



# INTERNATIONAL COMMITTEE *on* ELECTROMAGNETIC SAFETY

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## Annual Report: 2002 – 2003

### Executive Summary:

The membership of the International Committee on Electromagnetic Safety (ICES), SCC-28, stands at 109. During the year, we lost two outstanding, loyal members, Dr. C. Bruce Wenger and Dr. Carl H. Sutton, both of whose support and contributions will be greatly missed. Another member, Dr. J. Robert Ashley, resigned for personal reasons. Our present non-U.S. membership stands at 33. With the leadership of Dr. Tom McManus, Membership Chairman and Dr. Michael Murphy, Chairman of International Liaison, ICES SCC-28 continues to become more international. During the period covered by this report, ICES/SCC-28 held two meetings. The first was held at the IEEE Operations Center, Piscataway, NJ in December 2002 and the second in Maui, Hawaii in conjunction with the annual meeting of the Bioelectromagnetics Society (BEMS) in June 2003. Many non-US attendees at BEMS also were guests at the ICES meetings, thereby strengthening our potential for international growth. Attempts by the ICES EXCOM to hold a third meeting with the leadership of ICNIRP (International Commission on Non-Ionizing Radiation Protection) were unsuccessful, due to schedule conflicts. However, our mutual policy to exchange documents resulted in the receipt of review comments from ICNIRP members on the new IEEE C95-6 Standard (0 to 3 kHz). An International Workshop on Thermal Physiology with Applications to Standards for Electromagnetic Safety, proposed by ICNIRP in November 2000, was put on hold as a result of the events of 9/11. Plans to hold the originally-proposed workshop in 2004 are proceeding at this time.

Our continuing activities with the WHO (World Health Organization) are aimed at exploring paths toward the international harmonization of standards for the safe use of electromagnetic energy. The increased international membership in ICES provides us with greater influence as we engage the international community.

The authorization in 2001 by the IEEE Standards Board of the proposal that SCC-28 be renamed the International Committee on Electromagnetic Safety (ICES) has proved to be a giant forward step toward an international forum for broad consensus in the setting of safety standards across the frequencies 0 to 300 GHz. During this past year, ICES, its committees, and products have become far better known around the world and we expect this trend to continue. Some action has been taken toward forming a new governing Board and the raising of funds to support ICES, but much more work needs to be done and is in the planning stages now.

Other highlights during the year include:

- a) A revised standard, IEEE C95.3-2002 entitled “IEEE Recommended Practice for Measurements and Computations with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 100 kHz to 300 GHz” was approved in 2002 and supersedes IEEE C95.3-1991.
- b) A new standard, IEEE C95.4-2002 entitled “IEEE Recommended Practice for Determining Safe Distances From Radio Frequency Transmitting Antennas When Using Electric Blasting Caps During Explosive Operations” was approved in 2002.
- c) A new standard, IEEE C95.6-2002 entitled “IEEE Standard for Safety Levels With Respect to Human Exposure to Electromagnetic Fields, 0 to 3 kHz” was approved in 2002. Two Appeals based on this standard were denied by the IEEE Standards Board in January, 2003.
- d) Project 1460, “IEEE Guide for the Measurement of Quasi-Static Magnetic and Electric Fields”, was reaffirmed.
- e) A third draft of a new standard, formerly Project 1466, to be designated IEEE C95.7, entitled “Recommended Practice for the Safe Use of Electromagnetic Energy Sources, Equipment, and Systems Operating Between 3 kHz and 300 GHz”, is in progress. This standard is intended to be a guidance document for the development of RF safety programs and will provide useful guidance to those implementing IEEE C95.1-1991/1999.
- f) The fourth draft of a revision of IEEE C95.1-1991 (1999 edition) was discussed at the June 2003 meeting of Subcommittee 4, is under further revision, and a fifth draft will be discussed in September 2003 by the SC-4 Revision Working Group (RWG), which has met 3 times this past year. The goal is to complete a draft for balloting by the full Subcommittee before the end of 2003.

The Executive Committee (EXCOM) met in Portland, Maine, IEEE Operations Center in Piscataway, Wailea on the Island of Maui, Hawaii, and three times by teleconference during the past 12 months. In addition, informal meetings of EXCOM members are held frequently as appropriate. The ICES EXCOM plans and arranges the two main meetings per year of the parent committee, ICES/SCC-28, and its subcommittees. It approves (or rejects) applications for membership in ICES. Dr. Ralf Bodemann, of Siemens AG in Germany, who serves as ICES Vice Chairman, has become the ICES roving ambassador to EC/EU countries and has given several presentations in support of ICES and the IEEE open, consensus process in standards setting. Dr. Michael Murphy serves as ICES liaison

to the Bioelectromagnetics Society (BEMS) and attended meetings of the BEMS Board of Directors in February and June of 2003. During the past year, the EXCOM, through its Chairman, has sent out decisions and explanations of interpretations when questions have been raised. Whenever we have been asked to comment on the documents of other organizations, we have responded in timely fashion. Our continuing hope for broader participation in our standards-setting efforts was aided last year by a technical statement prepared by the Medical Technology Policy Committee of IEEE-USA. This statement concerned the implementation of OMB Circular A-119, and was sent to the Hon. John D. Graham, OMB Administrator, to encourage greater participation by Federal employees in voluntary standards-setting activities. The ICES Chairman drafted a letter that was sent in July 2002 to nearly 40 Government Agencies, together with the ICES brochure, the IEEE-USA statement, and a copy of the letter to Graham. Individual copies of this mailing were distributed by ICES Vice Chairman Bodemann to many Government Agencies throughout the EU. Although delayed by the events of 9/11, the plans for a joint Workshop on Thermal Physiology in Relation to Standards Setting are underway for 2004. There are still several issues that must be addressed by EXCOM. These include matters of fundraising, interaction with the media, enhancement of the international ICES image, and recruitment of new ICES members. A major goal is to bring IEEE SCC-34 under the ICES umbrella as soon as possible. The ICES Chairman has presented detailed material about ICES on several occasions this past year, including the COST 281 meetings in London (November, 2002), the IBC Conference in London (March, 2003), and the BEMS meeting in Maui (June, 2003).

ICES has cooperated with other groups, e.g. TABD (Transatlantic Business Dialogue) and IEC (International Electrotechnical Commission) in our efforts to harmonize Nonionizing Electromagnetic Energy standards world wide. Although the EEA (Electromagnetic Energy Association) was dissolved in 2001, ICES has received the archives and monetary assets of this association to further the ICES programs. A Short Course, based on the new IEEE C95.6-2002 exposure guidelines for human exposure to ELF fields, will be initiated in December of this year as part of the IEEE ICES semi-annual meetings. Plans are underway for this Short Course to be given several more times during the following year, under the auspices of ICES.

As reported last year, a special event, organized by the Chairs of SC-4 and supported by the U.S. Air Force, took place on June 23, 2002 in Quebec City in conjunction with the 24<sup>th</sup> Annual Meeting of the Bioelectromagnetics Society. Chaired by Dr. Michael Murphy, this was a U.S. Air Force Laboratory Workshop, "Setting a Science-Based Standard for Safe Human Exposure to RF Electromagnetic Fields: A Tribute to Dr. Eleanor R. Adair". The full-day program included synopses of 14 White Papers prepared by members of the SC-4 Revision Working Group as the scientific foundation for the revision of the IEEE C95.1-1991 standard. Twelve of these papers will be published in a special edition of the society journal 'Bioelectromagnetics' later this year.

ICES continues to work closely with SCC-34 (R.C. Petersen, Chairman), especially in its work toward a Recommended Practice on certification procedures for cellular phones. ICES also works with SCC-34 in liaison with IEC TC-106, which is charged with development of standard procedures for assessment and measurement of EM fields with respect to compliance with EM safety standards. A proposal for the IEC to enter into a

Co-operative Agreement with IEEE to publish double logo standards was finalized at IEC meetings in November 2002.

The leaders of ICES are frequently asked by the IEEE to respond to inquiries from the press and others about standards and their relevance in various situations. We attempt to do this with diligence and care and sometimes refer the questioner to other IEEE groups, like COMAR (Committee on Man and Radiation) of the EMB-S, for more detailed discussions through their TIS (Technical Information Statement) documents.

The current Chairman of ICES, in office now for 2 years, continues to rely on EXCOM members and other experts for much material related to the extensive work of this oversight committee and its subcommittees. We are extremely proud that the end of the year 2002 saw the approval of four new IEEE standards documents. This accomplishment was due principally to the dedication and extremely hard work of hundreds of volunteers in several ICES Subcommittees. Most of these individuals hold full-time jobs and, to a large extent, pay in time and money for the privilege of serving on ICES subcommittees and attending our meetings. We in ICES believe that our products are the best in the world and salute our volunteers for the tremendous effort they have contributed under the aegis of the IEEE.

### **Membership and Organization:**

The leaders of ICES/SCC-28 and its Subcommittees are listed on the letterhead. In April, 2003 a new IEEE Staff Liaison, Bill Ash, was assigned to us and we wish for an enduring relationship with him. The key aspect in our membership growth is the emphasis on non-U.S. members. We now have members from the United Kingdom (6), Australia (4), Switzerland (4), Canada (3), Finland (2), Greece (2), Netherlands (2), Ireland (2) and 1 each from Bulgaria, China, Germany, Israel, Italy, New Zealand, Slovenia, South Africa, and Sweden. Many ICES members and others from outside the U.S. are participating members of the Subcommittees. Under the leadership of Drs. McManus and Murphy, we are confident that ICES will keep pace with the general trend of the IEEE towards global consistency.

