

1998 International Advisory Committee Meeting Report

WHO INTERNATIONAL EMF PROJECT

INTERNATIONAL ADVISORY COMMITTEE

Minutes of Third Annual Meeting, Geneva, 25-26 May 1998

I. WELCOME

Dr. Michael H. Repacholi welcomed the delegates and presented Executive Director Wilfrid Kreisel's apologies for not welcoming them in person, due to a conflicting meeting. Dr. Repacholi read Dr. Kreisel's written welcoming remarks (Annex I). In them, Dr. Kreisel especially welcomed representatives who were attending their first meeting. He noted the continuing world-wide concerns over EMF, particularly those associated with the rapidly-growing mobile telephone communication systems and from the use of AC electric power. He noted that the past year had seen the International EMF Project progress toward its goal of uniform international standards for exposure to EMF, particularly in issuing the Agenda for Research, which identifies knowledge needed for a better assessment of any possible health risks. He also noted steps to clarify factors shaping public perception of risks. He closed by welcoming the delegates to this meeting, at which they must review the past and help shape the Project's future.

II. MEETING ORGANIZATION

Dr. Repacholi proposed and the groups appointed Dr. Russell Owen as chair, Dr. Michael Israel as vice chair, and Dr. Ben Greenebaum as secretary/rapporteur. The proposed agenda was agreed to without amendment.

III. PROJECT UPDATE

Dr. Repacholi referred the delegates to the Project's draft 1997-98 Progress Report (Annex II). He pointed out the following highlights:

The initial scientific review phase of the Project is now complete, following the publication of the Bologna meeting proceedings and the Research Agenda.

The Project is now in the research phase. This stage began with the Research Coordination Committee meeting in December, at which representatives of research-funding agencies identified studies on the Research Agenda that are already in progress and those that are still needed. This committee shaped the Agenda, recognizing studies already in progress and including studies that would support the criteria used by IARC for evaluation of a specific health hazard--cancer. These criteria will also be used to evaluate other possible hazards.

When research results are available, the Project will enter the risk assessment phase. IARC has formally agreed to assess the carcinogenicity of EMF, examining ELF in 2001 and RF in 2003. These assessments will be published as IARC monographs. Consideration of possible non-carcinogenic health effects and the overall assessment of hazard for each frequency range, incorporating the IARC assessments, will be done by WHO a year after the IARC assessment, that is 2002 for ELF and 2004 for RF. The WHO assessments ELF and RF will be published in separate WHO Environmental Health Criteria monographs.

In accord with the Research Agenda suggestion that improved protocols for epidemiological studies be established, an invitational meeting at NRPB (UK) has been organized.

A successful meeting to discuss the past thirty years of research published in Russian was held in Moscow during the week preceding this IAC meeting. This research forms the basis for current standards in the Russian Federation and many neighbouring states.

A meeting will be held in Ottawa, Canada, 31 August-4 September, to continue consideration of risk perception and risk communication issues in EMF. This meeting will refine a draft document that grew out of the meeting in Vienna in October, 1997.

IV. NATIONAL UPDATES

AUSTRIA (J. Hohenberg): Mobile telephone base station siting is the most prominent issue. A literature survey on EMF effects will be ready in drafted by March, 1999, and published by June in German; it will have an English summary. The Project's October, 1997, workshop in Vienna on EMF risk perception and risk communication was cosponsored by the ministry, as well as by ICNIRP and others.

BELGIUM (M. Hinsenkamp): A detailed summary and progress report of research activities was provided. For ELF (50 Hz) studies an effort was made to standardize protocols for both cellular and human behavioural studies. Studies covered genotoxicity, calcium signalling, tissue differentiation in vitro, osteoclast formation, and gene expression, as well as human studies and epidemiology. There are RF studies, conducted with industry support, in genotoxicity and dosimetry modelling. Government policy supports COST 244bis. In response to Parliamentary requests on RF, an expert commission has been selected to answer questions about the science.

BULGARIA (M. Israel): Details of the current EMF exposure standards, which are based, in part, on ACGIH and ICNIRP, were distributed. Over a dozen governmental and research units are involved with EMF issues. A data base of RF emission sources has been developed, as have standard methods for measuring their outputs and compliance with national RF and ELF standards. A summary of results of research on exposure assessment for occupational and residential sources was also presented; in some industries national standards are being exceeded.

CANADA (A. Thansandote): There is growing public concern about cell phones and base stations. Health Canada has published a brochure on RF exposure safety. It has also drafted a revision; the final version is expected by the end of 1998. The agency will be host for the WHO seminar on "Risk Perception and Risk Communication Applied to EMF (31 Aug.-4 Sept. 1998, Ottawa). In other activities, the agency has surveyed 5 Vancouver schools to measure RF fields (Dec 97) in response to public concerns and has an ongoing study of effects of EMF on tumour progression in animals. It has requested the Royal Society of Canada to form an expert panel on EMF health risks.

CROATIA (D. Simunic): Concerns are growing about mobile telephone base stations and other antennas on public buildings. Standards are being developed, using the 1998 ICNIRP guidelines, and are expected to be in force by the end of 1998. All RF-emitting devices will be covered. The Fourth EBEA Congress will be held in Croatia in November.

FINLAND (M. Heitanen): Governmental efforts recently have been directed toward a new NIR ordinance based on ICNIRP guidelines. There is also work with EC Directorate 5, the CENELEC standards group, COST 244bis, and a special working group on mobile telephone exposure. An established research programme is investigating hypersensitivity and mobile telephones, cancer, and dosimetry.

FRANCE (L. Miro): Interest has increased in occupational RF exposures, particularly among maintenance workers in the telecommunications industry. The Council for Applied Sciences (CADAS) of the National French Academy of Science created a working group on possible health effects of cell phone emissions. CADAS has also provided financial support to jump start the COST project. The Ministry of Research and Ministry of Industry have initiated a research programme on human biological effects of cell phone emissions within the framework of the National Network of Radio Telecommunications (RNRT).

GERMANY (A. Böttger): The ordinance that became effective on 1 Jan 97 governing on EMF exposure, which was based on ICNIRP guidelines, is considered to have performed well. It is to be revised in response to the April 1998 revision of the guidelines, even though the changes in limits were not made on a scientific basis. Recent experience has proven the need for greater emphasis on dissemination of information to the public and to politicians. The radiation protection agency has held meetings to review Environmental Health Criteria documents covering 0-100 kHz and will hold another on 30 Nov. 1998. It will publish reports this year from projects on the effect of GSM phones on human EEGs and on assessment of the general population's exposure at 16 2/3 Hz and 50 Hz (see also BfS report). A new Commission of NIR Research has developed criteria for research quality and evaluation of applications for research support and a programme and priorities for research.

IRELAND (T. McManus): Public concern regarding perceived risks of cell phone base stations has lead to frequent inquiries, to which the Department of Public Enterprise responds with an information package that is updated monthly. A request for an injunction against the construction of a cell phone base station was denied in court. The Department of Public Enterprise, which is responsible for telephone and power utilities, sponsored a well-received international conference on "Communication Technology and the Community" (March 1998, Dublin) to address concerns of the public and local governments of Ireland. The Dail (Irish Parliament) heard testimony recently from government, industry, and public regarding the cell phone base station issue. A conflict over the construction of a 220 kV transmission line around Cork harbour is anticipated.

ISRAEL (E. Ne'eman): The government requires compliance with IRPA guidelines and is working to improve compliance for power lines and transformers. However, in response to public concerns and enquiries, the Ministry of Environment is establishing a research information centre, co-sponsored by government and the mobile telephone industry, to gather and distribute EMF health information. It feels present guidelines are adequate. Environmental EMF impact assessments must be submitted with requests to construct new mobile telephone base stations. By the year 2000, the government estimates 2000 base stations will be needed to serve 5,000,000 subscribers.

