of learning in rats and dosimetric calculations, instrumentation for both ELF and RF, field assessment support for the ELF part of the national childhood cancer study, and special risk assessment reports. A major NRPB advisory group is reassessing the scientific evidence concerning EMF's relation to cancer. Broad collaboration continues with national and international groups, including an EC mobile telephone expert group.

**Bundesamt für Strahlenschutz (BfS, Germany: J. Bernhardt):** BfS provides advice on EMF dosimetry, risk evaluation and radiation protection and reviews the scientific literature and research project submissions. Recently, BfS assisted WHO and ICNIRP to organize the RF Seminar in Munich (November 1996), the ELF Seminar in Bologna (June 1997) and the Risk Perception Seminar in Vienna (October 1997). A major public ELF exposure assessment is underway in Bavaria. A newly-established commission that will sponsor NIR research, is currently examining possible priorities, practices, and procedures. The new law codifying ICNIRP guidelines has led to decisions of technical standard committees to follow the ICNIRP recommendation. Collaboration continues within EC task groups on NIR radiation protection.

**Center for Devices and Radiological Health, Food and Drug Administration (CDRH, FDA, US: R. Owen):** CDRH is the lead federal agency in regulating NIR-emitting products. It has a small in-house research programme, primarily working on reproducibility of reported ELF effects in vitro. CDRH collaborates with other agencies in the RAPID programme. It is also part of a broad inter-agency work group that reviews the research on the biological effects of RF exposure and facilitates the coordination of necessary Federal action. It is convinced that, because of the latency of some of the health effects that have been suggested to be associated with exposure to non-ionizing radiation, long-term study is essential to test such associations, and so continuing post-marketing surveillance is important in ensuring the safety of wireless technologies including telephones.

**National Institute of Environmental Health Sciences (NIEHS, US: C. Portier):** Intended to be a five-year, definitive research programme to fill the research gaps and promote public understanding of ELF health effects, RAPID has funded in vitro, in vivo and epidemiological work, focusing on replication of earlier reports. The final recommendation to Congress is now due in mid-summer 1998. Three public symposia reviewing the literature are being held (March 1997-March 1998). A working group will then draft conclusions, which will be used in drafting the final report.

**National Institute of Environmental Studies (NIES, Japan: M. Kabuto):** A body for interagency coordination of and collaboration in EMF research has recently been established. In addition to the ongoing study of individual environmental exposures to ELF, planning has begun for a study of occupation ELF exposure and a mobile telephone epidemiology study. Planning for studies of RF effects in rodents has also begun. The Institute is planning in-house assessment of RF exposures and is building a human-exposure laboratory facility.

**Karolinska Institute (Sweden: A. Ahlbom):** Written report distributed at the meeting described the EMF research programme of the Swedish Council for Work Life Research. Projects emphasize epidemiology in a variety of populations, hypersensitivity, and several in vivo, in vitro and theoretical studies of basic mechanisms.

## 6. REPORT FROM INTERNATIONAL ORGANIZATIONS

**International Commission on Non-Ionizing Radiation Protection (ICNIRP: J Bernhardt):** Three standing committees on epidemiology, medicine and biology, and physics and engineering have been established to assist the commission in evaluating the EMF literature and identifying research gaps. This independent commission publishes documents and recommend standards, both alone and in collaboration with international groups, such as the International EMF Project. Draft guidelines are being finalized on time-varying EMF. Statements have recently appeared on mobile telephones.

**International Agency for Research on Cancer (IARC; E Cardis):** Dr Cardis was unable to attend at the last minute.

**International Telecommunication Union (ITU: M. Wright):** Discussions continue on the evolution of the use of the electromagnetic spectrum by communications equipment. TDMA

technology will shortly dominate, and expansion into the 1800 MHz region is beginning. Speculation beyond a very few years ahead is difficult.

**International Electrotechnical Commission (IEC: R. Baillif):** Two standards are being developed that are of interest to the International EMF Project. One covers instrumentation and methodology for measuring human exposure to electric and magnetic fields in the range 15 - 9000 Hz. The other defines measurement methods for the frequency range 9 kHz to 300 GHz.