The present roster of ICES/SCC-28 is listed in the Appendix. In terms of stakeholders, we continue to be well balanced. We note, however, a continuing lack of representation from groups aligned with the wireless industry and hope to correct this in the future. About 50% of the ICES membership are IEEE members, with a fewer number of SA members. This is to be expected and defended in view of the interdisciplinary nature of our membership. We and the IEEE are grateful for their voluntary contributions to ICES under conditions where it would be an unreasonable imposition to require IEEE membership. However, we do require the leaders (e.g., Chairs) to be IEEE members.

Our total mailing list now approaches 400, including the many volunteers in the Subcommittees. Two years ago, we gave up our long-standing practice of sending hard copies of our extensive documents through the Mail to our global mailing list. We now make use of electronic communication of all our documents through E-Mail and the Internet. The IEEE ICES Website contains both open and private sites, not only for ICES/SCC28, but also for ICES Subcommittees. For example, Subcommittee 4 makes all agendas, meeting minutes, white papers, RF research database, draft standard

documents, and many special reports available to all, with certain proprietary or working documents available only to members of the Subcommittee on a private site. The ICES SC-4 literature database, comprising more than 1800 titles, now appears on the WHO website and is accessible to all. Many ICES and Subcommittee members bring laptop computers, loaded with ICES files, to our meetings so they can project slides and tables, take personal minutes, edit documents, refer to vital files, etc. When traveling to ICES meetings, many members believe that shepherding a laptop through airport security beats manhandling 40 pounds of paper.

### **Activity:**

In this section, we compare the objectives (in italics), stated in the report for 2001 – 2002 with actual achievements during the year 2002 – 2003.

#### **ICES/SCC-28 and ICES EXCOM:**

- *Bring SCC-34 on board as the second Standards Coordinating Committee under the ICES umbrella.*

— In May, 2003, this objective was initiated with Bill Ash, the ICES staff liaison, by the ICES Chairman and ICES Executive Secretary. Appropriate documentation was supplied as a basis for a dialogue on this matter. Mr. Ash discussed this proposal with several relevant IEEE personnel and responded to ICES with several questions related to the involvement of ICES as an umbrella. The ICES EXCOM discussed this development in a teleconference and the Former Chairman agreed to supply additional materials to Mr. Ash so that this activity could proceed.

- *Initiate fundraising, with the guidance of the IEEE staff, so that critical travel, support for special projects and meetings, support for visiting scientists and experts, and other critical needs can be met.*

— Fundraising is essential to the ICES activities in setting exposure standards. On March 14, 2002 four members of ICES EXCOM met with IEEE staff at IEEE Headquarters in Piscataway. The meeting began with a brief review of the issue of litigation involving the IEEE and was followed by discussions of 6 agenda items. These included 1) Support for ICES: travel, special projects, fundraising; 2) Follow-up letter to the agencies of the IEEE-USA letter to OMB; 3) Public information and media problems; 4) Litigation/communications with new law firm; 5) Operations problems: balloting, non-SA member fees, interpretations; 6) Status of ICES, domestic and global. While some of these items have been completed, others are still in an uncertain limbo. A second meeting between ICES EXCOM members and IEEE staff, scheduled for September 13, 2002 in Piscataway, did not materialize. Several attempts to hold another meeting with IEEE staff in Piscataway have so far been unsuccessful due to complex scheduling problems. Fundraising is also linked to bringing SCC-34 under the ICES umbrella. Thus, the two objectives go hand in hand.

- *Continue international expansion led by Drs. McManus and Murphy. Introduce new leadership with emphasis on non-U.S. and younger members. Revise and update rosters.*
  - As reported above, international expansion continues successfully. We now have 33 non-U.S. members in the parent committee ICES/SCC28 and many more among the volunteers for the Subcommittees. The Vice Chairman of ICES, Dr. Ralf Bodemann, has been extremely active in European meetings, presenting talks concerning the IEEE ICES open, consensus process and the standards generated by ICES Subcommittees. He has also sent letters and ICES brochures to a broad spectrum of EU governmental and industrial institutions to further their knowledge about the IEEE C95 standards. His enthusiasm and dedication to ICES continues to increase and we foresee a major role for him in the leadership of ICES down the road.
- *Institute a new policy of annual or semi-annual citations of merit for volunteers who have made substantial contributions to ICES projects.*
  - Although formal citations or award certificates have not yet been created, several individuals were cited at the semi-annual ICES meetings for their substantial and unique contributions to the ICES efforts this year. Foremost were Kent Jaffa, Chairman of ICES SC-3 for shepherding the new C95.6 ELF standard through to adoption and J. Patrick Reilly, primary architect of that standard. Other individuals cited were ICES Vice Chairman Ralf Bodemann for his outreach to the European standards-setting community, Howard Bassen for completing a revision of the Measurement standard, SC-5 Co-Chairs G. Drew Koban and John DeFrank for adoption of the Recommended Practice on the use of blasting caps, and SC-2 Chairman Richard Tell and SC-2 member Robert Curtis for drafting a Safety Program to compliment the SC-4 revision of C95.1. Special recognition was given to Ronald Petersen, Executive Secretary of ICES, for his mammoth efforts on behalf of ICES, SCC-34, and TC-106; without him, ICES could not exist.
- *EXCOM to prepare a policy on 100 kHz as the basic boundary between “ELF” and “RF/microwave” standards.*
  - It is clear that 3 kHz, currently used as the basic boundary between the two standards, is set at too low a frequency in terms of characteristic human responses. The Past Chairman, John Osepchuk, has prepared documents supporting 100 kHz as the proper boundary. Now that the new ELF standard (C95.6-2002) has been approved for implementation, SC-3 under two new Co-Chairs (Thanh Dovan and Philip Chadwick) is turning its attention to developing an interpretation and applications supplement to the new standard, a rationale for adopting the basic boundary at 100 kHz, and eventually merging the SC-3 and SC-4 standards into a single document.

- *ICES Past Chairman to prepare a White Paper on the usage of the words “safe” and “safety” in ICES documents.*
  - A draft of this document has been circulated for comments within Subcommittee 4, as an aid to finalizing the revision of the C95.1-1991 (1999) standard.
- *Strengthen liaisons with ICNIRP, IEC, WHO, COST 281, etc. Carry out closed leadership meeting with ICNIRP in late 2002. Plan joint Thermal Physiology Workshop.*
  - These activities were greatly impacted by the events of 9/11. A preliminary Thermal Workshop scheduled for October 2001 in Geneva was cancelled and rescheduled for March 2002. This placed the proposed joint ICNIRP/ICES Thermal Physiology Workshop on hold indefinitely. As reported last year, the semiannual meetings of ICES scheduled for Luxembourg in November 2001 were greatly reduced in scope and participation due to heavy travel restrictions on U.S. participants. The proposed leadership meeting with ICNIRP did not occur because ICNIRP members were unavailable to meet at that time. Subsequent attempts to meet with ICNIRP members have been unsuccessful for diverse reasons. Several ICES members have participated in a series of WHO Workshops in 2003; these Workshops have primarily concerned the implementation of the Precautionary Principle in the generation and implementation of EMF standards, as well as WHO efforts to achieve standards harmonization worldwide. The proposed Thermal Physiology Workshop must be delayed until 2004, but the possibility of combining it with a scheduled meeting of COST 281 is strong and WHO support is also possible. If this collaborative meeting should not materialize, the Thermal Physiology Workshop will be held in the United States with some financial and administrative support from the U.S. Air Force. Liaisons between ICES and IEC continue to be strong.
- *Arrange for winter meetings of ICES and Subcommittees in December, 2002, either at the IEEE Operations Center in Piscataway, NJ or in San Antonio. Make arrangements for summer meetings of ICES and Subcommittees in conjunction with the June 2003 meetings of the Bioelectromagnetics Society in Maui, Hawaii. Arrange for winter meetings of ICES and Subcommittees in December, 2003.*
  - Arrangements were made with the help of IEEE staff to hold the 2002 winter meeting the IEEE Operations Center in Piscataway, NJ and a very successful meeting ensued. The summer ICES and Subcommittee meetings were held in advance of the BEMS meetings in Maui. While they were successful and had a good turnout, they were very expensive, in terms of travel costs, room rates, meeting fees, and charges for audiovisual services, compared to our usual meeting rates. Arrangements have been made for the winter ICES and Subcommittee meetings in a Doubletree Hotel near the San Antonio Airport. Government rates will be honored by the hotel and other charges are modest. This meeting will feature a full-

day short course on the new C95.6-2002 standard, given by several of the prime architects of the standard and organized by the new SC-3 Chairs. Registration forms for the short course have already been posted.

- *Continue liaison with TABD and expand liaison to wireless industry groups.*
  - Our liaison with TABD (Dick Steinmetz) remains strong and the dual presentations at the EU/EC meeting in Luxembourg were well received. The matter of expanding the liaison with U.S. wireless industry groups in the U.S. goal has received limited attention this year. It remains a goal for 2003 – 2004.
- *Ballot the revision of C95.3.*
  - Following successful balloting, this Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields with Respect to Human Exposures to Such Fields, 100 kHz - 300 GHz, was approved by the IEEE SASB in December, 2002 and the 126 page standard was published in January, 2003.
- *Ballot the revision of IEEE C95.1-1991 (1999).*
  - The revision of this standard is in the final stages of the drafting process and is not yet ready for balloting by the Subcommittee. A meeting in September, 2003 of the Revision Working Group of ICES SC- 4 will hopefully achieve consensus on the general text of the draft document, which will be sent to a small editorial group for final editing before being presented to the full SC-4 at a meeting in San Antonio, TX on December 6, 2003.
- *Pursue the project on publicizing ICES and C95.1 standards in the literature, with the assistance of Karen McCabe of the IEEE staff.*
  - Some general white papers are being drafted for publication in Health Physics. These include a paper on the process by which ICES Subcommittees generate standards documents, and another paper on the special character of the new C95.6 standard recently approved by ICES. We are working closely with Karen McCabe, who has drafted a strategy for publicizing the work of ICES.
- *Reassess plans for an electronic newsletter in recognition of ICES objectives.*
  - No action has been taken on an electronic newsletter. This goal will be integrated into the plan for ICES after fundraising has been initiated. ICES financial supporters will receive special news updates on ICES matters.
- *Reassess the methods of dealing with requests for interpretation of standards documents and the role of IEEE staff.*
  - No new requests for interpretation of IEEE C95.1-1999 have been received this year. A request for reconsideration of an earlier



interpretation was submitted to the Interpretations Working Group (IWG) of SC-4, but the IWG reaffirmed the original interpretation and no further action was taken. In this case, the person who requested the original interpretation asked to be part of the reinterpretation process, but this was not feasible under the approved ICES P&P for interpretations. With the publication of IEEE C95.6-2002, the possibility of requests for interpretation of this new standard is not trivial. The new Co-Chairs of SC-3 have been advised to set up an appropriate IWG with a Chair and 5-10 representative members so that any requests for interpretation can be handled expeditiously.