ITALY (P. Vecchia): Research is being coordinated by a consortium of 9 universities and 4 public institutes; projects include mostly laboratory and theoretical studies, along with some pilot work on a broad epidemiology study of EMF and other agents. Italian centres are participating in the design of the IARC-led study of mobile phones and

cancer. The regulatory picture is mixed. The nation supported the EC recommendation for unified standards, and the Italian Parliament is discussing a law to provide a framework for health goals and regulatory responsibilities of specific agencies in NIR, in coordination with the EC. But there is also political pressure for a separate, special decree to regulate RF exposure from a "prudent avoidance" perspective; this decree is not consistent with other international guidelines.

JAPAN (C. Ohkubo): The National Institute of Public Health has provided a draft time line for completion of a coordinated RF research programme including dosimetry; bioeffects in cells, animals, and humans, and epidemiology. A written summary of current research was provided.

KOREA (Y.-S. Kim): Research has mostly been on ELF recently, but RF research has increased. Mobile telephone use is increasing, and a joint Korean-Japanese meeting on exposure to these fields was held recently. Guidelines have been requested by the government.

HUNGARY (L. Szabo): The Ministry of Health is lead EMF agency, working with several other ministries. Brief summaries of recent research results were provided. These included human volunteer RF studies, animal studies of tissue enzyme activity and melatonin metabolism, RF dosimetry methods development, and studies of RF electromagnetic compatibility (EMC) of cardiac pacemakers in vitro and in vivo. Other studies consider high RF fields from plasma generators and radars and fields from high voltage power transformers. There are currently about 2100 mobile telephone base stations and 55 video towers; the number of mobile telephones is expected to double.

MALTA (R. Spiteri): This country was welcomed as a new participant. The government regulates and inspects all telecommunication devices and equipment using national standards that are in accordance with international guidelines (e.g., EC, UK NRPB, etc.). It will promulgate national standards for electromagnetic compatibility, based on EU norms, by the end of 1998. The government recently issued NIR regulations specifically for "Protection of Young Persons and the Protection of Maternity." There is not much research being done in this small country.

NETHERLANDS (E. Van Rongen): Public concern about cell phones and base stations is growing. Recommended exposure limits (300 Hz-300 GHz; Health Council of the Netherlands (HCN) Report No. 1997/01) were adopted by the government as reference values. HCN issued two brochures in the past year, one on health aspects of cell phone use and another on EMF in the work place. Results from research on RF energy dosimetry in the head of a cell phone user will be published soon. ICNIRP 1998 guidelines and the EU draft regulations have caused some concerns in industry. The Netherlands Institute for Radiation Technology (NIFRT) gives lectures, organizes courses, and performs research in NIR for companies and institutions having to do with environment, trade or commerce (Web address "www.xlink.nl/nifrt").

NEW ZEALAND (S. Gilbert): The government has adopted a provisional, one-year standard for RF exposure (3 kHz to 300 GHz) which has the same fundamental basis as the 1998 ICNIRP guidelines and follows these guidelines up to 400 MHz. From 400 MHz-300 GHz, the standard remains at the level permitted for 10 MHz to 400 MHz. The standard also requires an approach "consistent with the principle of prudent avoidance." The Ministries of Health and Environment will draft a national guideline covering RF, including cell base station sites, that is to include advice on risk analysis,

exposure levels, resource management, and monitoring of emissions. Report of a study of leukaemia will be published shortly. A recent "private members' bill" establishing a moratorium on new cell base stations within 300 m of a school did not pass Parliament.

NORWAY (T. Tynes): ELF fields from power lines are a major concern. Following an expert group meeting in 1995, a Green Paper was drafted in 1995. Its recommendations on distances to power lines, etc. have now been recommended by the government to Parliament. Low additional costs are to be accepted for reducing fields, and new schools and homes are not to be too close to lines. The power industry is funding government-sponsored research in epidemiology of childhood leukaemia and among electrical workers' children and in various laboratories.

RUSSIA (Y. Grigoriev): Recent activities in the Russian Federation include a significant number of reports on NIR at the 3rd Congress on Radiation Research (14-17 October 1997, Moscow) and the WHO/ICNIRP/Russian Academy of Medical Sciences-sponsored International Seminar on EMF: Biological Effects and Hygienic Standards (18-22 May 1998, Moscow; proceedings to be published in both Russian and English). Russian scientists are working to develop a national NIR research programme and a national committee on EMF hazards, safety and protection measures. They are also involved in public information dissemination.

SLOVENIA (P. Gajsek): The Ministry of Health drafted an act based on ICNIRP guidelines to frame and facilitate regulation of NIR exposures. Special focus is placed on surveillance of people who are occupationally exposed to high levels of NIR. There is also a draft of a model EMF environmental impact assessment for the introduction of new EMF sources. In conjunction with the October workshop organized by NATO (see also the NATO report, below), the Ministry of Health will organize a seminar on the need for global harmonization of EMF standards.

SOUTH AFRICA (B. de Villiers and L. du Toit): Representing a new participant, the delegates described how the national interest was represented by the South African Forum for Radiation Protection, whose members act in personal capacity but are drawn from a variety of stakeholders. This group met six times in 1997, including an October meeting on EMF. The national government's Department of Health is the relevant regulatory body (0-300 GHz). It endorses the ICNIRP guidelines and does not currently support control of exposures due to power lines or household appliances. In mid-98, results are expected from a small research program, which includes two animal studies and an epidemiology project. ESKOM, the power utility consortium will support some research on power line EMF issues.

SWEDEN (E. Kivisakk): Public concern over the siting of cell phone base stations has risen in the past year, and concerns regarding cancer risks (LF EMF) and EM hypersensitivity continue. The national radiation protection agency has published a leaflet on cell phone base stations, which concluded that such stations pose no health risks to the general population. The Swedish National Institute for Working Life (NIWL) unit in Umea reported results from a cross-sectional, survey-based epidemiology study of subjective symptoms in users of cellular phones. The study found that ISM (analog system) users do not report more of such symptoms than do GSM (digital) phone users; if anything, the data support the opposite finding. Post hoc analysis revealed an association of some such symptoms (headache, fatigue, warmth sensations) with the amount of phone use. NIWL also reported a link between a poor capacity for filtering out the modulation of flickering light and the likelihood of reporting symptoms of electro sensitivity.

SWITZERLAND (V. Mercier): The Agency for the Environment, Forests and Landscape is preparing a Federal ordinance to control public exposure to new stationary NIR sources. It will be based on the 1998 ICNIRP guidelines' reference levels for short term exposure. A strategy of "prudent avoidance" is likely to be included. Enactment is expected in 1999. A study of effects of weak EMF on "electrically hypersensitive" people's sleep characteristics has begun; the study examines both self-reported and physiological measures.

UK (J. A. Barrett): Public concerns continue to be about both power lines and mobile telephone base stations. The Department of Health held a workshop on research into EMF and on risk perception. It has funded a project on the effect of power line electric fields on radon daughter products in aerosols and a project on the effects of mobile phone-like 900 MHz exposure on memory, reaction time, and spatial awareness. A report on a Society for Radiation Protection meeting on EMF, held in January, 1998, will be published. A circular on mobile telephone base stations will be also published soon, based in part on the International EMF Project's publications. The National Radiation Protection Board (NRPB) has been commissioned to write a report on fields emitted by power tools and domestic appliances.

US (R. Owen and M. Murphy): At power frequencies the national effort is centred in the NIEHS RAPID program (see separate collaborating agency report below), in which several other agencies cooperate. At RF a cooperative effort includes NIOSH, NIEHS, NTIA, FDA, and FCC. Public concern continues over the possible health effects of RF exposures due to wireless communications, as indicated, in part, by 3 Congressional inquiries on the topic in the past year (FDA-CDRH replies to 2 of these were supplied to the committee). FCC has revised public information documents concerning RF. It and the FDA are cooperating on concerns about possible interference by HDTV with medical devices. NIOSH, FDA and NIEHS were part of the process creating the WHO Research Agenda. The Defence Department research programme has recently published articles on long term, whole body, or ocular effects from exposure to 450 and 2450 MHz. It is also investigating effects of wide band microwave and ultra-high power systems.