**European Commission: DG V (Directorate on Public Health and Safety at Work: C. Schatzl):** A multi-disciplinary ad-hoc group of experts made recommendations concerning structured coordinated and focused research on non-thermal effects of radiofrequencies. This will form part of the recommendations for the 5th framework programme for research and technological development (1998-2002). The Commission's proposal for research to be carried under this framework programme provides for EMF research priorities in the field of environment and health.

Under the existing scheme, a two-year project on dosimetry for mobile phones is intended to establish well-defined procedures for the evaluation of the exposure to EMFs. It is planned to develop and maintain a database on literature and standards for dosimetry, and also numerical and experimental phantoms.

An EC report on possible health implications of subjective symptoms and electromagnetic fields has been completed. A proposal for a Community action programme (1999-2003) on the prevention of pollution-related diseases will provide support for the activities on risk perception, communication and management.

Concerns about EMFs are also reflected in Community provisions and proposals as regards Environmental Impact Assessment (EIA). The new environmental impact assessment Directive lists the construction of overhead electrical power lines with a voltage of 220 kV or more, and a length of more than 15 km amongst the projects subjected to an EIA. Sectors covered by a potential "strategic" EIA are transport, energy, waste management, water resource management, tourism and telecommunications.

**European Commission (COST 244 Biomedical effects of electromagnetic fields: Z. Koren):** Since 1992, a continuing series of working groups and workshops have discussed, produced, published proceedings, and generated coordination and cooperation on a very wide variety of topics. The second round, begun in spring 1997, includes working groups on epidemiology and human health, basic research, system and applications engineering, and steering committees on ELF and mobile communications. Seven specific topics were identified for the next four years.

**NATO (J. Klauenberg):** While standards for EMF exposure are not a critical issue in the organization, a 20-year-old agreement was revised in 1996 to provide that no nation will expose any personnel to levels exceeding its own standards. Plans have been formed for a collaborative research programme into effects of exposure of military personnel to NIR. A

proposal for a NATO-supported advanced study institute or workshop on biological effects of EMF, intended to be held in following the 1997 World Congress, was not funded. Much was learned about the most effective way to prepare and submit such a request, and a resubmission is planned.

ILO and UNEP were unable to attend.

## 7. PUBLICATION OF REPORTS

The following have been published or are about to be published by the International EMF Project:

- (i) Minutes: First International Advisory Committee meeting (30-31 May, 1996), WHO/EHG/96.14.
- (ii) Progress Report (1995-1996), WHO/EHG 96.19
- (iii) *Non-Thermal Effects of RF Electromagnetic Fields: Proceedings of the International Seminar on Biological Effects of Non-Thermal Pulsed and Amplitude Modulated RF Electromagnetic Fields and Related Health Risks.* Editors: JH Bernhardt, R Matthes, MH Repacholi, International Commission on Non-Ionizing Radiation Protection and World Health Organization. Publication: ICNIRP 3/97. Available from: R. Matthes, Scientific Secretary, ICNIRP, C/- Bundesamt für Strahlenschutz, Institut für Strahlenhygiene, Ingolstädter Landstraße 1, D-85764 Oberschleißheim, Germany. Tel: +49 89 31603288, Fax: +49 89 316 03289, E-mail: RMatthes@bfs.de
- (iv) Repacholi MH, Cardis E (1997): *Criteria for EMF health risk assessment.* Radiation Protection Dosimetry 72: 305-312.
- (v) Munich RF Meeting Report: Repacholi, M.H. (ed.) (1998) *Low-level exposure to radiofrequency fields: Health effects and research needs.* Bioelectromagnetics 19: (in press).

Another publication of interest to IAC members was: Repacholi M, Basten A, Gebiski V, Noonan D, Finni J, Harris AW (1997): *Lymphomas in Eμ-Pim1 transgenic mice exposed to pulsed 900 MHz electromagnetic fields.* Rad. Res 147: 631-640.

## 8. HOME PAGE

The home page for the International EMF Project has been operational for over six months and is updated regularly. It was suggested that if any member wanted to provide details for linking to other home pages these should be provided to Dr Repacholi. It was also suggested that the home page be used to provide the database of ongoing research. FDA, NIEHS, NRPB and many other organizations have databases that need to be combined with other, less accessible databases to provide an overall view of EMF research worldwide.