#### **SC-1:**

- *Help shepherd revised C95.3 through ICES SCC-28 and IEEE Standards Board.*
  - C95.3-1991 Recommended Practice for Measurements and Computations with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 100 kHz to 300 GHz was approved by the IEEE SA Standards Board in December 2002, and published in January 2003.
- *Consider new project for documents addressing Measurements below 100 kHz.*
  - SC-1 has already held two meetings for this new effort under the Chairmanship of Howard Bassen, one in Washington DC in the fall of 2002 and the other at the ICES and Subcommittee meetings in Maui in June 2003. Progress on this effort has been substantial, including general discussions, preparation of an outline, assignments, and work accomplished on the Measurements document.

#### **SC-2:**

- *Complete and ballot Work Practices document.*
  - This document, which outlines a comprehensive work safety program at several levels, is in the final drafting stages. Since there will be reference in the revision of the C95.1 standard (when it is completed) to the Work Practices document, the original draft has been elaborated to serve the needs of C95.1.
- *Establish formal record of OSHA exemption on signs.*
  - Chairman Richard Tell has written OSHA to obtain an updated confirmation of the exemption permitting industry to use the modern C95.2 warning signs instead of the obsolete signs still in the OSHA regulations.

**SC-3:**

- *Shepherd new standard through ICES SCC-28 and Standards Board.*
  - The completion of the new C95.6 standard has been the major success story of the past year. Under the able Chairmanship of Kent Jaffa, aided by the expertise of Dr. J. Patrick Reilly, SC-3 completed and balloted a final draft of the Standard for Safety Levels With Respect to Human Exposure to Electromagnetic Fields, 0 to 3 kHz. This standard was then approved by ballot of the sponsor, IEEE ICES and was approved by the IEEE SA Standards Board at the September 2002 meeting. Following this approval, two appeals were filed with the Standards Board, one by David Fichtenberg and the other by J. Robert Ashley. The ICES Chairman, Dr. Eleanor Adair, was named as Respondent to both appeals. She was assisted by Ronald Petersen, Kent Jaffa, and J. Patrick Reilly, all of whom were available, either in person or by teleconference, at the Appeals Hearings that were conducted on December 9, 2002. The responses of the IEEE Standards Board Appeals Panel were handed down in mid-January; both appeals were denied.
- *Work with ICES EXCOM on future budgets.*
  - This will be done when the fundraising project takes place.

**SC-4:**

- *Continue literature reviews and designate cutoff date.*
  - Under the able Chairmanship of Dr. C.K. Chou and Dr. John D'Andrea, this subcommittee has made substantial progress on the revision of IEEE C95.1 this year. There are now more than 1800 titles in the RF literature database (Listing #29). At the June 2002 meeting of SC-4, 3 motions were entertained that related to the literature database. The first motion, to disallow additional papers to be added after the cutoff date, failed. The second motion established December 31, 2002 as the cutoff date for adding new papers to the database. The third motion established that the issue of Brillouin precursors would not be included in deliberations regarding the revision of C95.1 because there is no evidence in the peer reviewed scientific literature that such precursors are biologically important at RF frequencies.
- *Begin drafting standard; prepare for balloting.*
  - In special meetings of the SC-4 Revision Working Group, a series of drafts has been prepared and critical issues discussed. At the next meeting of this group in September 2003, the 5<sup>th</sup> working draft will be discussed. The plan is that a 6<sup>th</sup> draft will be prepared for balloting by the full SC-4 before the end of the year 2002.

- *Work with ICES EXCOM on future budgets.*
  - This will be done when the fundraising project takes place.

**SC-5:**

- *Review plans for future activity including statement on fuel ignition hazard myth.*
  - SC-5, under the Chairmanship of John DeFrank and Drew Koban, has been fully engaged in unanticipated matters of correcting errors in the draft Recommended Practice for Determining Safe Distances from Radiofrequency Transmitting Antennas when Using Electric Blasting Caps during Explosive Operations. This new standard, after its 3<sup>rd</sup> recirculation to the sponsor, was submitted to RevCom for consideration at the September 2002 meeting and was approved by the IEEE SA Standards Board. At the December 2002 meetings of ICES and the Subcommittees held at IEEE Headquarters, a draft statement on the fuel ignition hazard myth was introduced.

**2002 – 2003 Goals:**

**ICES/SCC-28 (and ICES EXCOM):**

- Bring SCC-34 on board as the second Standards Coordinating Committee under the ICES umbrella.
- Initiate fundraising, with the guidance of the IEEE staff, so that critical travel, support for special projects and meetings, support for visiting scientists and experts, and other critical needs can be met.
- Continue international expansion led by Drs. McManus and Murphy. Introduce new leadership with emphasis on non- U.S. and younger members.
- Institute a new policy of annual or semi-annual citations of merit for volunteers who have made substantial contributions to ICES projects.
- Continue to strengthen liaisons with ICNIRP, IEC, WHO, COST 281, TABD, etc. Attempt to carry out a third closed leadership meeting with ICNIRP, at a mutually convenient time, within the next 6 months.
- Since ICNIRP appears to no longer be interested in planning a joint Thermal Physiology Workshop with ICES, entertain an offer made by WHO for such a collaborative effort in 2004, with the possible addition of COST 281 to the process.
- Arrange for summer meetings of ICES and Subcommittees, in conjunction with the June 2004 meetings of the Bioelectromagnetics Society in Washington, DC.
- Ballot the revision of C95.1.
- Pursue the project on publicizing ICES and C95.1 standards in the literature, with the assistance of Karen McCabe of the IEEE staff.

- Reassess the plans for an electronic newsletter in recognition of ICES objectives.
- Reassess the methods of dealing with requests for interpretation of standards documents and the role of IEEE staff.

**SC-1:**

- Move forward with new project, Recommended Practice for Measurements and Computations with Respect to Human Exposure to Electric and Magnetic Fields, 0 to 100 kHz.

**SC-2:**

- Finalize the Safe Work Practices document, coordinate with the revised C95.1 document, and ballot.

**SC-3:**

- Prepare materials for a 1-day Short Course on the C95.6 standard, select speakers, determine registration fees, and run the first course in conjunction with the IEEE ICES meetings in San Antonio in December. Select dates and locations for subsequent short courses in different parts of the country.
- Initiate work on a Guide for the Application of the new C95.6 Standard.
- Based on the new EXCOM policy of 100 MHz as the basic boundary between “ELF” and “RF/microwave” standards, initiate the effort to harmonize the C95.6 and C95.1 standards at 100 MHz.

**SC-4:**

- Complete the literature review and prepare a final draft of the revision of C95.1 for ballot by SC-4 and SCC-28.
- Work with members of SC-3 toward the harmonization of the two exposure standards.

**SC-5:**

- Review plans for future activities related to electro-explosive devices.

**IEEE Staff:**

We are pleased to have the support of the staff of IEEE Standards Activities, especially through Judy Gorman, Sue Vogel, Linda Gargiulo, Karen McCabe, Jerry Walker, Angela Ortiz (former staff liaison), and our new staff liaison, Bill Ash. We appreciate the input from the staff during a meeting held at IEEE Headquarters in March 2002. We hope for another similar meeting in the near future. The ICES EXCOM is pleased to have interacted with IEEE legal counsel Ralph Taylor on September 9 2002 in his Washington offices and also in several teleconferences related to critical issues for the IEEE. Many critical projects are well begun, but only partly done so far. We need to meet with IEEE staff on fundraising, on inclusion of SCC-34 under the ICES umbrella, on greater

international outreach for ICES, and on means by which we may communicate with the media without jeopardizing IEEE interests.

### **Other Activities:**

Members of ICES/SCC-28 are continually involved in a wide spectrum of activities that relate to standards setting including research, education, and drafting of regulations. Members participate in the governmental activities in many nations, as well. These include the FCC and FDA in the U.S. and the EU/EC in Europe. We participate in the broad activities of the WHO and its EMF Project as well as the European EBEA, and with various other meetings around the world. In the future, international meetings were/are scheduled in Russia (September 2002), Rhodes (October 2002), China (WHO - October 2003), Zurich (COST 281/WHO-May 2004), Thailand (January- 2004), Hungary (EBEA- November 2003), and Geneva (WHO – December 2003). We interact with professional societies especially the IEEE Societies (EMB-S, MTT-S), the Health Physics Society, and the Bioelectromagnetics Society (BEMS). We try to arrange our semi-annual meetings in coordination with the BEMS meetings and in the fall with other groups, when feasible.