IV. REPORTS FROM COLLABORATING INSTITUTIONS

Bundesamt fur Strahlenschutz (BfS, Germany; R. Matthes): The organization has helped the International EMF Project organize recent meetings, and it is the headquarters of ICNIRP. In November, BfS will review the scientific data in the range of 0-100 kHz. BfS research staff have published (in German) a study using human volunteers, which examined the effects of EMF on EEGs and evoked potentials. The agency is monitoring research being carried out under the aegis of the Ministry of Environment, including epidemiology of 50 Hz EMF and child leukemia, the effect of GSM phones on human hearing, human stimulation thresholds in MRI fields, and human and animal dosimetry. There is also an epidemiological study of 50 Hz fields. A commission has been formed to receive industrial funding for research, while separating the science from the source of money.

Food and Drug Administration Center for Devices and Radiological Health (FDA-CDRH, USA; R Owen): CDRH has worked with other agencies in the NIEHS-run EMF RAPID program, which has funded and is now reviewing 60 Hz EMF research. The CDRH lab will publish results of its recent attempts to reproduce in vitro ELF effects in 1998 (full text of gene expression paper and abstract of enzyme activities paper supplied). The laboratory has worked with the other relevant US health and regulatory agencies to

review RF EMF research and was part of the WHO EMF project Research Coordination Committee. It is working on newly identified potential problems of electromagnetic interference with medical telemetry systems caused by HDTV broadcasts. FDA scientists have published papers on exposure assessment and EM interference with medical devices. The agency has persuaded the National Cancer Institute to add EMF to the list of factors being investigated in an ongoing epidemiology study of lymphoma.

Karolinska Institute (Sweden; A. Albohm): Two investigators have joined the Institute from NIWL. Plans include continuing the meta-analysis of the childhood leukaemia studies, in order to include the expected UK data, studies with IARC and other Scandinavian countries of mobile telephones and leukaemia or brain cancer. Occupational exposures to RF are being analysed in order to identify populations with high exposures. To date, no major groups have been found with uniform-enough exposures; subpopulations are now being examined. Reports are expected relatively soon from studies of resistance welders and of children who were placed in incubators neonatally; in the latter study the compromised health status of the infants is a confounder. A meta-analysis of EMF and neurodegenerative diseases is likely to be reported in January. Funding is still stable, but there are concerns for the future.

National Institute of Environmental Health Sciences (NIEHS, USA; C. Portier): NIEHS has been managing a large ELF research programme for the nation's EMF RAPID programme, which technically ended in December. Most of the 28 projects will be reporting out soon; a few will be extended using other NIEHS funds. In this fiscal year it has held scientific review symposia on in vitro studies and theoretical mechanisms, animal and clinical studies, and epidemiology studies. In June a working group will assemble to assist the institute in drafting a final report on Health Effects Associated with Electric Power, which the US Department of Health and Human Services must submit to Congress by the end of 1998. In discussion it was pointed out that the working groups were composed of a mix of people, including scientists, the public and industrial representatives, who hold a spectrum of views on EMF hazards.

National Institute of Environmental Studies (NIES, Japan; M. Kabuto): The new intra governmental network discussed at the last IAC meeting held a workshop in January; all involved ministries were present. A pilot study of childhood leukaemia has been funded, and preparations have been made to fund the full-scale study. The NRPB workshop on epidemiology methodological problems will be quite timely.

National Radiation Protection Board (NRPB, UK; A. McKinlay): The agency's charge includes research and protection of the populace with regard to both ionizing and non-ionizing radiation. Mobile telephone base stations are still a concern, and recent Swedish research results have increased press and public attention to possible effects of handsets. The concerns have spread to include cancers from base stations, even though the study was not about that disease. Litigation may begin soon. In ELF research, the childhood cancer study is entering the data analysis stage, as is the parallel "gold standard study," comparing exposure measurements and surrogates. Reports are due in December. NRPB is helping with field measurements for the world-wide pilot RF epidemiology studies and helping raise funds for the full study. In discussion the question was raised of how the issue of cancer was linked to the Swedish research results. Several present commented on the tendency of the press and the public to connect one type of effect to another, quite different one. The Swedish study, which uses data derived from a questionnaire that was administered in Sweden and Norway. The study compares

subjective effects from analog and digital telephones, and results were described in more detail.

Mr. Kivisakk (Sweden) noted that he had a summary for others' inspection; he added that even the Swedish press were unable to preserve the distinctions. **Dr. McManus (Ireland)** pointed out that experts often also cross these lines. He noted that the Swiss study of the Schwartzberg broadcasting tower emissions, which found a weak correlation through a very large study, was cited and distorted in expert testimony in a recent Irish trial. The delegates concluded that it was highly important clarify the limitations of studies. Delegates also noted that in the case of the Swedish study, as well as in others (e.g., Matinowski's animal study or the recent Linet et al. epidemiological work), it was also important to clarify that a study is designed to confirm or reject the initial hypothesis, and in these examples that hypothesis was rejected. As in these examples, a study can suggest but not confirm a different hypothesis that was not part of the study design.

V. REPORTS FROM COOPERATING INTERNATIONAL ORGANIZATIONS

COST 244bis (D. Simunic): This EC-based collaboration presently includes 16 European

countries from both within and outside the EU. Separate working groups are considering issues in epidemiology, basic research, and field measurement and assessment. COST 244bis sponsored one meeting and one workshop this year. The workshop on Biomedical Effects of EMF in the Intermediate Frequency (IF) Range 3 kHz-3 MHz concluded that exposures are rising. It also concluded that the scientific basis of existing exposure guidelines is weak, since the guidelines were derived primarily by extrapolation, and highlighted a need for more research on RF dosimetry and bioeffects. A meeting is scheduled in conjunction with the EBEA meeting (21-22 November 1998, see report by Croatia) on RF exposure assessment in epidemiological studies. COST 244bis is assisting the EC directorates with preliminary thinking about for EMF research plans under the 5th Framework.

EUROPEAN BROADCASTING UNION (EBU, T. O'Leary): This organization of broadcasters is a new participant. The EBU participates in standards development for EMF safety for workers and the public, in collaboration with IEC and other organizations. Near RF field hazards are of particular interest. In the past two years, it has issued a technical report, "Electromagnetic Compatibility (EMC) at Transmitter Sites." It presently is updating a 1995 publication, "RFR Hazards: Exposure limits and their implications for broadcasters." The organization is working with a company that is developing a new type of field strength meter for both broadband and narrow band measurements instrument, based on optical techniques. It has a web site.

EUROPEAN COMMISSION (EC, C. Schatzl): Political negotiations continue for the 5th Framework of research, to begin in 1999. The Framework's research topic on health and environmental factors probably will include NIR, which has a level of political priority. Activities to be funded and program administration are not clear, but are likely to be identified by December, 1998. A two-year project to review the literature and build a data base on mobile telephone dosimetry began in October, 1997. It has its own Internet site. Exposures from a proposed magnetic or magneto elastic identification system is being studied; it seems probable that the system can operate within ICNIRP guidelines. The Karolinska Institute epidemiology study of cancer is due to report in April, 1999.

With regard to regulation, members' health ministers will probably meet in the second half of 1998 to discuss a draft for common limits of acute effects due to EMF, based on the ICNIRP guidelines. While non-binding, the proposal is a basis for common national standards that would reduce the present confusion.