It was suggested that descriptive information on EMF exposure from various devices could be added, together with the growth in numbers of key NIR exposing devices such as

mobile telephones. Over time this database could be enlarged to include our present state of knowledge on NIR emitting devices over the whole frequency range of interest (0-300 GHz).

WHO Collaborating Centres would be asked to assist with the accumulation of this data and to place it onto the home page. The home page coordinates are:  
<http://www.who.ch/emf/>

## **9. FACT SHEETS AND BROCHURES**

A series of WHO fact sheets, to be prepared by WHO's Information Services from material reviewed by the IAC, should be published later this year. Drafts which have been provided to IAC members for review and comments should be received before the end of July 1997. Brochures containing more detailed information are also being prepared. It was agreed at the meeting that separate fact sheets should be available for mobile telephones and the base stations. The topics are as follows:

- (i) International EMF Project
- (ii) Mobile Telephones
- (iii) Mobile Telephone Base Stations
- (iv) Radars
- (v) Radiofrequency Fields
- (vi) Non-Ionizing Radiations (NIR)
- (vii) Extremely Low Frequency Fields
- (viii) Video Display Units (VDTs)
- (xi) Household devices

IAC members agreed that the highest priority should be placed on the production of fact sheets and brochures on NIR, mobile telephones and base stations, and ELF fields. It was also agreed that some text should be added to appropriate documents on electromagnetic interference from EMF. Details on interference to devices such as hearing aids, pacemakers and other electromedical devices were of particular concern.

## **10. PRESS RELEASES**

Concerns were expressed about the 4 June 1996 WHO Press Release, which some delegates considered somewhat unbalanced. In future IAC members would have the opportunity to comment on draft releases, usually by e-mail to reduce delays.

## **11. NATIONAL AND INTERNATIONAL MANAGEMENT OF THE EMF ISSUE**

The International EMF Project provides a forum for a coordinated international response to the EMF issue, and there are currently over 40 national authorities and the 7 key international agencies involved which come from the areas of NIR research, protection, measurement and standards. It was felt that the International EMF Project could provide a useful facility for coordinating standards setting organizations to work towards drafting internationally acceptable standards on the following:

- (i) Measurement of EMF fields over the frequency range (0-300 GHz), led by the IEC.
- (ii) Guidelines for human exposure limits over the frequency range (0-300 GHz), led by the ICNIRP.

Dr Repacholi suggested the establishment of small working groups of representatives of appropriate standards setting committees to discuss this proposal.

It was also suggested that a committee of EMF research funding agencies be established to progress research initiatives identified for EMF by the meetings in Munich and Bologna. The committee would address the following:

- (i) Compile and maintain a database of completed and ongoing EMF research worldwide.
- (ii) Identify areas of research not currently being addressed, the results of which are needed by WHO/IARC to make better health risk assessments.
- (iii) Encourage funding agencies to support research in the needed areas.

The IAC also indicated that there was a need for practical advice on how to implement standards. These could be in the form of Health and Safety Guides published in conjunction with ICNIRP and ILO. First drafts of these documents could be prepared by WHO Collaborating Institutions. Some countries indicated that they may be prepared to fund the preparation and publication of such documents.

At the end of the discussions, Professor L. Miro drew attention to the fact that the Munich meeting was devoted to RF which was defined by the frequency range "few MHz-300 GHz". The Bologna meeting will address the biological effects of static and ELF fields in the range of 0-300 Hz. Thus, the frequency range from a few kHz to few MHz where the fields act on the body by inductive currents, is not being investigated. This frequency range has increasing use in industrial and domestic applications (anti left devices, inductive cooking systems, inductive horns). Little information is available about the biological effects of these frequencies and it seems necessary to encourage research in this domain.

There was a general support to assess this intermediate frequency range and determine any health risks. Professor Koren suggested that a future COST 244bis meeting could analyse this problem. This suggestion was supported.

## 12. RISK PERCEPTION, RISK COMMUNICATION ISSUE

For "Risk Issues" Seminar to be held in Vienna 22-23 October, 1997 a number of delegates stressed the importance of an awareness of cultural differences among countries, and urged that the documentation reflect this reality.