### **Meeting Schedule:**

#### Meetings of ICES/SCC-28 with Subcommittees:

- December 2002, IEEE Operations Center
- June 2003, Maui, Hawaii (BEMS)
- December 2003, San Antonio, Texas
- May 2004, proposed ICES/COST 281 Thermal Physiology Workshop, Zurich?
- June 2004, Washington DC (BEMS)

This report was prepared and submitted by:

Eleanor R. Adair, Ph.D.  
Chairman, ICES/SCC-28  
August 20, 2003

**ANNEX 1**  
**Balance Sheet**  
**(As of 18 August 2003)**

<b>DATE</b>	<b>DESCRIPTION</b>	<b>DEBIT US\$</b>	<b>CREDIT US\$</b>	<b>BALANCE US\$</b>
11/1/2000	Balance			11,154.78
12/4/2000	San Antonio Receipts		2,865.00	14,019.78
1/25/2001	San Antonio Expenses	1142.05		12,877.73
6/15/2001	Minneapolis Receipts		3,840	16,717.73
6/15/2001	Munich Expenses (LATE)	5482.64		11,235.09
9/25/2001	Minneapolis Expenses	3719.63		7,515.46
11/27/2001	Luxembourg Receipts		1760	9,275.46
11/27/2001	Luxembourg Expenses	2020		7,255.46
1/18/2002	San Antonio Receipts	3610		10,865.46
1/20/2002	San Antonio Expenses	6372.17		4,493.29
5/15/2002	San Antonio COMAR Receipts		313.98	4,807.27
6/21/2002	EEA Donation to ICES		2785.14	7,592.41
6/30/2002	Quebec Receipts		7540	15,132.41
8/5/2002	EXCOM Brochure expenses	317.56		14,814.85
12/10/2002	Quebec Expenses (A/V)	4473.12		10,341.73
12/10/2002	Quebec Expenses (Catering)	3235.02		7,106.71
1/13/2003	Piscataway Receipts		3240	10,346.71
1/13/2003	Piscataway Expenses	3329.05		7,017.66

<b>DATE</b>	<b>DESCRIPTION</b>	<b>DEBIT US\$</b>	<b>CREDIT US\$</b>	<b>BALANCE US\$</b>
1/13/2003	EEA Donation to ICES Final		3.22	7,020.88
1/13/2003	COMAR Reimbursements (Q&P)		664.6	7,685.48
1/13/2003	R. Petersen ICES Gift Cert.	35		7,650.48
7/31/2003	R. Petersen ICES Brochures	\$590.17		7,060.31
7/31/2003	Maui Receipts		8310	15,370.31
7/31/2003	EEA Donation to ICES additional		23.08	15,393.39
PENDING	MAUI expenses from BEMS			
	By: Arthur Varanelli, ICES Treasurer			

## ANNEX 2

### International Liaison Report June 2002- June 2003

#### Goals of the International Liaison Committee

- Ensure that ICES is represented at international meetings that impact EMF Standards
  - Participation by ICES officers and members
  - Special symposia/workshops organized by or for ICES
  - Platform presentations on ICES
  - Distribute ICES Brochures
- Personally solicit ICES participation from non-US scientists
- Inform ICES membership of upcoming meetings that impact EMF Standards
- Arrange presentations on International Standards issues at ICES Meetings
- Work with the Membership Committee to increase the number and breath of international participation in ICES

#### Meetings During the Past Year

- Air Force/ICES Workshop at BEMS, 23-27 June 02, Quebec City
- WHO EMF & Human Health. Researches & Standards
  - 3rd Int. Conference. Moscow & St. Petersburg, 23-27 Sept 2002
  - Standards roundtable – Dr. C. K. Chou represented ICES
  - During the discussions on standards, Dr. Grigoriev and Dr. Rubstova made a passionate defense of the very restrictive Russian standards for EMF. They insisted that all the “data” be considered, including the reports of non-thermal effects from the West and the voluminous reports from Russian labs, mostly from the 1970’s and published only in Russian, if published at all.
- WHO EMF Project International Advisory Committee, Geneva, Jun 03
  - ICES represented by Dr. Ralf Bodemann
  - International Advisory Group reviews the direction and progress of the WHO EMF Project that has 56 participating countries. Dr. Ralf Bodemann, International Committee on Electromagnetic Safety, did an excellent job representing this organization. We reviewed the “Precautionary Framework for Public Health Protection” that is being developed by the WHO. This framework is designed as an overarching



concept to manage risks that are either known (i.e., relatively established and certain) or uncertain. We spent several hours editing a document titled “Framework for Developing EMF Standards” that is intended for national bodies and international standardization organizations reviewing the basis of their standards and/or developing new standards. The conclusions of the WHO, the premier health organization in the world, on EMF health and safety will affect exposure standards worldwide for many years. Basing exposure standards on solid science is critical for the health and safety of individuals, as well as for the use and advancement of modern technologies. It is traditionally thought that decreasing the exposure limits would reduce the public concerns regarding exposure to EMF energy. However, Switzerland has recently introduced additional precautionary emission limitations that are 10 to 300 times more stringent than the already conservative International Commission on Non-Ionizing Radiation Protection (ICNIRP) standards, yet it appears that the level of public concern in Switzerland remains the same.

## Upcoming Meetings

- European Bioelectromagnetics Association (EBEA), Budapest, Hungary – 13-15 Nov ‘03
  - Dr. Murphy will represent ICES
- WHO Regional Meeting on EMF Health and Standards Harmonization, Guilin, China 20-23 October 2003 [http://www.who.int/peh-emf/International Standards Harmonization](http://www.who.int/peh-emf/InternationalStandardsHarmonization) will be a main topic
  - Finalize a “Framework for Standards Harmonization”
  - Expect ICES representation by Dr. C. K. Chou
- WHO EMF Project International Advisory Committee, Istanbul, Turkey Jun 04
  - ICES will be represented by Dr. Tom McManus or Dr. Michael. Murphy
- International Conference on Non Ionizing Radiation (ICNIR): EMF and Our Health, first scheduled for 20-23 Oct. Selangor, Malaysia. <http://www.uniten.edu.my/go/icnir2003/>
  - Standards and Guidelines and Country Experiences
  - Uncertain ICES representation
- BEMS – Washington, D. C. June 2004
  - Full meeting of ICES and its subcommittees
- WHO and U.S. Air Force Asia Pacific EMF Conference
  - Bangkok Thailand – 25-30 Jan 2004
  - <http://bangkokemf.com/>
  - ICES will be represented

— Agenda

- Tutorial: Introduction to EMF Health Issues
- Regional Concerns on EMF Health Issues
- Research on EMF Biological Effects and Dosimetry
- Electromagnetic Interference on Medical Devices
- Standards Harmonization: The WHO Framework
- Regional and International EMF Standards
- A Model for Standards Regulation & Compliance
- Public Policy and Acceptability/Risk Communication

**International Contacts for RFR Standards Reinforced in the Last Year**

- Dr. Vitas Anderson (Australia)
- Ms. Shaiela Kandel (Israel)
- Ms. Nisakorn Manatrakul (Thailand)
- Dr. Camela Marino (Italy)
- Dr. Chiyoji Ohkubo (Japan)
- Dr. Sheila Johnson (UK)
- Dr. Phil Chadwick (UK)
- Dr. E. Van Rongen (Netherlands)
- Dr. Rene de Seze (France)
- Dr. Peter Gajsek (Slovenia)
- Dr. Art Thansandote (Canada)
- Dr. Gyorgy Thuroczy (Hungary)

**International Speakers at ICES Meetings**

- Quebec City:
  - Dr Tom McManus, Ireland, spoke on recent activities in Europe affecting EMF standards.
  - Dr. William Scanlon, University of Ulster, UK, spoke on “Body-Worn and Body-Implanted Radiators”
- Maui:

- Dr. Vitas Anderson, Australia, spoke on “The Development of Guidelines for Assessing the Safety Impact of Metallic Implants in Personal Exposed to Radiofrequency Fields.”
- Dr Ralf Bodemann (Germany) spoke on recent activities in Europe affecting EMF standards.

### **International Standards Projects Organized by ICES International Liaison**

- Basic Materials for EMF Standards in Former Soviet Union
  - Chaired by Yuri Grigoriev, Russia (ICES Member)
  - Completed June 2003
- Criteria for Standards in the Field of Radio Frequency Radiation in Some East European Countries
  - Chaired by Michel Israel, Bulgaria
  - Completed December 2002
- Special ICES Edition of Bioelectromagnetics (in progress)
  - Based on an international symposium held in Quebec City in 2002 titled “Setting a Science-Based Standard for Safe Human Exposure to RF Electromagnetic Fields: *A Tribute to Dr. Eleanor R. Adair*,” a special edition of the Bioelectromagnetics Journal has been arranged. This publication is being sponsored by the U. S. Air Force Research Laboratory and will feature 12 papers on the scientific foundation of the ICES standard C95.1.

### **Other Topics**

- The Revision of NATO STANAG 23451 was promulgated in February 2003. This international standard is again based primarily on the ICES standard C95.1.
- Dr. Murphy was selected as the ICES liaison to the Bioelectromagnetics Society (BEMS), the largest international scientific association concerned with the biological effects of electromagnetic energy. He prepared slides for presentation at 2 meetings of the BEMS Board of Directors.