INTERNATIONAL COMMISSION ON NON-IONIZING RADIATION

PROTECTION (ICNIRP, A. McKinlay): Seminars were sponsored in collaboration with WHO on biological effects of ELF (Bologna, June 97) and on risk perception and communication (Vienna, Oct. 97), and proceedings were published. New guidelines on exposure up to 300 GHz were published in April. For the first time, these include both basic restrictions and reference values. The commission collaborated with ILO on the publication on RF sealers described in that group's report.

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC, R. Baillif and

G. Goldberg): The commission develops standards and issues reports on instrumentation and measurement methods. Its new EMF Task Force coordinates several committees on various aspects of EMF measurements; it also coordinates with other agencies. At its first meeting, the task force decided that IEC must furnish methods of measuring 100 kHz-1 Hz fields. They are now voting on draft standards for low frequency electric and magnetic field measurements of human exposure, which will be published in August, if approved. A working draft for 9 kHz-300 GHz is in circulation; approval of a final standard may take 2-3 years. The task force also decided to take up problems not covered under mobile telephone occupational areas. In discussion it became clear that IEC intended to develop documents that specified required equipment characteristics and measurement techniques in order to produce data that could be compared to ICNIRP or other standards. Static magnetic fields and some other types of measurements mentioned in the ICNIRP guidelines are not presently on the IEC agenda. However, at the end of the discussion it was agreed that the Commission would examine the 1998 ICNIRP guidelines point-by-point and ensure that the IEC either has or will begin to develop approved standards.

INTERNATIONAL LABOUR ORGANIZATION (ILO, S. Niu): ILO has published a booklet, "Safety in the Use of RF Dielectric Heaters and Sealers" in collaboration with ICNIRP and WHO in the past year. This year it also published the 4th edition (print + CD-Rom) of "The ILO Encyclopaedia of Our Health and Safety," including a new chapter on NIR. ILO is drafting a "Code of Practice on Ambient Factors at the Work Place" to protect workers, which includes coverage of EMF; the draft is scheduled to be reviewed in Jan. 1999. ILO's Centre on Information is a network of 420 sites that supply health and safety information. The ILO web site is "www.unicc.org/ilo".

INTERNATIONAL TELECOMMUNICATIONS UNION (ITU, M. Wright): In addition to activities mentioned in other reports, ITU is preparing recommendations for telephone system operators that are based on the ICNIRP guidelines.

NATO (M. Murphy): In the past year NATO revised (13 Oct. 97) their standard to evaluate and control exposure of personnel to RF fields (3 MHz-300 GHz). The organization established a three-year research programme, including work on dosimetry, epidemiology of military personnel, cell/organ bioeffects relevant to emitters unique to the military, and shocks and burns. NATO has furnished funding to sponsor, in cooperation with the University of Ljubljana, the 12-16 October 1998 workshop on RF dosimetry, measurement and their relationship to biological effects of EMF (see also

report by Slovenia). It also is planning a conference in April 1999 on health effects of directed energy weapons, high power MW, and ultra wide band weapons and radar.

WHO Pan-American Health Organization (PAHO, C. Borrás): This regional office of WHO responds to national requests from the region. An epidemiological program of research is being planned in cooperation with Costa Rico.

WHO Regional Office for the Eastern Mediterranean (EMRO) (S. Atallah): The past year's activities included responding to growing public concern with Environmental Health Criteria (EHC) 16, 35, 69 and 137; conducting a training workshop (22-25 February, 1998, Dubai, UAE) for the 6 member states of the Gulf Cooperation Council; and recommending endorsement of ICNIRP guidelines as exposure standard for states in the region.

VI. PUBLICATIONS

Dr. Repacholi discussed the list of Project publications in the Progress Report (see list in Annex II). All are freely available, and many are on the Project's World Wide Web site. The Web site's address has been simplified for easier access (see next section). The draft fact sheets that were circulated at the last IAC meeting for comment have been revised, incorporating many of the comments received, and most are either published or nearing publication. Comments on the draft Progress Report of 1997-98 should be sent to Repacholi as soon as possible. The Research Agenda is on the Web site and printed copies are being made. An article reporting on the Bologna meeting has been reviewed and revised for Bioelectromagnetics.

In discussion, it was noted that the WHO European regional office is preparing an EMF booklet, which delegates noted should be consistent with the Project's statements. Repacholi stated that the Project had to approve the final text of this publication and that discussion was currently in progress. It will be part of the series of attractive, clear booklets on various types of radiation, written primarily by people at NRPB (UK). Publication is estimated to occur in December, 1998. It was noted that the booklet's initial audience had been local authorities, not the general public, and that the initial authors had some concerns about the change. Repacholi noted that the regional office had obtained additional information and broadened the scope.

VII. WORLD WIDE WEB SITE

Dr. Greenebaum noted that as part of a major overhaul of the entire WHO Internet site, the Project had received a new, simpler address (<http://www.who.ch/emf/>); the former one still works as well. The WHO site had a new look and feel, and the Project site was receiving some minor alterations to conform to the new overall framework. In addition, several items had been added to the Projects Web pages. These include the Research Agenda and a data base of ongoing projects relevant to Agenda, linked to the objectives. This data base had been recommended at the last IAC meeting. Information concerning ongoing projects that are candidates for inclusion in the data base was urgently requested; it should be sent to Dr. Repacholi. Information concerning Internet links to other sites, particularly those maintained by collaborating institutions, was also requested.

Other items added to the Project pages include information on coming meetings and the text of the Fact Sheets. The Fact Sheets and Press Releases are available in English and French, and Dr. Repacholi requested that as many nations as possible furnish translations

into their languages, so these (or links to sites where they are available) could be added. Information on other important meetings is also sought.

VIII. FACT SHEETS

Repacholi noted that five fact sheets are now available. Many are available in several languages, and other translations are also under way. The Sheet on mobile telephones was released in Moscow, the week preceding the IAC meeting; copies were distributed. Comments on all sheets are welcome and are used in the periodic updates. A further group of Fact Sheets is in various stages of development. Intended for the general public and the press, Fact Sheets are written by the Project and WHO's Information Services staff, based on approved WHO documents. For example, the Sheet on ELF is based on the report of the Bologna meeting. Suggestions for additional topics were requested. In discussion several ideas were mentioned, particularly radar or pulsed RF; a comment on this suggestion indicated that new data on the topic might be necessary first. Dr. Murphy (USAF Armstrong Laboratories) indicated that this topic was high on its research agenda. It was also noted that the WHO Research Agenda omits any mention of the Munich meeting's concerns about this topic. There was also discussion about Fact Sheets concerning towers or sites where collections of RF transmitting antennas were located, exposure of medical personnel using RF devices with patients, and RF sealers. There was considerable comment about exposure of medical personnel. The group did not dissent from Repacholi's summary of the discussion, which gave priority to medical personnel exposure and to radars and pulsed RF and noted that ILO had documentation on RF heaters and sealers. Broadcast towers and clusters had some priority; it was noted that the US FCC had materials on this topic.

IX PRESS RELEASES

Dr. Repacholi noted that three press releases have been issued since the last IAC meeting (see listing in Annex II). A press release will be prepared by WHO Information Services for this meeting and given to a group of the attendees for review before release. Press releases are important for disseminating information and ensuring that the Project is contacted when EMF issues arise in the future. They build public confidence in the Project's process and results. These advantages compensate for the problems a release sometimes causes national authorities by reminding the public of the issue. In answer to a question about whether WHO monitors what the press prints, Repacholi said that this was done by WHO Information Services.

X. TOPICS OF NATIONAL AND INTERNATIONAL CONCERN

Four major topics were identified for discussion, though the first one was by far the most provoking:

1. ALARA and Prudent Avoidance (PA).
2. Global harmonization of standards.
3. Multiple standards in one country, including regional differences or differences between occupational exposures and those for the general public.
4. What to tell local authorities while research is still in progress.