The EC DGV indicated that it had funded the preparation of a report on *Electromagnetic hypersensitivity* since there had been a significant interest expressed in this issue by member

countries. It was suggested that the EC and the EMF Project should work closely on this issue. This will form part of the Vienna meeting.

### **13. PROGRESS ON FUNDING**

As of 19 May 1997 there was still a \$1.3 million shortfall in funds received or pledged to the Project. Strenuous efforts are being made to eliminate this shortfall by year-end. A copy of the financial statement for the whole period of the Project up to 19 May 1997 is attached as Annex 5.

### **14. ROUNDTABLE OF ACTIVITIES**

The following EMF conferences were proposed or announced:

- EMF around the Pacific Rim: possibly in Singapore, March 1998
- NIEHS RAPID: In Vivo, Animal and Human Studies: United States, April 1998

The following EMF reports are expected to be published over the next 18 months and would be of interest to members.

- United States FCC Standard on measurement protocol: late 1997
- EC Report on Electrosensitivity: Swedish National Institute, October 1997
- IEEE Literature Survey on RF Exposure: BEMS, Bologna, June 1997
- NIH-NCI Epidemiology Study: New England J. Med., July 1997
- NIEHS: Chronic Animal Carcinogen Study: February 1998
- ICNIRP: Bologna ELF Conference Proceedings: November 1997
- UK Childhood Cancer Study: Summer 1998
- NRPB: Revised report on EMF and cancer: late 1998
- NIEHS: Final Report to Congress: August/September 1998
- ICNIRP: Guidelines for limiting exposure to EMF (up to 300 GHz): late 1997

### **15. OTHER BUSINESS**

There was no other business.

### **16. NEXT MEETING**

It was agreed that the next meeting should be held at about the same time next year. Members would be advised on an appropriate time well in advance of the meeting date.

### **CLOSE**

The meeting concluded with thanks to the Chair - Mr J. Neil, the Vice-Chair - Professor Yu Grigoriev, the Rapporteur - Dr T. McManus, and to Mme M. Peter who dealt with the administration of this international meeting.

**FURTHER INFORMATION:**

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# Annex 1

## Welcome and opening remarks

Dr W Kreisel  
Executive Director, Health & Environment  
World Health Organization, Geneva

I would like to welcome all participants of the second International Advisory Committee of the International EMF Project and thank you for kindly accepting our invitation to participate. Over the next 2 days, this meeting will provide an opportunity for Project participants to be updated on the activities, priorities and operation of the Project.

Since we last met there has been a significant increase in the number of countries expressing interest in the Project and participating in it. Countries attending this International Advisory Committee for the first time include: Austria, Belgium, Bulgaria, Croatia, Israel, South Korea and the Russian Federation. Some of these countries have already provided support for the operation of the Project. As of today, the following countries have expressed an interest in the Project and are now considering their participation in it: Argentina, Bahrain, Brazil, Cyprus, Czech Republic, Denmark, Hungary, Iran, Luxembourg, Malta, Mexico, Norway, Poland, Singapore and South Africa. I am sure you will agree that there is considerable interest worldwide in determining whether there are adverse health consequences from exposure to electromagnetic fields.

Concerns have been expressed about the possible health effects of exposure to EMF coming from mobile telecommunication systems. This is a now a 700 billion dollar industry worldwide and the benefits of such communications systems are without question. However, it would be unfortunate if it was later discovered that there are health consequences from exposure to radiofrequency fields emitted by these systems. WHO is working through this Project to clarify the science and to provide public confidence that EMF exposure does not have the same consequences as has occurred with the tobacco industry.

As I mentioned previously to this meeting, concerns about EMF and health are now costing the United States economy alone some US\$1 billion annually. This is just from concerns about health effects from exposure to power frequency fields. The costs involved with the concerns to health from the telecommunications industry have not yet been estimated. These costs comprise the increased level of research into the biological effects of exposure to EMF, the need by various government agencies and industry to continually assess possible health effects from exposure to the large number and diversity of sources of EMF, and the measures being taken by governments and industry to keep the fields to a minimum until the science can more precisely determine whether a significant health problem exists. Similar proportional costs are being experienced by many countries.