## ANNEX 3

### Balloting Group Summary – 2002/2003

**C95.3-2002 (IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz–300 GHz)  
(Revision of IEEE C95.3-1991)**

	Name	Interest Category
1.	J Robert Ashley	Government/Academic/Consultant
2.	William Bailey	General Interest
3.	David Baron	General Interest
4.	Aviva Brecher	Government/Academic/Consultant
5.	Chung-Kwang Chou	Producer
6.	Jules Cohen	Government/Academic/Consultant
7.	Robert Curtis	Government/Academic/Consultant
8.	Guru Dutt Dhingra*	User
9.	Thanh Dovan	Producer
10.	Kenneth Gettman*	Producer
11.	Gregory Gorsuch	Government/Academic/Consultant
12.	Phil Hopkinson*	General Interest
13.	Sheila Johnston	Government/Academic/Consultant
14.	Shaeila Kandel	Government/Academic/Consultant
15.	Joseph L. Koepfinger	General Interest
16.	James Lin	Government/Academic/Consultant
17.	John Leonowich	Government/Academic/Consultant
18.	Arthur Light*	General Interest
19.	Patrick Mason	General Interest
20.	Daleep Mohla*	User
21.	Abdul Mousa*	User
22.	Michael Newman*	User
23.	John Osepchuk	General Interest
24.	Ronald Petersen	General Interest

	<b>Name</b>	<b>Interest Category</b>
25.	Steve Pittman*	Producer
26.	Vikram Punj*	General Interest
27.	Markus Riederer*	Government/Academic/Consultant
28.	Ervin Root	Producer
29.	Mays Swicord	Producer
30.	Arthur Varanelli	Producer
31.	Louis Williams	User
32.	Richard Woods*	User
33.	Donald W. Zipse	General Interest
34.	Marvin Ziskin	Government/Academic/Consultant

\*Member of ICES Balloting Pool but not a member of ICES

## Balloting Group Summary – 2002/2003

### C95.4-2002 (IEEE Recommended Practice for Determining Safe Distances from Radio Frequency Transmitting Antennas When Using Electric Blasting Caps During Explosive Operations) (Revision of ANSI C95.4-1978)

Name		Interest Category
1.	Eleanor Adair	User
2.	Quirino Balzano	General Interest
3.	Jerrold Bushberg	General Interest
4.	Chung-Kwang Chou	Producer
5.	Robert Cleveland	General Interest
6.	Jules Cohen	General Interest
7.	John DeFrank	Government
8.	Stewart Fastman	General Interest
9.	Gregory Gorsuch	User
10.	Arthur W. Guy	General Interest
11.	James Hatfield	General Interest
12.	George A. Koban	Producer
13.	Joseph L. Koepfinger	User
14.	John Leonowich	User
15.	James Lin	General Interest
16.	Stewart Maurer	General Interest
17.	Michael Murphy	General Interest
18.	John Osepchuk	General Interest
19.	Ronald Petersen	Producer
20.	Brad Roberts	User
21.	Mays Swicord	Producer
22.	Richard Tell	User
23.	Arthur Varanelli	Producer
24.	Louis Williams	General Interest
25.	Donald W. Zipse	General Interest

\*Member of ICES Balloting Pool but not a member of ICES

## Balloting Group Summary – 2002/2003

### C95.6-2002 (IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0–3 kHz) (New Standard)

Name		Interest Category
1.	Eleanor Adair	Government/Academic/Consultant
2.	J Robert Ashley	Government/Academic/Consultant
3.	William Bailey	Government/Academic/Consultant
4.	David Baron	General Interest
5.	John Bergeron	General Interest
6.	Prabhakar Bhat*	User
7.	Charles Boeggerman	Producer
8.	Aviva Brecher	Government/Academic/Consultant
9.	Jerrold Bushberg	Government/Academic/Consultant
10.	Chung-Kwang Chou	Producer
11.	Jules Cohen	Government/Academic/Consultant
12.	Guru Dutt Dhingra*	General Interest
13.	James Daly	User
14.	William Feero	Government/Academic/Consultant
15.	David Fichtenberg*	Government/Academic/Consultant
16.	Kenneth R. Foster	Government/Academic/Consultant
17.	Carl Fredericks*	User
18.	David George	User
19.	Kenneth Gettman*	Producer
20.	Gregory Gorsuch	Government/Academic/Consultant
21.	Konstantinos Halkiotis	Government/Academic/Consultant
22.	Louis Heynick	Government/Academic/Consultant
23.	James Hill*	User
24.	Kent Jaffa	Producer
25.	Sheila Johnston*	Government/Academic/Consultant
26.	Shaeila Kandel	Government/Academic/Consultant

	<b>Name</b>	<b>Interest Category</b>
27.	Joseph L. Koepfinger	User
28.	Russell Kurtz*	General Interest
29.	James Lin	Government/Academic/Consultant
30.	John Leonowich	Government/Academic/Consultant
31.	Arthur Light	Government/Academic/Consultant
32.	Robert McCourt	User
33.	Mehrdad Mehdizadeh*	User
34.	Daleep Mohla*	General Interest
35.	Abdul Mousa*	User
36.	Michael Murphy	Government/Academic/Consultant
37.	Michael Newman*	User
38.	John Osepchuk	General Interest
39.	Russell Owen	Government/Academic/Consultant
40.	Ronald Petersen	General Interest
41.	Steve Pittman*	Producer
42.	Vikram Punj*	General Interest
43.	J. Patrick Reilly	Government/Academic/Consultant
44.	Eric Von Rongen	Government/Academic/Consultant
45.	Ervin Root	Producer
46.	Veli Santomaa	General Inteest
47.	William Scanlon	Government/Academic/Consultant
48.	Jon Sirugo	Producer
49.	Jan Stolwijk	Government/Academic/Consultant
50.	Mays Swicord	Producer
51.	Richard Tell	Government/Academic/Consultant
52.	Arthur Varanelli	Producer
53.	Louis Williams	User
54.	Donald W. Zipse	General Interest
55.	Marvin Ziskin	Government/Academic/Consultant

\*Member of ICES Balloting Pool but not a member of ICES



## Balloting Group Summary – 2002/2003

### 1460 (IEEE Guide for the measurement of Quasi-Static Magnetic and Electric Fields) (Reaffirmation of 1460-1996)

Name		Interest Category
1.	J Robert Ashley	User
2.	William Bailey	General Interest
3.	David Baron	General Interest
4.	Jules Cohen	Government/Academic/Consultant
5.	John D’Andrea	Government
6.	John DeFrank	Government
7.	Thanh Dovan	Producer
8.	Kenneth R. Foster	General Interest
9.	Kent Jaffa	User
10.	Sheila Johnston*	General Interest
11.	Kenneth Joyner	General Interest
12.	Efthymios Karabetsos*	Government
13.	Shaeila Kandel	General Interest
14.	Niels Kuster	General Interest
15.	James Lin	General Interest
16.	John Leonowich	Government/Academic/Consultant
17.	Arthur Light*	General Interest
18.	Abdul Mousa*	User
19.	Michael Murphy	Government
20.	Michael Newman*	User
21.	Ronald Petersen	General Interest
22.	Vikram Punj*	General Interest
23.	Ervin Root	Producer
24.	Asher Sheppard	General Interest
25.	Carl Sutton	General Interest
26.	Mays Swicord	Producer
27.	Richard Tell	User

	<b>Name</b>	<b>Interest Category</b>
28.	Arthur Varanelli	Producer
29.	Louis Williams	General Interest
30.	Donald W. Zipse	User
31.	Marvin Ziskin	General Interest

\*Member of ICES Balloting Pool but not a member of ICES

## ANNEX 4

### Membership

**Table 1**

#### **ICES Membership (August, 2003) Main Committee**

	<b>LAST NAME</b>	<b>FIRST NAME</b>	<b>MI</b>	<b>AFFILIATION</b>	<b>COUNTRY</b>
1	Adair	Eleanor	R.	Independent Consultant	US
2	Altman	Melvyn	R.	FDA/CDRH	US
3	Ammann	Max	J	Dublin Institute of Technology	IE
4	Anderson	Vitas		TVNZ Australia Pty Ltd.	AU
5	Aslan	Edward		L-3 Microwave NARDA.	US
6	Balzano	Quirino		Independent Consultant	US
7	Bassen	Howard		FDA/CDRH	US
8	Bavin	John		Consumers Energy	US
9	Bergeron	John	A.	Independent Consultant	US
10	Black	David	R	Suite 6, Gillies Clinic	NZ
11	Blick	Dennis	W.	AFRL/HEDR (Veridian)	US
12	Bodemann	Ralf		Siemens AG	DE
13	Brecher	Aviva		DOT/RSPA Volpe Ctr.	US
14	Bushberg	Jerrold	T.	Dir. Health Physics	US
15	Chadwick	Philip		MCL	UK
16	Chesnick	Scott		National Heart Lung Blood Institute	US
17	Chiang	Huai		Zhejiang Medical University	CN
18	Chiusano	Stephen		Lawrence Livermore Nat'l Lab.	US
19	Chou	C.K.		Motorola, Inc.	US
20	Cleveland	Robert	F.	FCC, Office of Eng. & Technology	US
21	Coghill	Roger	W.	Coghill Research Labs	UK
22	Cohen	Jules		Jules Cohen P.E.	US
23	Curtis	Robert	A.	OSHA - USDOL	US
24	Daly	James	M.	General Cable	US
25	D'Andrea	John	A.	Naval Health Research Ctr.	US

	LAST NAME	FIRST NAME	MI	AFFILIATION	COUNTRY
26	de jager	Linda		School of Health Technology	ZA
27	DeFrank	John	J.	USACHPPM	US
28	DeLorge	John	O.	Independent Consultant	US
29	Dini	David		Underwriters Laboratory	US
30	Dovan	Thanh		SPI PowerNet Pty. Ltd.	AU
31	Durrenberger	Gregor		ETH	CH
32	Erdreich	Linda	S.	Exponent	US
33	Fastman	Stewart	M.	American Insurers	US
34	Feero	William	E.		US
35	Foster	Kenneth	R.	Univ. of Pennsylvania	US
36	Gajsek	Peter		Institute of Public Health	SI
37	Gandhi	Prof. Om	P.	Univ. of Utah, Dept. of Elec. Eng.	US
38	Gardner	Robert	C.	MOD D S&F Pol	UK
39	George	David	L.	Unisys Corp.	US
40	Grandolfo	Martino		Laboratorio di Fisica	IT
41	Guy	Arthur	W.	Bioelectromagnetics Consulting	US
42	Hadlock	Dr. Dennis	E.	Geo Centers Inc.	US
43	Haes, Jr.	Donald	L.	Consultant	US
44	Halkiotis	Konstantinos		Greek Atomic Energy Commission	GR
45	Hare	Ed		American Radio Relay League	US
46	Hatfield	James	B	Hatfield & Dawson	US
47	Heirman	Donald	N.	Don HEIRMAN Consultants	US
48	Heroux	Paul		McGill University	CA
49	Heynick	Louis	N.	Independent Consultant	US
50	Israel	Michel		National Centre of Hygiene	BL
51	Ivans	Veronica		Medtronic Inc.	US
52	Jaffa	Kent	C.	Pacificorp	US
53	Johnston	Sheila		Independent Consultant	UK
54	Joyner	Ken	H.	Motorola Australia Pty Ltd.	AU
55	Justus	Ralph		Electronic Industries Assoc.	US
56	Kandel	Shaiela		SOREQ NRC	IL
57	King	James	J.	Department of the Navy	US
58	Klauenberg	B. Jon		USAF	US
59	Koban	George	A.	Naval Surface Warfare Center	US