The discussion centred around PA, but touched on the other topics as it progressed: ALARA and Prudent Avoidance (PA); public information: Versions of PA are being requested in

many nations and are increasingly appearing in official regulations. The concept of ALARA

originated in ionizing radiation in recognition of the apparent stochastic nature of the risk. NIR seems to differ in this respect, since there is apparently a threshold below which adverse effects do not occur. ALARA therefore may not be applicable to NIR. PA was introduced as a way for individuals to take what they considered reasonable action in the presence of scientific uncertainty and absence of formal regulation. However, the continuing scientific uncertainty and public concern about the possibility of a problem from long-term exposure creates a demand for applying PA in an institutionalized way to require reasonable actions of utilities and governments. The big issue is, how does one define "reasonable"? In the absence of dose-related data on effects, costs per statistical life cannot be analysed very well.

Moreover, society is having problems in identifying the question, much less coming to a consensus, about how costs per statistical life for EMF should compare to similar costs for other risks.

In Sweden there has been generally positive experience with PA since a national document offered it two years ago as a principle to be used by local authorities. People have seen this as an open and responsible approach by government, and towns have been able to decide how to live with certain EMF-related risks, in comparison to other risks. In one example, a power line was buried, but some of the costs were recovered through sale of the land under the old lines. Property values may also have increased. But in general PA may have reduced the contentiousness of the whole range of EMF issues. In Sweden there does not seem to be much concern about whether it is fair for one community or group in a town to be exposed to lower fields from new construction, built under PA with somewhat higher costs, compared to their neighbours, who are exposed to fields from pre-PA installations.

PA-related actions and public pressures in other countries were also discussed. Fears play an important factor, and PA or other precautions can help allay them or can play a role in intensifying them. The public are not always persuaded by scientific data indicating little need for action, and when authorities or companies take action under PA, some conclude that the data are not to be trusted. This occurs for both power lines and mobile telephone base stations. In some areas, local authorities have objected to warning signs on fences around mobile telephone base stations or other RF antennas on the ground that the signs heightened general anxiety. On the other hand, omission or removal of such signs is taken of evidence of a "cover-up." In any nation, the public will have some information, requiring authorities to either furnish more, reliable information or step aside. Where PA is to become a matter of policy, it must also be explained clearly.

Political influences are important. They have led to informal pressures or legislation requiring PA in several countries. The Treaty of Rome requires the EC to use a precautionary principle that considers the scientific and technical data, local economy and the costs and benefits of both action and inaction. Discussion raised the question of whether people have seriously considered the costs in relation to even the potential benefits, making rather generous assumptions. The conceptual basis of the precautionary principle assumes some knowledge about the hazards.

It was pointed out that in societies where litigation is more common, action taken under PA by businesses or governmental agencies creates potentially large costs because of

equity issues. People will tend to seek reduced exposures, particularly if the personally do not pay the costs. For this reason, as well as because of the international nature of commerce, PA guidelines in one place can become de facto standards for all. It was noted that in Sweden there was a general attitude in favour of protecting the common good. In the Scandinavian setting, the principle offers guidance to local authorities in considering a multiplicity of factors, including health, the environment, economics, and politics. These local regulations are temporary, pending further knowledge. The governing national document is also temporary and will be reexamined in 2000. In these nations the public is accustomed to this approach.

Global harmonization of standards and multiple standards in one country: If there are different standards in different countries or different standards for different regions or different population groups within a single country, misunderstandings and fears can also arise. A regional variation in standards occurs in the Russian Federation, where somewhat higher levels of EMF exposure are permissible in the Moscow region than elsewhere. In parts of that city field strengths currently exceed the general national standards. In the US, as in many other nations, allowable occupational exposures are higher than those for the public. Questions are now arising about which standard applies to occupational mobile telephone use and how to differentiate between occupational and personal calling. The tendency of the lowest standard, worldwide, becoming a de facto worldwide standard because of commercial pressures was already noted in the discussion of PA. Many of the issues raised by non-uniform standards are related to these pertaining to PA.

Equity questions--whether people subject to the more lenient standards are not being sufficiently protected or whether people subject to the more stringent ones are being deprived unnecessarily of the benefits of a new technology--are at the core of this issue. Commercial questions, including the conflict between manufacturing for a world market and protection of local industry, are also factors. For many reasons, global harmonization of standards would be very useful.

It was noted that at present, two sets of guidelines dominate the advice used by governments in setting national standards, ICNIRP and IEEE/ANSI. If these two came into agreement, reaching a global standard would not be difficult. The forthcoming meeting in Slovenia on globalization of standards was noted. However, because national standards are set using not only the science, but philosophical and socio-political factors that differ between countries, Repacholi suggested that a separate workshop to discuss the role of these may be useful. There may not be time to prepare properly for including all of these issues in the Slovenia meeting.

It also was noted that standards cannot be static. A great deal is still not known about biological interactions with EMF, and many types of questions have yet to be researched. An example is the predominance of whole-body RF experiments, rather than head-only exposures of the sort experienced by users of mobile telephones.

Further discussion pointed out that most standards arise from the same scientific base and general restrictions. Reference levels are more likely to differ due to different methods of extrapolation, calculation, applying safety factors, etc. Since national political and other pressures also affect the process, universal standards may be a naive goal. It was also noted that standards must offer stability and cannot shift as each new research result appears. They must evolve in a way similar to that afforded by the present system, using a system of checks, balances, and judgement and changing relatively slowly to make

living with them possible for everyone affected, including industry, government and especially the public.

XI. INTERNATIONAL EMF PROJECT SCHEDULE OF ACTIVITIES AND OUTPUTS

Dr. Repacholi presented a draft revision of the 1996 schedule of Project activities and outputs. He explained that the revision reflected the extra time needed to perform the unexpectedly large amount of research that is still needed for a more definitive health assessment of EMF. It also reflects the Research Coordination Committee's comments that some of the needed RF experiments would require on the order of 5 years before publication, though the results needed for an ELF assessment should be ready earlier. The scope of the Project has also expanded. He therefore projects the total length of the Project to be 8-9 years, probably extending through 2005, in order to allow IARC to complete its monographs on the possible carcinogenicity of EMF. He asked the members for advice on suggestions on the activities and documents listed and for other activities that should be added.

General discussion produced the strong recommendation that a Fact Sheet be published covering each major report. It was also noted that the EU's 5th Framework would not conclude before 2004 and that some results would be unavailable for the IARC ELF reviews scheduled for 2001 and RF one in 2003 or, for that matter, for the Project's reviews of ELF and RF in 2002 and 2004. It was noted that both IARC and the Project recognized these problems, but they also recognized the need to stop hold a review at some stage and that some research will be in progress whenever the reviews are held.

Beginning the year-by-year discussion of the schedule, there was also a spirited exchange over whether work proposed for 1998 on environmental impacts was important to the Project, particularly given budgetary and time limitations. It was noted that environmental issues do bear on public health and are often required in impact statements for new projects. However, this aspect will be held to a low level of cost and activity, possibly as a report generated without a meeting or as an issue to be delayed until the EHC is written. Previous EHCs concerning EMF had small sections on environmental effects.

For 1999 it was agreed that the follow-up to the recent meeting on 300 Hz-10 MHz, where standards are primarily based on extrapolation, since little data exist, would be held in the same format as the Bologna and Munich meetings. ICNIRP would cooperate. The meeting may be in the Netherlands in early 1999.