If there are any health risks from exposure to EMF, they need to be identified quickly so that appropriate mitigation measures can be taken. If the science establishes, for example, that there are subtle risks to health from EMF exposure, this needs to be quantified so that society can

assess the benefits of the technology against the health risks. However, if there are no health effects, the money currently spent on this issue could be put to better use.

The EMF Project is important and offers a clear example of WHO's responsibility to provide internationally unbiased reference and guidance on public health issues which have global implications. Such guidance would have a significantly higher authority than a statement from an individual country, particularly in a situation where the implications of any findings would have wide ranging global significance.

Since the last meeting, the Project has worked very successfully with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) to organize scientific meetings. One of the most important of these was the meeting on low-level radiofrequency fields held in Munich late last year with the generous support of the German and Austrian governments. Details of the conclusions of this meeting are provided in your meeting files and the final report will be published in the Bioelectromagnetics Journal. Discussion on this meeting will take place later in the meeting.

The Munich RF meeting provided a review of the high frequency EMF fields and the review of the low frequency fields will take place in Bologna, Italy immediately after this meeting. This will complete the initial scientific reviews of the Project and identification of research needs. A focused programme of research is being encouraged so that this Project can use the research results to undertake a detailed review of the science and evaluate any health risk through the normal WHO/IARC process.

To complete the package of information that national authorities need in dealing with the health issues related to EMF, WHO and ICNIRP, with the support of the German and Austrian governments, are conducting an international seminar on "risk perception, risk communications and risk management". This will be held in Vienna, 22-25 October 1997. The outputs of this meeting will enable national authorities to more effectively communicate with workers and the general public about the EMF issues. More details on this meeting will be provided to you.

I hope that we can work fruitfully together to arrive at conclusions on which we can all agree to properly address the valid concerns raised by the national authorities, general public and workers. I also hope that you will enjoy your visit to Geneva and thank you once again for making the effort to travel to WHO for this meeting.

Dr W Kreisel  
2 June, 1997.

## Annex 2

### International Advisory Committee Meeting Agenda

**Location:** World Health Organization, Geneva, Salle A, Main Building

**Dates:** 2- 3 June 1997

#### Opening of meeting

Welcome

Dr W. Kreisel

1. Election of Chair, Vice-Chair and Rapporteur/Adoption of agenda
2. Project organization Dr T. Kjellstrom
3. Project update Dr M. Repacholi
4. Roundtable on national concerns
5. Problem elaboration from collaborating institutions  
NRPB (UK), BfS (Germany), FDA (USA), NIEHS (USA), NIES (Japan), KI (Sweden)
6. Report on NIR activities from International Organizations  
ILO, ICNIRP, IARC, UNEP, ITU, EU, IEC
7. Publication of reports
8. Home Page
9. Fact Sheets
10. Press Releases
11. Discussion on national and international management of the EMF issue
12. Discussion on risk perception, risk communication issue
13. Progress on funding
14. Time-table of activities
15. Any other business
16. Next meeting

Close

## Annex 3

### MEMBERSHIP OF THE INTERNATIONAL ADVISORY COMMITTEE

- Members:**
- Representatives of governments who have provided resources for the Project
  - Representatives of collaborating organizations
  - Representatives of WHO collaborating centres

- Observers:**
- Representatives of governments who are interested in supporting the Project
  - Representatives of independent scientific bodies

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## Annex 4



# THE INTERNATIONAL EMF PROJECT

## Guiding Principles

**Project:** The 5-year Project will assess health and environmental effects of exposure to static and time varying electric and magnetic fields in the frequency range 0 - 300 GHz. This range is divided into: static (0 Hz), extremely low frequency (ELF, >0-300 Hz) and radiofrequency (RF, 300 Hz-300 GHz) fields. The Project has the following objectives:

- (i) Pool resources of international and national agencies and key scientific institutions in the environmental health domain working on the biological effects of electromagnetic fields.
- (ii) Identify gaps in scientific knowledge, provide protocols for the conduct of this research and encourage research in those areas that will lead to better health risk assessments.
- (iii) Provide authoritative, independent, scientific, peer-review of the scientific literature, with fully substantiated recommendations.
- (iv) Publish EHC monographs giving health risk assessments using results obtained during the Project on health effects of exposure to RF, ELF and static fields. These monographs would clearly differentiate between well established effects, preliminary results and hypotheses, and those requiring further research.
- (v) Publish EHC monographs on risk perception, risk communication and risk management, and public and occupational health policy.
- (vi) Publish reports on appropriate topics to assist and support National Health Programmes.
- (vii) Use modern efficient means of communicating essential research information and findings which develop during the Project.