	LAST NAME	FIRST NAME	MI	AFFILIATION	COUNTRY
60	Koepfnger	Joseph	L.	Consultant	US
61	Kuster	Niels		IT'IS	CH
62	LaMastra	Anthony		American Iron & Steel Inst.	US
63	Lang	Sakari		Nokia Research Ctr.	FI
64	Leonowich	John	A.	Battelle Pacific NW Nat. Lab	US
65	Lin	James	C.	University of Illinois	US
66	Maletskos	C.J.		National Council for Rad.	US
67	Mason	Patrick	A.	USAF/AFRL/HEDR	US
68	Maurer	Stewart		RF & ELF Consultant	US
69	McCourt	Robert	W.	PSE&G	US
70	McManus	Tom		Dept of Comm., Marine and Nat Res	IE
71	McNamee	James	P.	Health Canada	CA
72	Meltz	Martin	L.	Ctr. for Env. Rad. Tox.	US
73	Monahan	John	C.	FDA/CDRH	US
74	Montgomery	Noel	D.	Joint Nonlethal Weapons Directorate	US
75	Moore	Michael	R.	Oak Ridge National Lab	US
76	Mukhopadhyay	Amitabha		Con Edison	US
77	Murphy	Michael	R.	Radio Frequency Radiation Branch	US
78	Orr	John	L.	Toxicology Consultant	US
79	Osepchuk	John	M.	Full Spectrum Consulting	US
80	Pakhomov	Andrei	G.	McKesson Bio Services	US
81	Paul	William	F.	Int. Brotherhood of Elect. Workers	US
82	Persson	Bertil	R.	Lund University	SE
83	Petersen	Ronald	C.	R C Petersen Associates	US
84	Reilly	J. Patrick		Metatec Associates	US
85	Repacholi	Michael	H.	World Health Organization	CH
86	Roberts	Brad	J.	US Army CHPPM	US
87	Root	Ervin	D.	Alliant Energy	US
88	Rybak	Terence		General Motors Proving Grnd.	US
89	Samaras	Theodoros		Aristotle University of Thessaloniki	GR
90	Santomaa	Veli	A	Independent Consultant	FI
91	Scanlon	William	G.	Center for Comm. Eng	UK
92	Schwan	Herman	P.	Independent Consultant	US
93	Sheppard	Asher	R.	Asher Sheppard Consulting	US

	LAST NAME	FIRST NAME	MI	AFFILIATION	COUNTRY
94	Sirugo	Jon	H	Southern California Edison	US
95	Stolwijk	Jan A.	J.	Yale University	US
96	Swicord	Mays	L.	Motorola	US
97	Tang, MD	Rosa	M	NASA???	US
98	Tattersall	John		DSTL	UK
99	Tell	Richard	A.	Richard Tell Assoc. Inc.	US
100	Tenforde	Thomas	S.	Battelle Pacific NW Lab.	US
101	Thansandote	Art		Health Canada	CA
102	Utteridge	Tammy		Inst of Med. & Veterinary Science	AU
103	van Rongen	Eric		Health Council of the Netherlands	NL
104	Varanelli	Arthur	G.	Raytheon Company	US
105	Wagenaar	Femme-Michelle		PhoneVision International	NL
106	Watkins	Robert	T.	Mass Dept of Public Health	US
107	Williams, Jr.	Louis	A.	Louis A. Williams Jr. & Associates	US
108	Zipse	Donald	W.	Zipse Electrical Eng., Inc.	US
109	Ziskin, MD	Marvin	C.	Temple Univ. Medical School	US

**Table 2**  
**ICES Membership (August, 2003)**  
**SC1 (Techniques, Procedures, Instrumentation and Computation)**

	LAST NAME	FIRST NAME	MI	AFFILIATION	COUNTRY
1	Adair	Eleanor	R.	Independent Consultant	US
2	Anderson	Vitas		TVNZ Australia Pty Ltd.	AU
3	Aslan	Edward		L-3 Microwave NARDA.	US
4	Babij	Tadeusz	M.	Florida International University	US
5	Balzano	Quirino		Independent Consultant	US
6	Baron	David		AIHA Representative	US
7	Bassen	Howard		FDA/CDRH	US
8	Bergeron	John	A.	Independent Consultant	US
9	Bodemann	Ralf		Siemens AG	DE
10	Brecher	Aviva		DOT/RSPA Volpe Ctr.	US
11	Chan	Kwok	W	FCC Laboratory	US
12	Chou	C.K.		Motorola, Inc.	US
13	Cleveland	Robert	F.	FCC, Office of Eng. & Technology	US
14	Cohen	Jules		Jules Cohen P.E.	US
15	Cox	Diane		US Navy, NHRC	
16	Curtis	Robert	A.	OSHA - USDOL	US
17	Dovan	Thanh		SPI PowerNet Pty. Ltd.	AU
18	Fastman	Stewart	M.	American Insurers	US
19	Feero	William	E.		US
20	Frazier	William	F	Laurence Behr Associates, Inc.	US
21	Gandhi	Prof. Om	P.	Univ. of Utah, Dept. of Elec. Eng.	US
22	Guy	Arthur	W.	Bioelectromagnetics Consulting	US
23	Hammer	Wayne	C.	SPAWAR Systems Ctr. Charleston	US
24	Hare	Ed		American Radio Relay League	US
25	Hatfield	James	B	Hatfield & Dawson	US
26	Hubbard	Roy		Technology Services International	ZA
27	Hurt	William	D.	USAF	US
28	Iskra	Steve		Telstra Corp	
29	Ivans	Veronica		Medtronic Inc.	US
30	Johnston	Sheila		Independent Consultant	UK
31	Khalil	Kathy		SPAWARSYSCEN Charleston	US

	LAST NAME	FIRST NAME	MI	AFFILIATION	COUNTRY
32	Kim	Jin Suk		ETRI	KR
33	Kumbier	Werner		Narda Safety Test Solutions	DE
34	Kuster	Niels		IT'IS	CH
35	Leonowich	John	A.	Battelle Pacific NW Nat. Lab	US
36	Lotz	Gregory		NIOSH	US
37	Luebbers	Raymond		Remcom Inc.	US
38	MacLean	Kathy		APREL Laboratories-SSI	CA
39	Mantiply	Ed		FCC/OET	US
40	Maurer	Stewart		RF & ELF Consultant	US
41	Misakian	Martin		NIST	US
42	Moore	Michael	R.	Oak Ridge National Lab	US
43	Needy	Robert		Naval Surface Warfare Ctr.	US
44	Olsen	Richard	G.		US
45	Osepchuk	John	M.	Full Spectrum Consulting	US
46	Persson	Bertil	R.	Lund University	SE
47	Petersen	Ronald	C.	R C Petersen Associates	US
48	Roberts	Brad	J.	US Army CHPPM	US
49	Rogers	Walt		Veridian Eng/RFR Branch	US
50	Rowley	Jack		Telstra Research Labs	AU
51	Santomaa	Veli	A	Independent Consultant	FI
52	Schueller	Michael		Mannesmann Mobilfunk Gmbh	DE
53	Seabury	David		Chase Systems Inc.	US
54	Tell	Richard	A.	Richard Tell Assoc. Inc.	US
55	Thansandote	Art		Health Canada	CA
56	Umbdenstock	Donald	J.	Sensormatic Electronics Corp.	US
57	Varanelli	Arthur	G.	Raytheon Company	US
58	Watanabe	Soichi		CRL, Ministry of Telecom	JP
59	Watkins	Cleveland	F.		US
60	Williams, Jr.	Louis	A.	Louis A. Williams Jr. & Associates	US
61	Woods	Richard	W.	Sensormatic Electronics	US
62	Ziriaux	John		Microwave Department	US
63	Zollman	Peter		Vodafone Group R&D	UK



**Table 3**  
**ICES Membership (August, 2003)**  
**SC2 (Terminology, Units of Measurements and Hazard Communication)**

	LAST NAME	FIRST NAME	MI	AFFILIATION	COUNTRY
1.	Adair	Eleanor	R.	Independent Consultant	US
2.	Anderson	Vitas		TVNZ Australia Pty Ltd	AU
3.	Aslan	Edward		L-3 Microwave NARDA.	US
4.	Baron	David		AIHA Representative	US
5.	Bassen	Howard		FDA/CDRH	US
6.	Bellier	Pascale		Health Canada	CA
7.	Biby	Richard	P.	Crown Castle International	US
8.	Black	David	R	Suite 6, Gillies Clinic	NZ
9.	Bodemann	Ralf		Siemens AG	DE
10.	Boyer	Jim		Lawrence Livermore Nat. Labs	US
11.	Brecher	Aviva		DOT/RSPA Volpe Ctr.	US
12.	Bushberg	Jerrold	T.	Dir. Health Physics	US
13.	Charlow	Kevin	J	NISE	US
14.	Chou	C.K.		Motorola, Inc.	US
15.	Cleveland	Robert	F.	FCC, Office of Eng. & Technology	US
16.	Coghill	Roger	W.	Coghill Research Labs	UK
17.	Cohen	Jules		Jules Cohen P.E.	US
18.	Conover	David		NIOSH Contractor	US
19.	Curtis	Robert	A.	OSHA - USDOL	US
20.	D'Andrea	John	A.	Naval Health Research Ctr.	US
21.	DeFrank	John	J.	USACHPPM	US
22.	Erdreich	Linda	S.	Exponent	US
23.	Everist	Donald	G	Cohen, Dipell and Everist	US
24.	Fahy-Elwood	Alice		Consultant	US
25.	Gajda	Greg		Health Canada	CA
26.	Gettman	Ken		National Elect Manufacture Assoc.	US
27.	Guy	Arthur	W.	Bioelectromagnetics Consulting	US