The proposed meeting in 2000 on the health consequences of perception of risk or injury generated a great deal of comment. In addition to the questions raised by people who may be hypersensitive to EMF, people living near the Chernobyl accident have shown that stress due to the perception of a risk, whether real or not, produces consequences needing treatment. The issues are related to risk perception and risk communication, but differ in that they are manifested through increased demands for health care. Others pointed out the need to expand this question to include both imagined and real exposures and to include measures to train the health care professionals, particularly the primary and emergency care personnel whom these patients first encounter, how to approach these cases. Often medical staff use the approaches appropriate to doses of ionizing radiation, adding to the patients' alarm. US Air Force experience, to be described in a report that will be out soon, is that the most important factor in following up on cases of accidental

exposure to EMF is whether the initial medical contact alarmed or upset the patients or whether they and their problems were treated with dignity. Investigating what physicians and others know and what they ought to be given in the way of training materials was agreed to be important.

The training programs for national authorities, scheduled for 2001, could be used at once by some of the WHO regional offices, which could cooperate in their preparations. Environmental issues could be deleted or downgraded to allow more time to prepare these materials. Such materials would have to be clear that further research may change conclusions and would have to be updated as soon as the EHC are produced towards the end of the Project.

Additional topics of importance that should be worked into the existing activities are the interaction of EMF and medical pharmaceuticals, since there are some indications that fields increase the activity of drugs. A small working group was suggested, as well as integrating its results into the materials for medical personnel. An additional suggestion was to find a specific place to consider which parameters (frequency, intensity, intermittency, etc.) of the fields describe their biologically active aspects, in other words, to identify the relevant dosimetric factors. Before a working group can be struck, the idea needs refinement: Dr. Hinsencamp was asked and agreed to furnish a short concept paper or proposal.

A final question that was raised was, in essence, how the scientific community, which currently has members who hold a broad spectrum of views concerning whether health risks are associated with various types of EMF, can come to agreement on these questions. It is hard to see how the public's questions will be satisfactorily answered until the scientists agree. WHO and IARC procedures are designed to create such a consensus.

XII. BUDGET

Dr. Repacholi presented the Project's current financial status (see Financial Statement in Annex V). He noted that the Project was financially healthy and doing well under its initial financial plan. As noted briefly in the previous discussion, the extension of the Project will require additional budget; the yearly cost of the Project is expected to continue at about the same level. A number of representatives questioned whether their governments would be willing to increase their commitments. However, Repacholi noted that the number of participating states has increased and that he expected a significant part of the additional funding commitments to come from countries that had not been counted on to fund the initial five years of the Project.

XIII. NEW BUSINESS

A discussion of the membership of the International Advisory Committee began with a question about whether the International Commission on Occupational Health should be invited to join. The present membership includes representatives of governments, usually from ministries of health, and of international organizations directly associated with EMF issues. It does not include professional societies, such as ICOH or various engineering societies, or other interested or potentially interested groups such as, for example, Greenpeace. In discussion there was agreement that groups directly associated with standards, such as the IEEE in the USA, should be considered for membership. There was also agreement that the broadest possible input should be sought, but that the WHO project should avoid formal involvement with politics. Just as industry is excluded, its

opposition should be excluded from membership. However, meetings should be open, and observers and their inputs from all sources should be welcome.

There was concern that the RF Research Agenda of the Project is reactive. Even more that the Munich meeting report, it stresses mobile telephone waveforms and frequencies and does not include waveforms, pulses, and frequency regions that are likely to be important in the near future. Repacholi noted that the Agenda should be fixed to more accurately reflect the Munich meeting's concerns. He also noted that for the near future, the greatest RF public health questions will be those relating to mobile telephones, which therefore makes these the most pressing questions for WHO.

XIV. ACTION ITEMS

In reviewing the two days of the meeting, Repacholi and the group arrived at the following set of items that should be noted for specific actions. Other action items identified in the body of these minutes should also attended to.

- The IEC has agreed to go through the 1998 ICNIRP Guidelines point-by-point to identify the recommendations for which it already has set measurement standards, the ones for which it is presently standards, and the ones for which it has neither. It will begin work on the latter.
- The Project will begin work on Fact Sheets concerning exposure of medical personnel using EMF-generating devices, radars and other strong pulsed RF sources, and the public and occupational issues related to broadcast antenna towers and clusters.
- The Project schedule will be revised further. Both the proposed activities and their timing will be considered in light of the Committee's comments.
- Working groups and meetings will be considered for the criteria and framework for international standards and for identifying the content and experimenting with training programs for health care workers, especially primary care and emergency room staff, who are most likely to encounter people with real or imagined overexposure to EMF.
- Members of the committee are urged to keep in communication with the Project Secretariat and each other between meetings, sharing potentially useful information and publications. They are specifically urged to furnish the Project with information on research work in progress that might be eligible for inclusion in the data base of ongoing projects relevant to the Research Agenda.

XV. NEXT MEETING; ADJOURNMENT

After some discussion the next meeting was tentatively set for the third week of May, 1999, in Geneva. The meeting adjourned with thanks to the Chair, Vice Chair, Rapporteur, and WHO staff and with special thanks to Ms. Michele Peters for the extensive preparations for the meeting.

LIST OF ANNEXES

- I. Welcoming Remarks of Dr. W. Kreisel
- II. WHO International EMF Project 1997-1998 Progress Report (Draft)
- III. List of Participants

- IV. Project Schedule
- V. Financial Statement

Annex I. Welcoming Remarks of Dr. W. Kreisel

I am pleased to welcome all participants of the third International Advisory Committee of the International EMF Project and to thank you for kindly accepting our invitation to participate. Over the next 2 days, you will have the opportunity to be updated on the activities, priorities and operation of the Project and to inform us and each other of your own organizations= activities concerning electromagnetic fields.

It is evident that in many countries EMF continues to be a source of concern, particularly about low-frequency fields associated with electric power generation, distribution and use, and radio frequencies associated with mobile telephones and their base stations. The increasing number of nations attending this International Advisory Committee is one indicator of this world-wide interest. I am pleased to welcome representatives of Iran, Hungary, Norway and South Africa, who are attending for the first time.

Concerns about the effects of EMF exposure, particularly the effects of long-term exposure to fields, too weak to produce the acute health effects which form the basis of present international standards limiting exposure, continue to grow along with the increasing use of RF-based technology and electric power. Mobile telecommunications is a very rapidly-growing industry, affecting large sectors of our societies. Finland leads the world in per capita use of this technology; on 1 January of this year, 42% of the population had a mobile telephone. Other Scandinavian countries are close behind, and in many places, at least 20% of the people subscribe to a mobile telephone service. RF field intensities received by users of these telephones are below current international guidelines, but the research on long-term effects is sparse.

At lower frequencies controversies over possible health effects of magnetic fields from electric power transmission lines continue to erupt around the globe. Meta-analyses of epidemiological studies of childhood cancer suggest a weak association with exposure to low frequency magnetic fields, even though a great many of the studies themselves are not statistically significant. Given the very large numbers of people exposed to EMF in their daily living, confirmation of even a weak adverse health effect might become a significant public health issue. It is important therefore that the EMF issue be resolved as soon as possible so that, either appropriate mitigation measures and any needed changes in exposure limits are instituted., or if there are no adverse effects from low-level EMF exposure, the resources and worries now devoted to this concern can be redirected to more pressing issues.

The ultimate goal of the International EMF Project is to foster the adoption of universally-accepted, scientifically-based standards for exposure to EMF. Before this goal can be reached, many intermediate steps must be taken, and these are part of the plan of activities of the EMF Project. The work to date would not be possible without the active participation between national bodies, ICNIRP and research institutions that collaborate with the WHO International EMF Project and are represented here.

In the past year, the Project has made considerable progress. It has completed the first round of scientific reviews for both static and low frequency fields and for radiofrequency fields. These reviews have identified specific programmes of research to be completed before there is sufficient scientific knowledge for a more definitive assessment of whether exposure to low-level EMF has any adverse health. This Agenda

for Research has now been widely disseminated, and all organizations that perform or fund EMF research are urged to include in their activities whatever projects on the Agenda are within their own capabilities and terms of reference.