**Collaboration:** This Project is intended to be a collaboration with the international partners listed below as well as with government contributors and key scientific institutions. It is envisaged that publications will be jointly with the World Health Organization (WHO), United Nations Environment Programme (UNEP), International Commission on Non-Ionizing Radiation Protection (ICNIRP), International Labour Office (ILO), International Agency for Research on Cancer (IARC), International Telecommunications Union (ITU), International Electrotechnical Commission (IEC) and the European Commission (EC), and incorporating their logos. All national partners and contributors will be listed in Project publications.

**International Advisory Committee:** This Committee will be composed of representatives of the major government contributors and scientists from key research institutions. Members and observers of the IAC are defined as follows:

**Members:** - Representatives of governments who have provided resources for the Project  
- Representatives of collaborating organizations  
- Representatives of WHO collaborating centres

**Observers:** - Representatives of governments who are interested in supporting the Project  
- Representatives of independent scientific bodies

The terms of reference for operation of the Committee are as follows:

1. To provide a forum for a coordinated international response and approach to the scientific, occupational, public and environmental management of the potential problems of health effects of electromagnetic fields.
2. To provide oversight for the Project, including work priorities and schedules.
3. To review the output of each of the major activities.
4. To make recommendations on gaps in scientific knowledge needing to be researched to make better health risk assessments, and to provide encouragement to the conduct of research in appropriate areas.

**WHO Secretariat:** The Project will be managed from the WHO Office of Global and Integrated Environmental Health, Geneva by Dr M. H. Repacholi. The Secretariat will facilitate all activities and provide regular reports to the International Advisory Committee and to the contributors to the Project.

**Activities:**

- (i) Support and make available databases on research literature, scientists and projects, through the INTERNET, diskette and hard copy.
- (ii) Draft interim reports on substantiated, important findings, as soon as available, according to priorities set by the International Advisory Committee.
- (iii) Publish detailed international scientific reviews and guidance documents as Environmental Health Criteria (EHC) monographs, reports or, where appropriate, as publications in scientific peer reviewed journals. The EHC monographs, with summaries in French, Spanish, German, and Russian, will be:
  - (a) Radio Frequency fields
  - (b) Extremely Low Frequency electric and magnetic fields
  - (c) Static fields
  - (d) Risk perception and communication, and public and occupational health policy

- (iv) Publish summary guidance documents on policy development, risk perception, risk communication, risk management, and others as recommended by collaborating institutions.
- (v) Provide general information brochures in various languages.
- (vi) Compile training materials in various languages and conduct training courses as needed.
- (vii) Provide updated information in the form of press releases, brochures and reports for government and general enquiries.

**Scientific Working Groups:** WHO collaborating institutions and internationally recognized independent scientists will prepare drafts and participate in working groups to progress these drafts for formal review prior to publication.

**Duration of the Project:** It is intended that the Project run for a period of 5 years. The commencement date was 1 January 1996.

Dr T Kjellström  
Director  
Office of Global and Integrated Environmental Health

## Annex 5.

### Financial Statement (1996-1997)

Statement of income and expenditure as at 19 May 1997

	US\$	US\$
<b>Income received at WHO</b>	660 477	
<b>Expenditure</b>		
Salaries (to end of 1997)		346 287
Secretarial support		119 327
Travel (WHO staff and others)		31 373
Work contracts		32 613
Consultants		23 972
Miscellaneous (postage, audiovisual & computer supplies, etc.)		8 720
Publications		1 800
Programme Support Costs		24 385
	<u>660 477</u>	<u>588 477</u>
<b>Uncommitted balance</b>		<b>72 000</b>
Funds pledged (approx.)	1 360 000	
Total funds pledged or received	2 020 477	
Funds needed for 5-year project	3 330 000	
May 1997 shortfall	1 309 523	
May 1996 shortfall	2 130 000	