	LAST NAME	FIRST NAME	MI	AFFILIATION	COUNTRY
28.	Haes, Jr.	Donald	L.	Consultant	US
29.	Hammer	Wayne	C.	SPAWAR Systems Ctr. Charleston	US
30.	Hare	Ed		American Radio Relay League	US
31.	Hatfield	James	B	Hatfield & Dawson	US
32.	Heynick	Louis	N.	Independent Consultant	US
33.	Hubbard	Roy		Tech Services International	ZA
34.	Ivans	Veronica		Medtronic Inc.	US
35.	Johnson	Robert	E.	L-3 Microwave NARDA	US
36.	Johnston	Sheila		Independent Consultant	UK
37.	Joyner	Ken	H.	Motorola Australia Pty Ltd.	AU
38.	Kantner	Kimberly		AT&T	US
39.	Khalil	Kathy		SPAWARSYSCEN Charleston	US
40.	Kierl	Bill		Motorola	US
41.	Klauenberg	B. Jon		USAF	US
42.	Koban	George	A.	Naval Surface Warfare Center	US
43.	Kumbier	Werner		Narda Safety Test Solutions	DE
44.	Kuster	Niels		IT'IS	CH
45.	Lathrop	Janet		Resource Strategies, Inc	US
46.	Leonowich	John	A.	Battelle Pacific NW Nat. Lab	US
47.	MacLean	Kathy	M	APREL Laboratories	CA
48.	Mantiply	Ed		FCC/OET	US
49.	Maurer	Stewart		RF & ELF Consultant	US
50.	Meltz	Martin	L.	Dept of Radiation Oncology	US
51.	Mercer	Christopher		Vodacom Pty Ltd	ZA
52.	Minnecci	Gerry		Lucent Technologies	US
53.	Murphy	Michael	R.	Radio Frequency Radiation Branch	US
54.	Nappert	Hughes		Industry Canada	CA
55.	Needy	Robert		Naval Surface Warfare Ctr.	US
56.	Norman	Larry		Pike Electric	
57.	Olsen	Richard	G.		US
58.	Osepchuk	John	M.	Full Spectrum Consulting	US
59.	Persson	Bertil	R.	Lund University	SE
60.	Petersen	Ronald	C.	R C Petersen Associates	US

	LAST NAME	FIRST NAME	MI	AFFILIATION	COUNTRY
61.	Proctor	Ken	R.	US Army	US
62.	Roberts	Brad	J.	US Army CHPPM	US
63.	Rogers	Walt		Veridian Eng/RFR Branch	US
64.	Rowley	Jack		Telstra Research Labs	AU
65.	Scanlon	William	G.	Center for Comm Eng	UK
66.	Seabury	David		Chase Systems Inc.	US
67.	Smith	Matthew		Dade Moeller & Associates	US
68.	Strickland	Richard		RF Safety Solutions	US
69.	Tell	Richard	A.	Richard Tell Assoc. Inc.	US
70.	Testagrossa	Paul	A	Lucent Technologies Inc.	US
71.	Thansandote	Art		Health Canada	CA
72.	Ulcek	Jerry		FCC	US
73.	Vanetta-Richard	Anne		Lucent Technologies Inc	US
74.	Varanelli	Arthur	G.	Raytheon Company	US
75.	Wagenaar	Femme-Michelle		PhoneVision International	NL
76.	Williams, Jr.	Louis	A.	Louis A. Williams Jr. & Assoc.	US
77.	Ziskin, MD	Marvin	C.	Temple Univ. Medical School	US

**Table 4**  
**ICES Membership (August, 2003)**  
**SC3 (Safety Levels with Respect to Human Exposure, 0-3 kHz)**

	LAST NAME	FIRST NAME	MI	AFFILIATION	COUNTRY
1.	Adair	Eleanor	R.	Independent Consultant	US
2.	Adlkofer	Franz		VerUm Foundation	DE
3.	Bailey	William	H.	Exponent Inc.	US
4.	Barker	J. Richard		General Cable	US
5.	Baron	David		AIHA Representative	US
6.	Bassen	Howard		FDA/CDRH	US
7.	Bavin	John		Consumers Energy	US
8.	Bellier	Pascale		Health Canada	CA
9.	Bergeron	John	A.	Independent Consultant	US
10.	Black	David	R	Suite 6, Gillies Clinic	NZ
11.	Bodemann	Ralf		Siemens AG	DE
12.	Boeggeman	Charles	J.	PECO Energy Co.	US
13.	Brecher	Aviva		DOT/RSPA Volpe Ctr.	US
14.	Carberry	Robert	E.	Northeast Utilities	US
15.	Chadwick	Philip		MCL	UK
16.	Chikamoto	Kazuhiko		Japan Nus Co. Ltd. (JANUS)	JP
17.	Coghill	Roger	W.	Coghill Research Labs	UK
18.	Curtis	Robert	A.	OSHA - USDOL	US
19.	Dale	Steiner	J.	ABB Power T&D Company	US
20.	Daly	James	M.	General Cable	US
21.	D'Andrea	John	A.	Naval Health Research Ctr.	US
22.	de jager	Linda		School of Health Technology	ZA
23.	DeFrank	John	J.	USACHPPM	US
24.	Dovan	Thanh		SPI PowerNet Pty. Ltd.	AU
25.	Feero	William	E.		US
26.	Fichtenberg	David	S	State of Washington, Med Asst Ad	US
27.	Gandhi	Prof. Om	P.	Univ. of Utah, Dept. of Elec. Eng.	US
28.	Gettman	Ken		National Electrical Man. Assoc.	US
29.	Gibney	Kelly	B	Retired	CA
30.	Goldberg	Georges		Advisory Comm. on Elect Comp	CH
31.	Goulet	Daniel		Hydro-Quebec	CA

	LAST NAME	FIRST NAME	MI	AFFILIATION	COUNTRY
32.	Haes, Jr.	Donald	L.	Consultant	US
33.	Hammer	Wayne	C.	SPAWAR Systems Ctr. Charleston	US
34.	Hernandez	Martin	A.	Florida Power & Light Co.	US
35.	Herz	Michael	C.	Pacific Gas & Electric Co.	US
36.	Heynick	Louis	N.	Independent Consultant	US
37.	Hicks	Danny	O.	South Carolina Electric & Gas Co.	US
38.	Hubbard	Roy		Technology Services Intl (TSI)	ZA
39.	Ivans	Veronica		Medtronic Inc.	US
40.	Jaffa	Kent	C.	Pacificorp	US
41.	Johnston	Sheila		Independent Consultant	UK
42.	Kautz	Richard	W.	Ford	US
43.	Koepfinger	Joseph	L.	Consultant	US
44.	Kuster	Niels		IT'IS	CH
45.	Lathrop	Janet		Resource Strategies, Inc	US
46.	Leonowich	John	A.	Battelle Pacific NW Nat. Lab	US
47.	Lotz	Gregory		NIOSH	US
48.	Mason	Patrick	A.	USAF/AFRL/HEDR	US
49.	McCourt	Robert	W.	PSE&G	US
50.	McManus	Tom		Dept of Comm, Marine and Nat Res	IE
51.	McNamee	James	P.	Health Canada	CA
52.	Merritt	James	H.	USAF Research Lab	US
53.	Murphy	Michael	R.	Radio Frequency Radiation Branch	US
54.	Needy	Robert		Naval Surface Warfare Ctr.	US
55.	Osepchuk	John	M.	Full Spectrum Consulting	US
56.	Paul	William	F.	Int. Brotherhood of Elect. Workers	US
57.	Petersen	Ronald	C.	R C Petersen Associates	US
58.	Pittman	Steve		Potlach Pulp and Paperboard	US
59.	Podhrasky	Robert	J.	Garrett Metal Detectors	US
60.	Polson	Peter		Ausa Research	US
61.	Proctor	Ken	R.	US Army	US
62.	Reilly	J. Patrick		Metatec Associates	US
63.	Roberts	Brad	J.	US Army CHPPM	US
64.	Rogers	Walter		AFRL (Veridian)	US
65.	Root	Ervin	D.	Alliant Energy	US
66.	Samaras	Theodoros		Aristotle University of Thessaloniki	GR

	<b>LAST NAME</b>	<b>FIRST NAME</b>	<b>MI</b>	<b>AFFILIATION</b>	<b>COUNTRY</b>
67.	Sawdon	Dave		IBM Global Services	UK
68.	Sheppard	Asher	R.	Asher Sheppard Consulting	US
69.	Sirugo	Jon	H	Southern California Edison	US
70.	Slesin	Louis		Microwave News	US
71.	Sliney	David		US Army CHPPM	US
72.	Swicord	Mays	L.	Motorola	US
73.	Tell	Richard	A.	Richard Tell Assoc. Inc.	US
74.	Thansandote	Art		Health Canada	CA
75.	van Rongen	Eric		Health Council of the Netherlands	NL
76.	Varanelli	Arthur	G.	Raytheon Company	US
77.	Wagenaar	Femme-Michelle		PhoneVision International	NL
78.	Watkins	Cleveland	F.		US
79.	Williams, Jr.	Louis	A.	Louis A. Williams Jr. & Associates	US
80.	Woods	Richard	W.	Sensormatic Electronics	US
81.	Yandek	Edward	M.	GE Lighting	US
82.	Zipse	Donald	W.	Zipse Electrical Eng., Inc.	US
83.	Ziskin	Marvin	C.	Temple Univ. Medical School	US