The Project has also devoted considerable effort to the public's perception of the risks from EMF exposure. EMF raises strong opinions among both experts and the general public, and that public fears are not always consistent with the findings of scientific research. This year the Project held a meeting to consider what research has been done on factors that contribute to risk perception and the ways risk communication programmes can affect risk perception. Follow-up working group meetings are scheduled for this summer. The resultant monograph should assist governments, scientists, the concerned public and industry to establish an effective dialogues about EMF.

The EMF Project offers a clear example of WHO's responsibility to provide internationally unbiased reference and guidance on public health issues which have global implications. This 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.

In the past week, the Project has sponsored a meeting in the Russian Federation that discussed the large body of research conducted over many decades in the former Soviet Union and published primarily in Russian. This work, much of which is not known in other parts of the world, became the basis for limits on EMF exposure that are much more restrictive than in the rest of the world. The results of this past week's discussions will help clarify and, I hope, lead eventually to a resolution of the differences in exposure standards.

So I welcome you and thank you for your past and your future collaboration in the International EMF Project. I hope that in the next two days and over the remainder of the term of the EMF Project we will work fruitfully together. I also hope that by the end of the Project we will have jointly reached conclusions that address the concerns about EMF raised by the national authorities, general public and workers. Finally, I hope that you enjoy your visit to Geneva and thank you once again for making the effort to travel to WHO for this meeting.

Dr W Kreisel
Executive Director, Environment and Health
World Health Organization
25 May 1998

Annex II. WHO International EMF Project 1997-1998 Progress Report (Draft)

This report will be published as a separate document and so will not be reproduced here.

Annex III. List of Participants

NATIONAL GOVERNMENTS AND COLLABORATING INSTITUTIONS

Dr SY ACRAM	Netherlands Institute for Radiation Technology
Prof. A AHLBOM	Karolinska Institute, Sweden
Mr J Arwel BARRETT	Health and Safety Executive, UK
Dr A. BÖTTGER	Federal Ministry for the Environment Nature Conservation and Nuclear Safety, Germany

Mr P. GAJSEK	Slovenian Institute of Quality and Metrology
Ms S. GILBERT	Ministry of Health, New Zealand
Prof. Y. G. GRIGORIEV	Institute of Biophysics (Moscow), Russian Federation
Dr M. HIETANEN	Finnish Institute of Occupational Health
Prof. M. HINSENKAMP	Brussels University, Erasmus Hospital, Belgium
Dipl. Ing. J.-K. HOHENBERG	Federal Chancellery, Section VI/8b, Austria
Prof. M. ISRAEL	National Centre of Hygiene, Medical Ecology and Nutrition, Bulgaria
Dr M. KABUTO	National Institute for Environmental Studies, Japan
Dr Y.-S. KIM	Hanyang University, South Korea
Mr E. KIVISAKK	Swedish Radiation Protection Institute
Dr A. F. McKINLAY	National Radiological Protection Board, UK
Dr. J. McLEAN	Radiation Protection Bureau, Health Canada
Dr T. McMANUS	Dept. of Transport, Energy and Communications, Ireland
Dr V. MERCIER	Federal Office of Public Health, Switzerland
Prof. L. MIRO	Centre Hospitalier Universitaire Caremeau, France
Dr M. MURPHY	USAF Armstrong Research Site, USA
Dr E. NE'EMAN	Ministry of the Environment, Israel
Dr C. OHKUBO	National Institute of Public Health, Japan
Dr R. D. OWEN	FDA Center for Devices and Radiological Health, USA
Dr C. J. PORTIER	National Institute of Environmental Health Sciences, USA
Dr E. van RONGEN	Health Council of the Netherlands
Dr D. SIMUNIC	COST 244 Bis and University of Zagreb, Croatia
Dr R. SPITERI	Commission for the Promotion of Occupational Health and Safety, Malta
Dr L.D. SZABO	National Research Institute for Radiobiology and Radiation Hygiene, Hungary
Dr A. THANSANDOTE	Radiation Protection Bureau, Health Canada
Mr L. L. du TOIT	Ministry of Health, South Africa
Dr T. TYNES	Norwegian Radiation Protection Authority
Dr P. VECCHIA	National Institute of Health, Italy
Dr L. VERSCHAEVE	Vlaamse Instelling voor Technologisch Onderzoek, Belgium
Prof. B. de VILLIERS	South Africa Forum for Radiation Protection

INTERNATIONAL ORGANIZATIONS

Dr R. BAILLIF	International Electrotechnical Commission
Mr G. GOLDBERG	International Electrotechnical Commission
Mr R. MATTHES	International Commission on Non-Ionizing Radiation Protection
Dr S. NIU	International Labour Office
Mr Terry O'LEARY	European Broadcasting Union
Ms C. SCHATZL	Directorate-General V/F/1, European Commission
Mr M. WRIGHT	International Telecommunications Union

WHO REGIONAL OFFICES

Mr Sadok ATALLAH	WHO Eastern Mediterranean Regional Office
Dr C. BORRAS	Pan American Health Organization (PAHO/WHO)

WHO INTERNATIONAL EMF PROJECT SECRETARIAT

Dr M. REPACHOLI EHR - Scientific Responsible Officer
Mrs M. PETER Secretariat, EHR
Dr B. GREENEBAUM Consultant, EHR

Annex IV. Project Schedule

REVISED SCHEDULE OF ACTIVITIES AND OUTPUT

Continuing Activities of the Project

- Monitor all appropriate research results and attend scientific meetings.
- Participate in seminars and symposia to provide updated reviews of EMF health effects and progress of the EMF Project.
- Compile, review and disseminate interim output reports on substantial findings.
- Hold press conferences and issue press releases following Project sponsored scientific meetings.
- Update home page at regular intervals.
- Publish WHO Fact Sheets on various EMF topics.
- Draft minutes of all meetings and progress reports.
- Prepare for and conduct International Advisory Committee and scientific meetings.
- Prepare information brochures on the Project.
- Provide training courses and lectures on an as-needed basis.
- Update scientific databases relevant to the Project's research agenda and maintain a file of EMF references.
- Respond to enquiries and distribute information as needed.
- Raise funds for Project administration and specific activities.

Schedule of Major Activities and Outputs

1996

- Hire initial staff, complete administrative infrastructure arrangements, prepare for first International Advisory Committee meeting.
- Draft scientific reviews of literature in preparation for international seminars and working group meetings on RF fields.
- Develop EMF Project home page and update with all Project publications.
- Prepare press release and WHO Fact Sheet on EMF Project.
- Publish 1995-96 progress report.

Meetings

- *First International Advisory Committee meeting to review schedule and targets for activities (WHO, Geneva, 30-31 May, 1996).*
- *International seminar and working group meetings on health effects of exposure to RF fields (Munich, 20-23 November, 1996).*

1997

- Publish RF symposium proceedings and send draft summary report to WGs for comment and approval. Send approved summary report (Munich) to scientific journal.
- Draft scientific review for international seminar and WG meeting on static and ELF electric and magnetic fields.
- Send draft static and ELF field WG report for comment and approval prior to dispatch for publication in a scientific journal.
- Publish minutes of first International Advisory Committee meeting.
- Publish 1996-97 progress report.
- Draft WG report on risk perception and communication for international seminar and WG meeting.
- Draft preliminary research agenda.

Meetings

- *Second meeting of International Advisory Committee (WHO, Geneva, 2-3 June, 1997).*
- *International seminar and WG meeting on static and ELF electric and magnetic fields (Bologna, Italy, 4-8 June, 1997).*
- *International seminar and WG meeting on EMF risk perception and communication (Vienna, Austria, 22-25 October, 1997).*
- *First meeting of an ad hoc Research Coordination committee to identify research still needed to complete the research agenda required by the international seminar and WG meetings on static, ELF and RF fields (WHO, Geneva, 4-5 December, 1997).*

1998

- Publish WHO' s EMF Research Agenda.
- Publish minutes of second International Advisory Committee meeting.
- Publish minutes of first ad hoc Research Coordination Committee meeting.
- Publish 1997-98 progress report.
- Publish working group report of scientific review of static and ELF fields (Bologna report) in scientific journal.