**Table 5**  
**ICES Membership (August, 2003)**  
**SC4 (Safety Levels with Respect to Human Exposure,**  
**3 kHz-300 GHz)**

	LAST NAME	FIRST NAME	MI	AFFILIATION	COUNTRY
1	Adair	Eleanor	R.	Independent Consultant	US
2	Allen	Stuart	G.	Nat'l Rad. Protection Board	UK
3	Altman	Melvyn	R.	FDA/CDRH	US
4	Ammann	Max	J	Dublin Institute of Technology	IE
5	Anderson	Vitas		TVNZ Australia Pty Ltd.	AU
6	Aslan	Edward		L-3 Microwave NARDA.	US
7	Babij	Tadeusz	M.	Florida International University	US
8	Bailey	William	H.	Exponent Inc.	US
9	Baron	David		AIHA Representative	US
10	Bassen	Howard		FDA/CDRH	US
11	Bellier	Pascale		Health Canada	CA
12	Bergeron	John	A.	Independent Consultant	US
13	Black	David	R	Suite 6, Gillies Clinic	NZ
14	Blick	Dennis	W.	AFRL/HEDR (Veridian)	US
15	Bodemann	Ralf		Siemens AG	DE
16	Brecher	Aviva		DOT/RSPA Volpe Ctr.	US
17	Bushberg	Jerrold	T.	Dir. Health Physics	US
18	Chadwick	Philip		MCL	UK
19	Chesnick	Scott		National Heart Lung Blood Inst.	US
20	Chiang	Huai		Zhejiang Medical University	CN
21	Chikamoto	Kazuhiko		Japan NUS Co, Ltd	JP
22	Chou	C.K.		Motorola, Inc.	US
23	Cleveland	Robert	F.	FCC, Office of Eng. & Technology	US
24	Cobb	Brenda		Air Force Res Labs	US
25	Coghill	Roger		Coghill Res Labs	UK
26	Cohen	Jules		Jules Cohen P.E.	US
27	Curtis	Robert	A.	OSHA - USDOL	US
28	Cyr	Howard	W	FDA/CDRH	US
29	D'Andrea	John	A.	Naval Health Research Ctr.	US
30	de jager	Linda		School of Health Technology	ZA

	LAST NAME	FIRST NAME	MI	AFFILIATION	COUNTRY
31	DeFrank	John	J.	USACHPPM	US
32	deLorge	John	O	Ind Consultant	US
33	Dini	David		Underwriters Laboratory	US
34	Dovan	Thanh		SPI PowerNet Pty. Ltd.	AU
35	Durrenberger	Gregor		ETH	CH
36	Elder	Joe	A	Motorola	US
37	Erdreich	Linda	S.	Exponent	US
38	Fahy-Elwood	Alice	K	Ind Consultant	US
39	Fastman	Stewart	M.	American Insurers	US
40	Fichtenberg	David	S	State of Wash Med Asst Ad	US
41	Foster	Kenneth	R.	Univ. of Pennsylvania	US
42	Futch	James		Florida Dept. of Health	US
43	Gajsek	Peter		Inst of Public Health	SI
44	Gandhi	Prof. Om	P.	Univ. of Utah, Dept. of Elec. Eng.	US
45	Gardner	Robert	C.	MOD D S&F Pol	UK
46	George	David	L.	Unisys Corp.	US
47	Gettman	Ken		National Elect Manufacture Assoc.	US
48	Goldberg	Georges		Advisory Comm. on EMC	CH
49	Haes, Jr.	Donald	L.	Consultant	US
50	Halkiotis	Konstantinos		Greek Atomic Energy Comm.	GR
51	Hammer	Wayne	C.	SPAWAR Systems Ctr.	US
52	Hatfield	James	B	Hatfield & Dawson	US
53	Healer	Janet			
54	Heirman	Donald	N.	Don HEIRMAN Consultants	US
55	Heroux	Paul		McGill University	CA
56	Heynick	Louis	N.	Independent Consultant	US
57	Hubbard	Roy		Tech Services International (TSI)	ZA
58	Hurt	William	D.	USAF	US
59	Ilieva	Michael	D		
60	Israel	Michel		National Centre of Hygiene	BL
61	Ivans	Veronica		Medtronic Inc.	US
62	Johnston	Sheila		Independent Consultant	UK
63	Joyner	Ken	H.	Motorola Australia Pty Ltd.	AU
64	Kandel	Shaiela		SOREQ NRC	IL
65	Kantner	Kimberly		AT&T	US



	LAST NAME	FIRST NAME	MI	AFFILIATION	COUNTRY
66	Kean	John		BTS IEEE	US
67	Klaenberg	B. Jon		USAF	US
68	Koepfinger	Joseph	L.	Consultant	US
69	Lang	Sakari		Nokia Research Ctr.	FI
70	Leonowich	John	A.	Battelle Pacific NW Nat. Lab	US
71	Lin	James	C.	University of Illinois	US
72	Lotz	Gregory		NIOSH	US
73	Maletskos	Costas	J	National Council for Rad.	US
74	Mantiply	Ed		FCC/OET	US
75	Mason	Patrick	A.	USAF/AFRL/HEDR	US
76	Maurer	Stewart		RF & ELF Consultant	US
77	McKenzie	Raymond	J	Telstra Research Laboratories	AU
78	McManus	Tom		Dept of Comm., Marine and Nat Res	IE
79	McNamee	James	P.	Health Canada	CA
80	Meltz	Martin	L.	Dept of Radiation Oncology	US
81	Montgomery	Noel	D.	Joint Nonlethal Weapons Dir.	US
82	Moore	Michael	R.	Oak Ridge National Lab	US
83	Morrissey	Joe		Motorola	US
84	Murphy	Michael	R.	Radio Frequency Radiation Branch	US
85	Needy	Robert		Naval Surface Warfare Ctr.	US
86	Osepchuk	John	M.	Full Spectrum Consulting	US
87	Pakhomov	Andrei	G.	McKesson Bio Services	US
88	Persson	Bertil	R.	Lund University	SE
89	Petersen	Ronald	C.	R C Petersen Associates	US
90	Polson	Peter		Ausa Research	US
91	Proctor	Kenneth	R	US Army HQ CECOM	US
92	Reilly	J. Patrick		Metatec Associates	US
93	Roberts	Brad	J.	US Army CHPPM	US
94	Rogers	Walter	R	Veridian Engineering	US
95	Ruscio	Bruce		Joint Programs Office, MMR	US
96	Rybak	Terence		General Motors Proving Grnd.	US
97	Samaras	Theodoros		Aristotle Univ. of Thessaloniki	GR
98	Santomaa	Veli	A	Independent Consultant	FI
99	Scanlon	William	G.	Center for Comm. Eng	UK
100	Schwan	Herman	P.	Independent Consultant	US

	<b>LAST NAME</b>	<b>FIRST NAME</b>	<b>MI</b>	<b>AFFILIATION</b>	<b>COUNTRY</b>
101	Sheppard	Asher	R.	Asher Sheppard Consulting	US
102	Sliney	David	H	US Army-CHPPM	US
103	Stolwijk	Jan A.	J.	Yale University	US
104	Swicord	Mays	L.	Motorola	US
105	Tattersall	John		DSTL	UK
106	Tell	Richard	A.	Richard Tell Assoc. Inc.	US
107	Tenforde	Thomas	S.	Battelle Pacific NW Lab.	US
108	Thansandote	Art		Health Canada	CA
109	Tofani	Santi		Servizio Di Fisica Sanitaria	IT
110	Utteridge	Tammy		Inst of Med & Veterinary Science	AU
111	van Rongen	Eric		Health Council of the Netherlands	NL
112	Varanelli	Arthur	G.	Raytheon Company	US
113	Wachtel	Howard		University of Colorado	US
114	Wagenaar	Femme-Michelle		PhoneVision International	NL
115	Weller	Robert	D.	Hammett & Edison, Inc.	US
116	Whitmore	Jamaal	A	US navy Bur Med & Surgery	US
117	Williams, Jr.	Louis	A.	Louis A. Williams Jr. & Assoc.	US
118	Woods	Richard	W.	Sensormatic Electronics	US
119	Zipse	Donald	W.	Zipse Electrical Eng., Inc.	US
120	Ziskin	Marvin	C.	Temple Univ. Medical School	US

**Table 6**  
**ICES Membership (August, 2003)**  
**SC5 (Safety Levels with Respect to Electro-Explosive Devices)**

	<b>FIRST NAME</b>	<b>LAST NAME</b>	<b>MI</b>	<b>AFFILIATION</b>	<b>COUNTRY</b>
1.	Adair	Eleanor	R.	Independent Consultant	US
2.	Babij	Tadeusz	M.	Florida International University	US
3.	Balzano	Quirino		Independent Consultant	US
4.	Bean	John		Naval Surface Warfare Center	US
5.	Colville	Frank		U.S. Army CHPPM	US
6.	DeFrank	John	J.	USACHPPM	US
7.	Hammer	Wayne	C.	SPAWAR Systems Ctr. Charleston	US
8.	Harmon	Ray		EG&G	US
9.	Hatfield	James	B	Hatfield & Dawson	US
10.	Joyner	Ken	H.	Motorola Australia Pty Ltd.	AU
11.	Koban	George	A.	Naval Surface Warfare Center	US
12.	Leidel	David		Halliburton Energy Services	US
13.	Petersen	Ronald	C.	R C Petersen Associates	US
14.	Roberts	Brad		CHPPM	US
15.	Stuart	James		Franklin Applied Physics	US
16.	Thompson	Ramie		Franklin Applied Physics	US