- Draft report for international seminar and WG meetings finalising the publication on EMF risk perception and communication.
- Publish brochure on International EMF Project.
- Draft report for international seminar and WG meeting on the biological effects and research needs for the frequency range 300 Hz to 10 MHz.
- Update WHO Fact Sheets on EMF topics and have translated into French, German, Japanese, Spanish and Russian.

Meetings

- *International seminar on Russian EMF scientific literature and draft summary report (Moscow, Russian Federation, 18-22 May, 1998).*
- *Third meeting of International Advisory Committee (Geneva, 24-25 May, 1998).*
- *International seminar and WG meetings to finalise the report on EMF risk perception and communication (Ottawa, Canada, 31 Aug to 4 Sept, 1998).*
- *Workshop on EMF exposure assessment for epidemiological studies (NRPB, Oxford, UK, 7-9 September, 1998).*
- *Preliminary meeting of the Working Group on Standards at EBEA Round table on Standards, Zagreb, 19-21 November, 1998.*
- *Second meeting of ad hoc Research Coordination committee to review progress of research (WHO, Geneva, 7-8 December, 1998).*

1999

- Draft text for international seminar and working group meeting on health consequences from perception of EMF hazards (eg hypersensitivity, consequences of psychological stress, etc.).
- Draft report on medical handling of persons highly exposed to EMF: In conjunction with WHO collaborating centre at Armstrong Labs, San Antonio.
- Publish EMF risk perception and communication report following Ottawa meeting.
- Publish proceedings of the Moscow meeting in Russian and English.
- Publish report on the Russian EMF literature following approval by speakers whose text is being summarised. Report to be available to WGs on text for EHC monographs.
- Publish minutes of third International Advisory Committee meeting.
- Publish minutes of second ad hoc Research Coordination Committee meeting.
- Publish 1998-99 progress report.
- Collaborate with ICNIRP to prepare international workshop on EMF (Kyoto meeting).

Meetings

- *WG meeting to draft EMF training package for national authorities (1999).*
- *International seminar and WG meeting on the biological effects and research needs for the frequency range 300 Hz to 10 MHz (Netherlands, May, 1999).*
- *Fourth meeting of International Advisory Committee (WHO, Geneva, June, 1999).*
- *International seminar on RF health effects and standards, and ICNIRP WGs review EMF literature for EHC monographs (Erice, Sicily, 20-30 November, 1999).*
- *Second meeting of the Working Group on Standards in conjunction with Erice meeting.*
- *Third meeting of ad hoc Research Coordination committee to review progress of research (WHO, Geneva, December, 1999).*

2000

- Circulate report on EMF training package for review.
- Circulate report on medical handling of persons highly exposed to EMF for comment.
- Publish proceedings and summary report of international seminar on the biological effects and research needs for the frequency range 300 Hz to 10 MHz.
- Consultant to prepare text on environmental impacts of EMF fields for WG review. Include possible EMF effects on marine organisms, birds, animals and plants. To be done in conjunction with UNEP.
- Publish proceedings of international seminar on RF health effects and standards.
- Publish minutes of fourth International Advisory Committee meeting.
- Publish minutes of third ad hoc Research Coordination Committee meeting.
- Publish 1999-2000 progress report.

Meetings

- *International workshop with ICNIRP, on EMF (22-26 May, 2000, Kyoto, Japan).*
- *Fifth meeting of International Advisory Committee (WHO, Geneva, June, 2000).*
- *International seminar and working group meeting on health consequences from perception of EMF hazards (Helsinki, Finland, September, 2000).*
- *Fourth meeting of ad hoc Research Coordination committee to review progress of research (WHO, Geneva, December, 2000).*
- *Third meeting of the Working Group on Standards in conjunction with Research Coordination committee, December, 2000.*

2001

- Publish EMF training package for national authorities and publish in UN languages.
- Publish report on medical handling of persons highly exposed to EMF.
- Circulate draft report on EMF environmental impacts.
- Publish report on health consequences from perception of EMF hazards. Address recommendations on actions to be taken.
- Publish proceedings of EMF update (Kyoto meeting).
- Circulate draft EHC on static and ELF fields for review after IARC meeting in 2001.
- Publish minutes of fifth International Advisory Committee meeting.
- Publish minutes of fourth ad hoc Research Coordination Committee meeting.
- Publish 2000-2001 progress report.

Meetings

- *IARC Task Group on carcinogenesis of static and ELF fields (Lyon, June, 2001).*
- *WG meeting to finalise report on environmental impacts of EMF fields (2001).*
- *Sixth meeting of International Advisory Committee (WHO, Geneva, 2001).*
- *Final meeting of ad hoc Research Coordination committee to review progress of research (WHO, Geneva, December, 2001).*
- *Fourth meeting of the Working Group on Standards in conjunction with Research Coordination committee meeting.*

2002

- Publish final report on environmental impacts of EMF fields in conjunction with UNEP.
- IARC monograph on carcinogenicity of Static and ELF fields.
- Publish minutes of sixth International Advisory Committee meeting.
- Publish minutes of final ad hoc Research Coordination Committee meeting.
- Publish 2001-2002 progress report.

Meetings

- *WHO Task Group review of EHC on static and ELF fields (WHO, Geneva, 2002).*
- *Seventh meeting of International Advisory Committee (WHO, Geneva, 2002).*
- *Fifth meeting of the Working Group on Standards (late 2002)*

2003

- Publish EHC monograph on static and ELF fields.
- Publish minutes of seventh International Advisory Committee meeting.
- Publish 2002-2003 progress report.
- Circulate draft EHC on RF fields for review after IARC June 2003 meeting.

Meetings

- IARC Task Group determining carcinogenesis of RF fields (IARC, Lyon, June, 2003)
- Eighth meeting of International Advisory Committee (WHO, Geneva, 2003).
- Sixth meeting of Working Group on Standards (late, 2003).

2004

- IARC monograph on carcinogenicity of RF fields
- Publish minutes of eighth International Advisory Committee meeting.
- Publish 2003-2004 progress report.
- Review and update contents of EMF training package.

Meetings

- *Task Group review of EHC on RF fields (WHO, Geneva, 2004).*
- *Ninth meeting of International Advisory Committee (WHO, Geneva, 2004).*
- *Seventh meeting of Working Group on Standards (WHO, Geneva, 2004).*

2005

- Update all WHO Fact Sheets as necessary and have translated and put onto home page.
- Publish minutes of final meeting of International Advisory Committee.
- Publish EHC monograph on RF fields.
- Publish final report of Working Group on Standards.
- Complete all outstanding publications in UN languages.
- Publish final report of EMF Project.
- Issue final press release on WHO and results of EMF health risk assessments.

Meetings

- *Final meeting of International Advisory Committee (WHO, Geneva,....., 2005).*
- *Final meeting of Working Group on Standards (WHO, Geneva,.....2005).*

Annex V. Financial Statement 1996-1998

Interim statement of income and expenditure as at 12 May 1998

	Income received at WHO US\$	Expenditure US\$
	1 031 734	
Salaries (to end of 1998)		431 800
Secretarial support		199 870
Travel (WHO staff and others)		45 067
Work contracts		42 613
Consultants		83 972
Miscellaneous (postage, audiovisual & computer supplies, etc.)		12 773
Publications		2 750
Programme Support Costs		134 125
	<hr/>	<hr/>
	1 031 734	952 970
Balance		78 764
Funds needed for 5-year Project:	3 330 000	
Funds expected before end of 1998	196 400	
Balance at mid-May 1998	78 764	
Funds pledged (approx.)	900 000	